" Sheel, Sharir, Adhyayan "
Aundh Shikshan Mandal, Aundh

Raja Shripatrao Bhagawantrao Mahavidyalaya, Aundh. (Satara)

Experiential Learning
B.Sc. Part 2
Subject: Environmental Studies

2019-2020

RSBM AUNDH B.SC II NAMELIST 2019-20 SUB-ENVIRONMENTAL STUDIES

Sr. No.	Name of Student	Group	Batch	project	Assignment
1	Yadav Namrata Savata	PCB	A	Chemical fertilizers	Sound Pollution
2	Kadam Shivani Shankar	PCB	A		
3	Bandalkar Harshvardhan Sudhir	PCB	A	Pesticides	Air pollution
4	Chavan Shriram Anandrao	PCB	A		
5	Jadhav Nikhil Ankush	PCB	A		
6	Deshmukh Vaishnavi Manohar	PCB	A	Corona virus	Water pollution
7	Ingale Pooja Shantaram	PCB	A		
8	Jadhav Sujata Chandrakant	PCB	A		
9	Kumbhar Gauri Krushnat	PCB	A		
10	Yewale Shivani Dipak	PCB	A	Medicinal plants	Acid rain
11	Kadam Punam Ramesh	PCB	A		
12	Kadam Pooja Rajaram	PCB	A		
13	Ghutugade Gauri Dadaso	PCB	A		
14	Yewale Nikita Netaji	PCB	A	Energy consumption in RSBM Aundh	Rain water harvesting
15	Gharge Priyanka Mahadev	PCB	A		
16	Kumbhar Geeta Rajendra	PCB	A		
17	Ingale Komal Ramchandra	PCB	A		
18	Pawar Akshay Dilip	PCB	A	Poultry farming	Environmental Act
19	Pawar Rutuja Namdev	PCB	A	Corona virus	Marine pollution
20	Pawar Madhuri Jayvant	PCB	A		
21	Pawar Priyanka Tanaji	PCB	A		
22	Surywanshi Vrushali Arvind	PCB	A		
23	More Shreyas Laxman	PCB	A	Impact of population, health and environment	Soil pollution
24	Gurav Tushar Siddhanath	PCB	A		
25	Dharmadhikari Govind Mahesh	PCB	A		
26	Chavan Sharad Gangaram	CBZ	B		
27	Jadhav Chaitanya Jitendra	CBZ	B	Side effect of an atom bomb explosion: case study	Environmental Act
28	Suryawanshi Rutuja Ramdas	CBZ	B	Flood: 2 case study of Maharashtra	Importance of water conservation
29	Gaikwad Vaishnavi Shalivhan	CBZ	B		
30	Kulkarni Adesh Anil	CBZ	B	Medicinal plants	Disaster management

31	Kulkarni Sudesh Sunil	CBZ	B	Poultry farming	Air pollution
32	Gharge Pratiksha Bhausaheb	CBZ	B	Effect of soil errosion	Environmental Act
33	Jadhav Prateek Suresh	CBZ	B	Poultry farming	Industrial pollution
34	Mane Kajal Tanaji	CBZ	B	Loss of Animal biodiversity	Environmental Act
35	Ingale Shivam Ramesh	CBZ	B	Earthquake- 2 case studies	Greenhouse effect
36	Thorat Dhiraj Ramchandra	CBZ	B		
37	Bhise Sangram Madhukar	CBZ	B		
38	Kumbhar Sonali Gajanan	CBZ	B	Cyclone-2 case studies	Radioactivity
39	Nikam Komal Ashok	CBZ	B		
40	Dabade-Mane Maya Dhanaji	CBZ	B		
41	Pawar Priyanka Balkrishna	CBZ	B		
42	Gharge Sunny Manik	CBZ	B	Impact of urbanization on environmental health quality	Disaster management
43	Inamdar Shubham Shrikant	CBZ	B		
44	Lohar Gauri Umesh	CBZ	B	Global warming	Importance of water conservation
45	Sawant Sushma Ramesh	CBZ	B		
46	Yewale Shital Ananda	CBZ	B		
47	Bagal Priti Tanaji	CBZ	B		
48	Ghorpade Amruta Jaywant	CBZ	B	Land sliding 2 case studies	Ozone depletion
49	Gharge Ashish Hanmant	CBZ	B	Poultry farming	Ozone depletion
50	Ingale Asha Suresh	CBZ	B	Loss of biodiversity	Radioactivity
51	Shinde Shraddha Dayanand	CBZ	B		
52	Patole Sunil Hankamt	CBZ	B	Impact of population, health and environment	Solid waste management
53	Gaikwad Aditya Santosh	CBZ	B		
54	Sarnobat Swapnil Manohar	CBZ	B		
55	Ubale Rushikesh Mahadev	CBZ	B		
56	Jagdale Mayur Uttam	CBZ	C	Deforestation a big threat	Greenhouse effect
57	Zanje Prakash Dhanaji	CBZ	C		
58	Deshmukh Prathamesh Arvind	CBZ	C		
59	Galande Vaibhav Dattatray	CBZ	C		
60	Jadhav Ganesh Popat	CBZ	C	Climate change	Importance of water conservation
61	Dalavi Swapnil Vikas	CBZ	C		

62	Pawar Vidya Gorakh	CBZ	C	Loss of Animal biodiversity	e- waste management
63	Shinde Shivanjali Sanjay	CBZ	C	Renewable and non-renewable energy sources	Marine pollution
64	Phadatare Arti Dilip	CBZ	C		
65	Jadhav Dhanashri Dhanaji	CBZ	C	Loss of bird biodiversity	Disaster management
66	Jadhav Shivani Dnyandev	CBZ	C		
67	Ingale Vishal Dinkar	CBZ	C	Land sliding 2 case studies	Solid waste management
68	Jadhav Suraj S.	CBZ	C		
69	Bhosale Suraj Ramchandra	CBZ	C		
70	Pawar Aishwarya Pandurang	CBZ	C	Loss of Animal biodiversity	Soil pollution
71	Bagal Raju Shankar	CBZ	C	Poultry farming	ecosystem
72	Jagtap Pooja Vinod	CBZ	C	Plastic ban: necessity of human being	Importance of water conservation
73	Deshmukh Sanchita Chandrakant	CBZ	C		
74	Mulani Ajaruddin Kabir	CBZ	C	Poultry farming	Sound pollution
75	Deshmukh Revati Amrutrao	CBZ	C	Renewable and non-renewable energy sources	ecosystem
76	Ghadge Aparna Madhukar	CMS	D		
77	Gharge Abhishek Santosh	CMS	D	Effect of soil erosion	Water pollution
78	Shaikh Fiza Harun	CMS	D	Organic farming	Disaster management
79	Yadav Payal Vijay	CMS	D		
80	Bhokare Anjali Anil	CMS	D		
81	Magar Tukaram Akaram	CMS	D	Plastic ban: necessity of human being	Industrial waste
82	Jadhav Suraj Subhash	CMS	D		
83	Mane Poonam Netaji	CMS	D	Transmission of Ebola virus on animal and humans	Solid waste management
84	Vedpathak Sonali Himmat	CMS	D		
85	Nikam Nikita Pratap	CMS	D		
86	Jadhav Pratiksha Ashok	CMS	D		
87	Yadav Shubham Krishna	CMS	D	Organic farming	Disaster management
88	Gharge Ruturaj Shivaji	CMS	D		
89	Dabade Shubham Prakash	CMS	D		
90	Jadhav Rohit Jagannath	CMS	D		

R.M.K

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"Solid Waste Management"

A project submitted to

Shivaji University, Kolhapur

For the partial Fulfillment Bachelor of Science

In

Environmental Science

By

Prof. Kharatmol R.M.
Under the Guidance of

Raja Shripatrao Bhagwantrao Mahavidyalaya,
Aundh
Maharashtra, India.
(2019-2020)

"SHEEL SHARIR ADHYAYAN"

ANUNDH SHIKSHAN MANDAL'S AUNDH

RAJA SHRIPATRAO BHAGAWANTRAO MAHAVIDYALAY, AUNDH
Tal. Khatav, Dist. Satara

CERTIFICATE

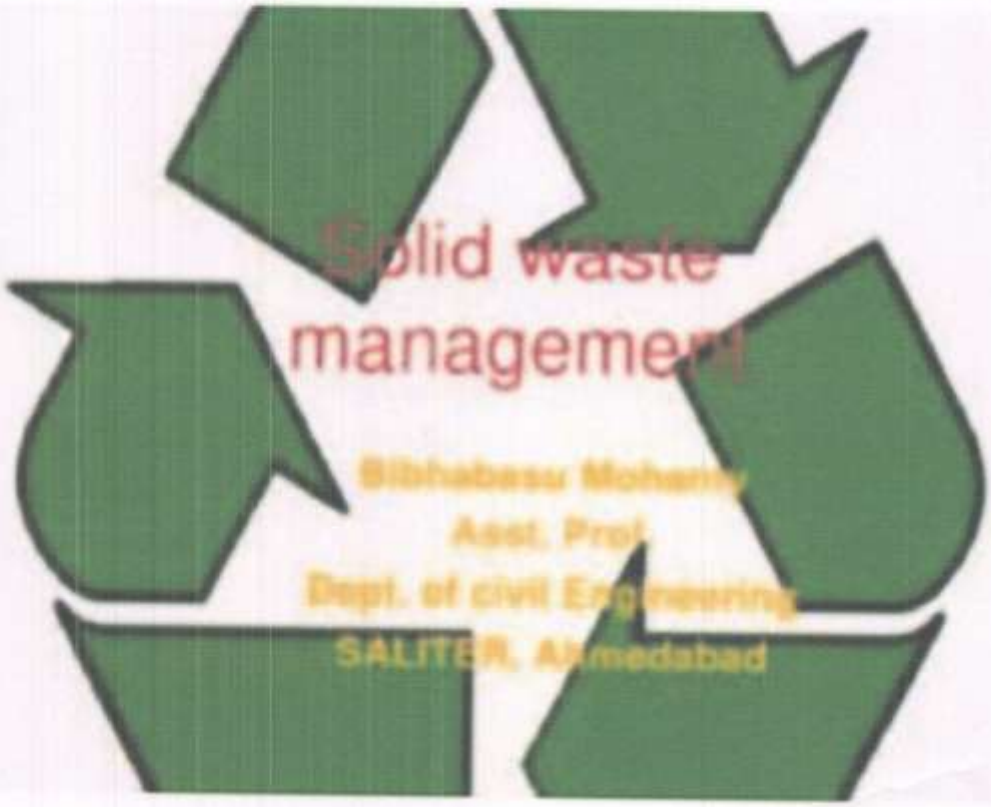
This is to certify that,

Miss. Nikam Nikita Pratap
Miss. Vedpathak Sonali Himmat
Miss. Mane Poonam Netaji
Miss. Jadhav Pratiksha Ashok

of class **B.Sc.II (2019-2020)** has satisfactorily carried out required project work entitled **"Solid Waste Management"** for **B.Sc.II Environmental Science** in the year **2019-2020**. The project is done under my guidance and supervision.

18/3/20.

Prof. Kharatmol R.M.
Project Guide



Solid waste management

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INTRODUCTION

Solid waste management is an essential service in any society before introducing the process however lets start with a discssion of the material being managed soid waste.

Solid waste refers to the range of garbage materials arising from animal and human activities that are discarted as unwanted and useless solid waste is gnerated from industrial, residential and commercial activities in a given area and may be handled in a variety of ways such as landfills are typically classified as sanitary muncipal construction and demoltition or industiral waste sites.

Solid waste management is a polite term for garbage management as long as liumans have been living in settled communities solid waste or garbage has been an issue and modern socities generate far more solid waste than early humans ever did.

Types and Soucres of Solid Waste:

Basically solid waste can be classified into different types depending on their sources.

Sources	Typical waste Generators	Types of Solid waste
Residential	Single and multi family dweings	Food waste, Paper, Cardboard, Plastics,Textile, Leather,yard waste,wood,Glass, Metals, Ashes, Special waste (i.e. bulky iems batteries, oil) and household hazardous waste.
Industrial	Light and heavy manufacturing fabrication, construction sites, power and chemical plants	Houseeeping wastes, packaging food waste,construction and demolition materials, ashes, hazards waste special wastes.
Commercial	Stores, Hotels, restorants, markets, office buildings etc.	Paper,cardboard, plastics, wood food waste,glass, metals, special waste, hazardous waste.
Industrial	Schools, hospitals, prisons, Goveronment centres	Paper,cardboard, plastics, wood food waste,glass, metals, special waste, hazardous waste.
Construction and Demolition	New construction, sites, road repair, renovation sites, demolition of building.	Wood, steel, concrete, dirt etc.

Solid Waste:

What is solid waste?

Garbage refuse sludge or other waste material of a solid nature.

What is solid waste management?

Solid waste management is the process of reducing reusing and recycling waste products. It requires a change in our habits but does not necessarily mean a return to a more difficult lifestyle.Good solid wastemanagement improves our standard of living imfact if we do not reduce waste the economic and social cost of waste disposal will continue to increase and communities large and small will fact increasingly harder decisions about managing there trash.

We need to start reusing

1) Paper
2) Glass bottles
3) Aluminium wrapping
4) Orange waste such as spoilt or unwanted portins of food items for example Banana skins
5) Plastics.

Solid Waste Disposal:

Garbage orising from human or animal activities that isabandoned as anwanted an useless is referred as soild waste. Generally it is ganerated from industrial residental and commercial activities in a given area and may be handled in a variety of ways. However wast can be categorized based on materials such as paper plastic, glass, metals and organic wasle. Solid waste disposal must be managed systematically to insure environmental best practices. Solid waste disposal is a critical aspect of environmental hygiene and it needs to be incorporated into invironmental planning.

Solid waste disposal includes planning. Administrative financial engineering and legal function. It is typically the job of the generator , subject to local national and even international authoorities.

Method of solid waste disposal and management-

1) **Solid waste open burning**

Solid waste open burning is not the perfect method in the present scenerio.

2) **Disposal by ploughing into the fields**

Disposal by ploughing into the fields are not commonly used. These desposals are not invironment friendly and generally.

3) **Salvaging procedure**

Material such as metal, paper, glass, rags certain types of plastic and so on can be salvaged recycled and reused.

4) **Fermentation/biological digestion**

Biodegradable waste are converted to compost and recycling can be done whenever possible hazardous waste can be disposed using suitable methods.

5) **Sea dumping process**

This sea dumping process can be carried out only in coastal cities. This is very costly procedure and not invironment friendly.

Effect of solid waste Pollution:

Muncipal solid waste heap up on the roads due to improper disposal system. People clean there own house and litter their immediate surroundings which the community including themsleves.

This type of dumping biodegrable materials to decompose under uncontrolled and unhygenic conditions. This produces foul smell and breeds various types of insects and infctious organism besides spoiling the aesthstics of the site. Industrial solid wastes are sources of toxic metals and hazards cause changes inphysiochemical and biological characteristic thereby affecting productivity of solids.

Toxic subtances may leach or percolate to centaminate the ground water.In refuse mixing the hazardous wastes are mixed with garbase and other combustible wastes. This makes segregation and disposal all the more difficult and risky.

Magnitude of Problem:

Per capita waste generation increasing by 13% per annum with urban population is incrasing between 3-3.5% annum annual increasing in waste generation is around 5% annually India produces 42.0 million tons of muncipal solid waste annually at present per capital generation of waste various from 200gm to 600gm capita/day. Average of waste in 0.1 milion plus towns coection efficiency is between 50% to 90% of solid waste generated Urban local bodies spend Rs 500/- to Rs 1000/- per ton on solid waste management of which 60-70% of the amount is on collection spent on transportation. No fund is waste crude dumping of this waste is practised in most of the cities.

Waste Management : Reasons for Failure

Lock of overness the health hazards related to health care waste inadequate training in proper waste management absence of waste management and disposal system insufficient financial and human resources and low priority given to the topic are the most common problems connected with health care waste. Many regulations or do not enforce them an essential issue is the clear attribution of responsibility of the handiling and disposai of waste. According to the polluter pays principle the responsibilities with the waste producer usually the health care provider or the establishment involved inrelated activities. To achieve the safe and sustainable management of health care waste financial analysis shoud include all the costs of disposal.

Reasons of Improper Management of Waste:

- Improper planning for waste management while planning the townships.
- Impractical institutional set up for waste management and planning in designing in urban local bodies.
- Lack of technical and trained manpower incomplete community involvement.
- Less experties and exposure to the city waste management using modern techniques and best practices.
- Partial awareness creation mechanism.
- Outdated management information systems.
- Less funds with ULBS.
- Indifferent attitudes of ULBS in user changes and sustanability.

Ideal approches to waste management:

1) Possibe waste management options.
   a) Waste Mninmisation
   b) Material Recycling
   c) Waste processing
   d) Waste Transformation
   e) Sanitary land fiing limited land avaability is a constraint in metro cities.
2) Processing/Treatment should be:
   a) Technically sound
   b) Financially viable
   c) Eco friendly / Environmental Friendly
   d) Robust oprate and maintain by local community
   e) Long term sutainabiility.

Health Impact:

Health care waste contains potentially harmful micro organism which can infect hospital patients health care workers and the general public, other patential infectious risks may include the spread of drug resisitant micro organisms from health care establishments into the environment.

Waste and by product cand also cause injuries for example

1) Radiation burns.
2) Sharps inflicted injuries.
3) Poisning and pollution through the release of pharamaceutical products in particular antibiotics and cyto toxic drugs.
4) Poisoning and pollution through waste water
5) Poisoning and pollution by toxic elements or compounds such as mercury or dioxins that are released during incineration.

Future Plans:

1) Increasing the number of workers (by this year)
2) Extend the space by purcasing the land next to the site (5 acres approval and granted)
3) Educate public to do a proper sorting
4) Buy a vibrating sieve and a small machine to mix the waste (approval and granted)
5) Establish the quality of compost.
6) Increase the productivity.

Conclusion:

1) Socities have made great strides in addressing are waste problems.
2) Modern methods of waste management are far safer for people and gentler on the environment.
3) Recycling and composting are growing rapidly.
4) Our prodigious consumption has created more waste than even before.
5) We still face challenges from hazardous and radioactive wastes and local oppsitism to disposal sites.
6) The best solution to our waste problems is to reduce generation of waste.

Flood 2 case study on maharashtra

A project submitted to

SHIVAJI UNIVERSITY, KOLHAPUR

For partial fulfillment Bachelor of Science

In

Environmental study

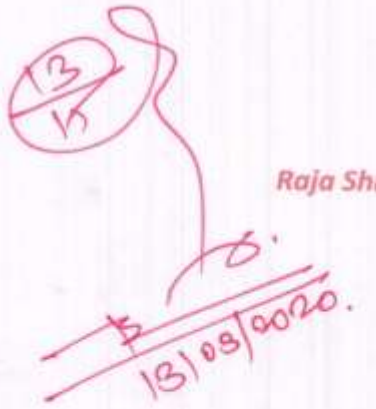
By

MISS. SURYAWANSHI RUTUJA RAMDAS

MISS. GAIKWAD VAISHNVI SHALIVAHN

Under the Guidence of

SHRI. R.M. KHARATMOL



Raja ShripatraoBhagwantraoMahavidyalaya,

Aundh.(satara)

(2019-2020)

Flood case study of Kolhapur

INDRUCTION

Historically floods are known to cause damage to property and life leaving a long term traumatic impact on those who get affected by them. The intensity and magnitude of floods is supposed to be increasing world over in the recent decades because of climate change and global warming phenomenon. The Western Ghats are globally important, not only being rich in biodiversity, but primarily because of the role, they play in influencing climatic regime and annual precipitation in Indian subcontinent. The climate change has caused uncertainty and wide fluctuations in precipitation pattern from extreme droughts to heavy rains and periodic cloud bursts. Thus, floods, which were locally almost unknown, are becoming a potential disaster in the earlier relatively safe and climatically stable areas such as Western Ghats. Kolhapur district being largely i.e. over 6570% of the total area, being situated in the Western Ghats region, receives high annual rainfall in its western hilly part. It was therefore felt necessary to study the region for vulnerability and risk analysis of annual floods in Kolhapur district to know their main causes and their consequences. Therefore, this chapter deals with the relevant topics such as rainfall variability in Kolhapur district, correlation and multiple regression analysis of rainfalls and water levels in flood prone Panchganga basin. It also includes readings on drinking water quality from Panchganga river basin, during pre and post flood period and people"s perception on the issue through social Impact assessment (SIA) studies. Panchganga flood line drawn by using Arc GIS Software 9.3 version. The secondary information collected on major rivers prone to floods in the area, flood prone areas, flood levels at different tahsils and the consequences and Impact of floods in Kolhapur city are also covered in the study.

RAINFALL VARIABILITY IN KOLHAPUR DISTRICT

The rainfall of the twelve tahsils of Kolhapur district, in the years 2001 to 2013, was collected from relevant agencies and analyzed for the mean, S.D., coefficient of rainfall variability, rainy month"s rainfall percentage, and month wise total rainfall variation and finallythe choropleth map were evaluated. The study revealed significant variation trends in the frequency and the magnitude of extreme rain events all over Kolhapur district. This type of detailed localized study is useful for the practical implementation for disaster planners and managers. (Data generated is applicable to the tahsil level but not geographical area). Table no 3.1 presents the mean annual rainfall value with standard deviation and coefficient of variability, during the years 2001 to 2013 for the twelve tahsils of Kolhapur district.

Sum	DF	SS	MSS=SS/DF	F Factor
YSS	11	22788154	2071650.32	18.21
PSS	11	3.09E+08	28110928.27	247.14
ESS	121	13763287	113746.17	
TSS	143	3.46E+08	2417983.58	

Two Way ANOVA table for Determining Significant Difference between Rainfalls

Where, DF= degree of freedom, SS= sum of squares, MSS= Mean sum of squares, YSS= Year sum of square, PSS= Place sum of square, ESS= Error sum of square, TSS=Total sum of square.

Two way ANOVA (Analysis of Variance) table (table no 3.2) calculated for checking average equality between rainfall of 12 different tahsils for 13 years, shows that the two calculated F values are greater than cut of point value (1.8686) i.e. cut of point < F. Hence from the two ways ANOVA test; there is significant difference in the average rainfall of 12 tahsils of Kolhapur district in last 13 different years. It was noticed that there were large variation in the rainfall of these tahsils in the period from rainfall in Gaganbawda (average 5812.4 mm) to Shirol (average 535.4 mm). Kolhapur district annual average rainfall also varied from 16850.4 (2003) to 33102.9 (2005). Hence it was realized that the occurrence and intensity of flash floods, dependent upon the rainfall in a particular tahsils, is varied in different tahsils of Kolhapur tahsil.

ROLE OF CLIMATE CHANGE

Climate change has played an important role in causing large-scale floods across central India, especially the Mumbai floods of 2005.During 1901-2015, there has been a three-fold rise in widespread extreme rainfall entire of India natural be events, over from Mumbai to Bhubaneshwar, leading to a steady rise in the number of flash floods3the rising number of extreme rain events are attributed to an increase in the fluctuations of the monsoon westerly winds, due to increased warming in the Arabian Sea. This results in occasional surges of moisture transport from the Arabian Sea to the subcontinent, resulting in widespread heavy rains lasting for 2-3 days. The Mumbai 2005floods also occurred due to moisture surge from the Arabian Sea, and the heavy rains were not confined to Mumbai but spread over large region across central India3!.

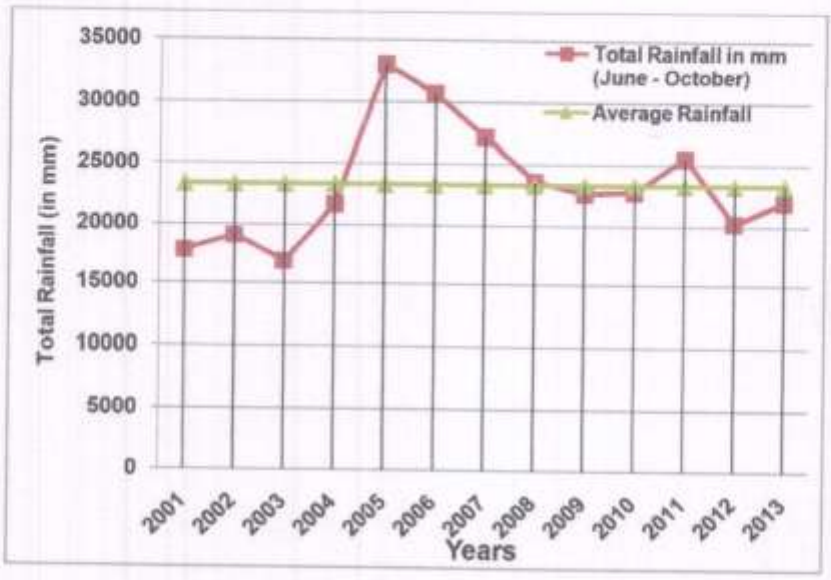
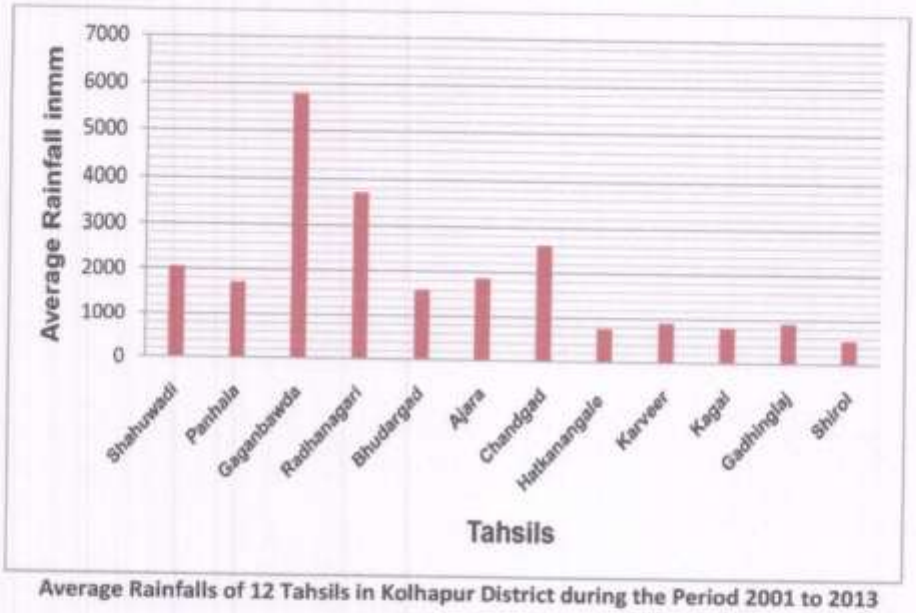


Figure No. 3.1. Rainfall Trend in 13 years (2001-2013) in Kolhapur district

The figure no. 3.1 shows the annual rainfall during the period between years 2001 to 2013 where the total average rainfall of the district for this period is 23323.4 mm. From the figure it is apparent that in the years 2001, 2002, 2003 and 2012 rainfall received as compare to other years in the period, was less than or near to 20000 mm and below average, as the years 2005, 2006, 2007 and 2011 received little higher, i.e. more than 25000 mm rainfall more than average. In other years of the period i.e 2004, 2008, 2009 and 2010 comparatively moderate rainfall (nearly equal to the average) was received. During years 2001 to 2003 rainfalls showed below average i.e. 23323.4 mmthat is total rainfall of Kolhapur district was in between minimum (16850.4 mm) to maximum (33102.9 mm).

However, after year 2003, which received lowest rainfall (16850.4 mm), water scarcity was observed as compare to the other years. After this year there was sudden increasing trend in the rainfall pattern in 2004 and in the year 2005 received abnormal and highest rainfall in the previous thirteen years resulting in to one of the disastrous floods experienced by Kolhapur district in years. Then rainfall showed gradual decreasing trend in the following years 2006, 2007 and 2008. The years 2009 and 2010 received nearly same amount of rainfall. There was slight



Average Rainfalls of 12 Tahsils in Kolhapur District during the Period 2001 to 2013

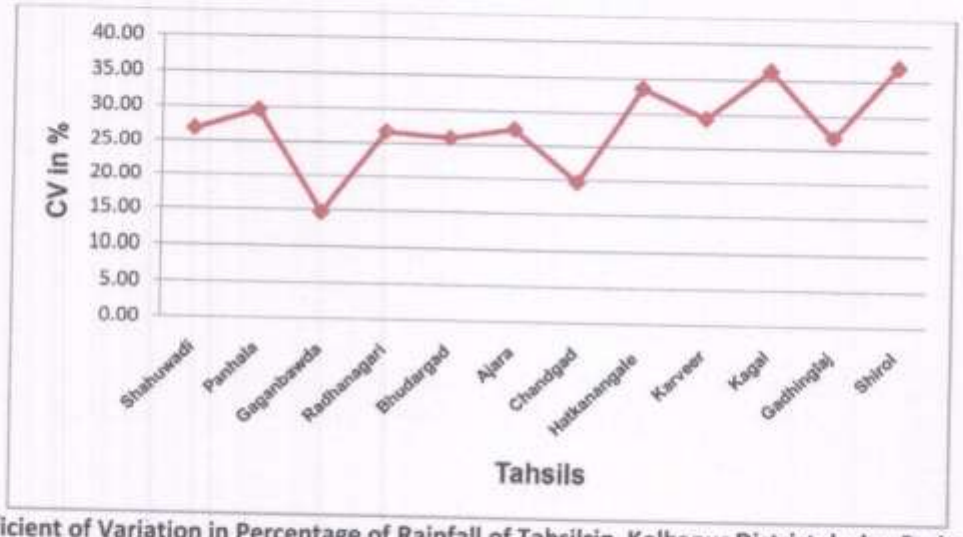
increase in the rainfall in the year 2011 to drop again in the year 2012,when again water scarcity was experienced in the district. There was slight improvement in rainfall in the year 2013 during the study period.

It was observed that whenever there was more amount of rainfall it was directly proportional to the intensity of floods observed in the study area. For example in high rainfall years i.e. 2005 (33102.9 mm), 2006 (30689.7 mm) and 2007 (27195.3 mm) respectively, there were high flood levels observed in Panchganga river at RajaramBandhara (K.T. weir) at KasbaBawda in Kolhapur city. They were 545.11 meters, 544.16 meters and 543.11 meters, above MSL respectively where normal flood line is 541.77 meters.

During the period (2001-2013) mean annual rainfall for Kolhapur district was 23323.45 mm. In the thirteen years Gaganbawdatahsil received highest annual rainfall with more SD. It is revealed that high precipitation takes place in the western and NW direction tahsils of the Kolhapur district, located along the

WesternGhats namely Gaganbawda (5812.4 mm), Radhanagari (3719.6 mm), Chandgad (2610.4 mm) and Shahuwadi (2057.7 mm) tahsils with more standard deviation. Also high rainfall is received in the other tahsils namely Ajara (1866.5 mm), Panhala (1720.9 mm) and Bhudargad (1593.3 mm) as most of the area of the tahsils located partially in the Western Ghats. Most of the rivers in the districtoriginate in this hilly area and support a large number of the dams that are constructed in the Western Ghats part of the district, are filled at their full capacity every year. Rainfall decreases rapidly in the eastern part of Kolhapur district towards tahsils

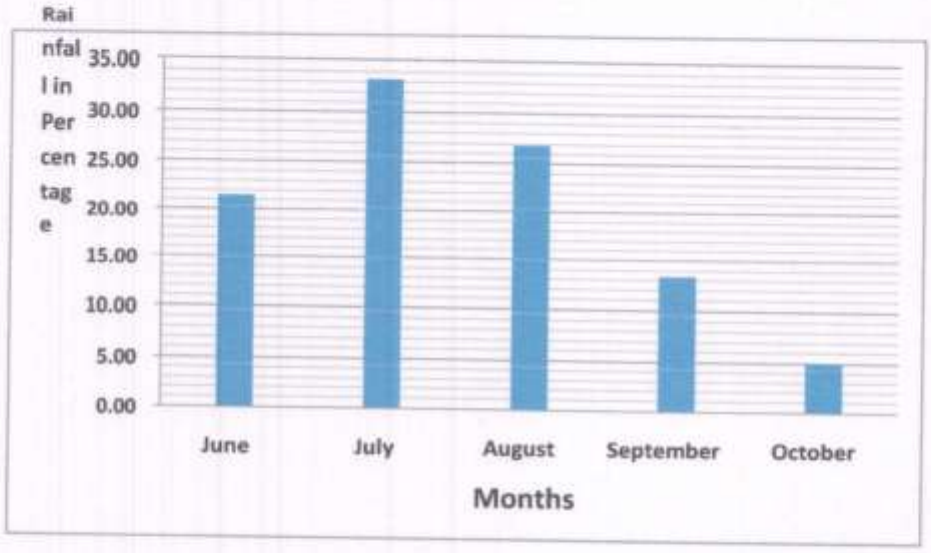
namely Gadhinglaj(914.0 mm), Karveer (908.8 mm) tahsil, Kagal (813.6 mm), Hatkanangale (770.9 mm) and Shirol (535.4 mm) with medium standard deviation with the lowest rainfall received by Shiroltahsil every year



Coefficient of Variation in Percentage of Rainfall of Tahsilsin Kolhapur District during Period 2001 to 2013

Coefficient of variation in percentage (CV%) is calculated to compare variability in rainfall of the 12 tahsils in last 13 years. As compared to the eastern tahsils less CV % was observed in the western tahsils, means there is large variation in the rainfall in eastern part than western part of Kolhapur district (figure no. 3.3). However, according to past experience flood intensity is more in downstream then upstream of the river as the surface gradient in the western part of the tahsils is more hence the water goes quickly to eastern part and backwater from river Krishna increases beyond confluence so the flood intensity in the Karveer, Hatkanangaleand Shiroltahsil is more.

As Coefficient of variation in percentage, (CV %) is more in the tahsils in eastern part of the district. People in these tahsils are not prepared for the flood



calamity, because for some years the tahsils experience rainfall lesser than the district average. The floods observed in these tahsils are due to their location being downstream of the rivers like Panchganga, originating in the Western Ghats region that receives maximum rainfall every year. This excess rainfall in upstream catchment of the rivers flowing in the tahsils gets further aggravated by the backwaters reaching the tahsils due to Krishna river floods makes it worse.

FLOODS IN KOLHAPUR DISTRICT

River Panchganga is formed by five tributaries in the mid section of the district and is the major flood prone river along with others in the south of the district namely Dhudhganga, Hiranyakeshi, Vedganga, and Tamraparni. These flood plains are restricted only to lower reach in the east of the district till they meet river Krishna flood plain.

There are several irrigation and multipurpose projects in the district which include 3 major dam projects, 12 medium project and 10 minor projects. It is seen that majority of these dams are situated in the maximum rainfall area i.e. western parts of the district. This will be helpful to reduce the impact of flood during maximum rainfall period and also it maintains river flows in the summer season and reduces the severity of water.

However, in the event of unforeseen situation, as a result of climate change, the excess water from these tanks also needs to be considered as potential threat for flooding. It can be seen that the large percentage of flood affected villages in Kolhapur district are from Chandgadtahsil followed by Karveer and Shiroltahsils. Where as excessive rainfall in the river basins is the main cause to flood prone villages in Kolhapur district except in Shirol and Hatkanangaletahsil, where main cause of floods is due to the back water pressure of Panchgangariver caused by excesses swelling of Krishna river flood during the same time.

Details of the Rivers, Tahsils, Dams and Flood Prone Villages in Kolhapur District

River	Tahsil	Dams with Capacity (M.C.FT.)	Total villages	flood prone villages	% total number of flood prone to total flood prone villages	% total number of flood prone villages in the tahsil	% to total numbe r of village s in the district
Panchganga, Krishna	Shirol	-	52	23	12.23	44.23	1.92
Panchganga, Warna	Hatkanangale	-	60	14	7.45	23.33	1.17
Tulsi, Panchganga,	Karveer	-	128	33	17.55	25.78	2.75
Kasari, Panchganga, Warna,	Panhal a	Padsali (6.90)	129	25	13.30	19.38	2.09

Kadavi, Kasari	Shahuwadi	Warna (974.19), Kadavi (71.24), Kasari (77.96), Manoli (5.20), Nandari (3.21), Kumbhawade (5.61), Kesarkarwadi (5.68), Manpaleshwar (9.11)	142	6	3.19	4.22	0.50
Dhudhganga, Vedganga,	Kagal	Hanbarwadi (2.67)	84	16	8.51	19.04	1.34
Bhogawati, Dhudhganga	Radhanagari	Dudhganga (719.12), Radhnagari (236.79), Tulasi (56.16), Dhamni (109.10)	121	12	6.38	9.92	1.00
Dhamani, Kumbhi,	Gaganbawda	Kumbhi (76.88)	39	05	2.66	12.82	0.42
Vedganga, Chikotra	Bhudargad	Patgaon (105.24), Chikotra (43.11), Megholi (2.79)	108	2	1.06	1.85	0.17
Chitri, Hiryankeshi	Gadhinglaj	Yenechawandi (1.54)	95	9	4.79	9.47	0.75
Chitri, Hiryankeshi	Ajara	Ambeolol (35.11), Sarfnala (18.98), Chitri (53.41)	95	4	2.12	4.21	0.33
Ghatprabha, Tamraparni	Chandgad	Jambre (23.23), Jangamhatti (34.21), Nittur (4.38)	145	39	20.74	26.90	3.26
Total	**12**		**1198**	**188**			**15.69**

In all 70 villages in the district come under flood threat, potentially caused by major dams in the district, out of which majority 42 villages come under red belt (Restricted zone / Abnormal flood line) area and only two villages come under category of the Blue zone (Prohibition Zone /Normal Flood Line). Also 26 villages from the study area come under Yellow belt (Caution Zone/Danger area) (Multi Hazard Management Plan of Kolhapur district, 2005). See list of the villages in different zones in Annexure -V

CASE STUDY OF RIVERPANCHGANGA FLOODS

The Panchganga basin lies between $16^0$19"04" to $16^0$55"19" North latitudes and $73^0$44"08" to $74^0$42"18" East longitude in the northern part of the district is formed by the confluence of five rivers with their catchments namely Dhamani (188.42 km²), Kumbhi (227.09 km²), Tulasi (160.57 km²), Bhogawati

(401.44 km²) and Kasari (354.86 km²). Thus called it is called 'Panchganga" i.e. five rivers and it as a catchment of 767.25 km after it is formed till it meet river Krishna. Panchganga river system (PRS) thus is the main river system in the district with a total length of 338 km length and a total catchment area of 2099.63 km² sq km (MPCB and Collector office, Kolhapur (2009). Panchganga River receives average rainfall of 2501.9 mm according to the year 2005 (Pawar and Raskar, 2011). Figure no. 3.7 gives organogram of the Panchganga river basin

In Panchganga river system (PRS) basin has 5 major dams in its upper catchment, namely Radhanagari (8.36 TMC) with 10400 cusec total dischargecapacity, Tulsi (3.47 TMC) with 640 cusec total discharge capacity, Kasari (2.77 TMC) with 22266 cusec total discharge capacity, and Kumbhi (2.71 TMC with 15046 cusec total discharge capacity (Sangli Irrigation Board, 2010). however, It has been seen that the flood intensity in Panchganga river is largely depended upon the discharge from Radhanagari dam due to its large capacity and position in PRS system, where more rainfall in the district is reported every year.

FLOOD CASE STUDY OF MUMBAI

INTRODUCTION

Maharashtra floods of 2005 -: This article includes a list of references, but its sources remain unclear because it The 2005 Maharashtra floods refers to the flooding of many parts of the Indian state of Maharashtra including large areas of the metropolis Mumbai, a city located on the coast of the Arabian Sea, on the Western coast of India, in which approximately 1,094people died. It occurred just one month after the June 2005 Gujarat floods. The term 26July, is now always used to refer to the day when the city of Mumbai came to a standstill due to flooding.

Maharashtra floods of 2005

Date 26-27 July 2005

Location

Maharashtra inclusive of Mumbai

Deaths 1094

Many people were stranded on the roads, lost their homes while many walked long distances back home from work that evening. The floods were caused by the eighth heaviest-ever recorded 24-hour rainfall figure of 944 mm (37.17 inches) which lashed the metropolis on 26 July 2005, and intermittently continued for the next day. 644mm (25.35inches) was received within the 12-hourperiod between 8 am and 8 pm. Torrential rainfall continued for the next week. The highest 24-hour period in India was 1,168 mm(46.0 inches) in Aminidivi in the Union Territory of Lakshadweep on 6 May 2004although some reports suggest that it was anew Indian record. The previous record high rainfall in a 24-hour period for Mumbai was575 mm (22.6 inches) in 1974.

OVERVIEW

Timeline --On 26 July 2005, around 2:00 pm, the Mumbai Metropolitan Region was struck by a severe storm and subsequent deluge. The Indian Meteorological Department (IMD) station Santacruz recorded 944.22 mm Local train movement came to a halt by2:30 p.m. due to the water-logging on the tracks. This caused traffic on roads to increase dramatically with water logging and submerging of certain low-lying pockets of the region, such as Dharavi and Bandra-KurlaComplex.Thousands of school children were stranded due to flooding and could not reach home for up to 24 hours. The following two days were declared as school and college holidays

by the state government.

Areas in Mumbai badly affected by the flooding

Threat to public health- -:

The rain water caused the sewage system to overflow and all water lines were contaminated. The Government ordered all housing societies to add chlorine to their water tanks.

IN ACADEMIC RESEARCH

The floods have been the subject of research by scientists and social scientists attempting to understand the causes, impacts, and short/long term consequences. Scholars have studied the floods in Mumbai from the perspectives of climate change, disaster management / mitigation, urban health, vulnerability and adaptation, hydrology, environmental degradation and encroachment. Kapil Gupta (2007) assesses urban flood resilience, while Andheri (2006) contrasts the "widespread acts of generosity and altruism" in Mumbai with the general social disorder that was seen in the aftermath of Hurricane Katrina in New Orleans.

AromarRevi (2005) draws lessons from the floods for prioritising multi-hazard risk mitigation. Parthasarathy (2009) links social and environmental insecurities to show that the most marginalised groups were also the most affected by the floods.

FINANCIAL EFFECT

The financial cost of floods was unprecedented and these floods caused a stoppage of entire commercial, trading, and industrial activity for days. Preliminary indications indicate that the floods caused a direct loss of about 5.50 billion (€80 million or US$100 million). The financial impact of the floods were manifested in a variety of ways:

• The banking transactions across the counters were adversely affected and many branches and commercial establishments were unable to function from late evening of 26 July 2005. The state government declared 27 and 28 July as public holidays. ATMATM networks of several banks, which included the State Bank of India, the nation's largest national bank; ICICI Bank, HDFC Bank, and several foreign banks like Citibank and HSBC, stopped functioning from the afternoon of 26 July 2005 at all the centres of Mumbai. ATM transactions could not be carried out in several parts of Could not De camed out in severai parts of India on 26 July or 27 July due to failure of the connectivity with their central systems located in Mumbai.

• The Bombay Stock Exchange and the National Stock Exchange of India, the premier stock exchanges of India could function only partially. Electronic trading platforms of the brokerage houses across the country remained largely inoperative. Impartial trading, the Sensex, India's most tracked equity index closed at an all-time high of 7605.03 on 27 July 2005.TheExchanges,however, remained closed for the following

EFFECT ON MUMBAI'S LINKS TO THE REST OF THE WORLD

• For the first time ever, Mumbai's airports (ChatrapatiShivaji Maharaja International Airport and Juhu Aerodrome) were shut for more than 30 hours due to heavy flooding of the runways, submerged Instrument Landing System equipment and extremely poor visibility. Over 700 flights were cancelled or delayed. The airports reopened on the morning of 28 July 2005.12 Within 24hours of the airports becoming operational, there were 185 departures and 184 arrivals, including international flights. Again from early morning of 31 July, with increase in water logging of the runways and different parts o Mumbai, most of the flights were indefinitely cancelled.

• Rail links were disrupted, and reports oblate evening of 30 July indicated cancellation of several long distance train still 6 August 2005.

• The Mumbai-Pune Expressway which

• The Mumbai-Pune Expressway, which witnessed a number of landslides, was closed the first time ever in its history, for 24 hours.

• According to the Hindustan Times, an unprecedented 5 million mobile and

2.3 million MTNL landline users were hit for over four hours.

• According to the .in registrar (personal communication), the .in DNS servers in

Mumbai had to be reconfigured because the servers were not operational.

Transport stats-

• 52 local trains damaged

• 37,000 autorickshaws spoiled

4,000 taxis damaged

• 900 BEST buses damaged

FACTORS AGGRAVATING THE DISASTER IN MUMBAI

Antiquated drainage system –:

The present storm-water drainage system in Mumbai was put in place in the early 20thcentury and is capable of carrying only25.1237 millimetres of water per hour which was extremely inadequate on a day when993 mm of rain fell in the city. The drainage system was also clogged at several places.

Only 3 'outfalls' (ways out to the sea) are equipped with floodgates whereas the remaining 102 open directly into the sea for more than 24 hours. As a result, there is no way to stop the seawater from rushing into the drainage system during high tide. In 1990, an ambitious plan was drawn to overhaul the city's storm water drainage system which had never been reviewed in over 50 years. A project costing approximately6 billion rupees was proposed by UK based consultants hired by the Brihanmumbai Municipal Corporation to study the matter.

Implementation of the project would have ensured that rainwater did not flooding the streets of Mumbai. The project was planned to have completed by 2002 and aimed to enhance the drainage system through larger diameter storm water drains and pipes, using pumps wherever necessary and removing encroachments. The project, if implemented would have doubled the storm water carrying capacity to 50 mm per hour. The BMC committee had rejected the proposed project on the grounds that it was "too costly". These were few of the drawbacks due to which the city suffered so gravely.

Uncontrolled, unplanned development in Northern Suburbs – :

Development in certain parts of Mumbai is haphazard and buildings are constructed without proper planning. The drainage plans in northern suburbs is chalked out as and when required in a particular area and not from an overall point of view. Development in certain parts of Mumbai is haphazard and buildings are constructed without proper planning. The drainage plans in northern suburbs is chalked out as and when required in a particular area and not from an overall point of view.

The Environment Ministry of the Government of India was informed in the early 1990s that sanctioning the Bandra-Kurla complex (commercial complex in northern Mumbai)was leading to disaster. No environment clearance is mandatory for large urban construction projects in northern Mumbai. Officials in the environment ministry claimed that it was not practical to impose new guidelines with retrospective effect "as there're millions of buildings".

Destruction of mangrove ecosystems –

Powailake ,Mumbai on the verge of overflowing

Mangrove ecosystems which exist along the Mithi River and Mahim Creek are being destroyed and replaced with construction. Hundreds of acres of swamps in Mahim creek have been reclaimed and put to use for construction by builders. These ecosystems serve as a buffer between land and sea. It is estimated that Mumbai has lost about 40% of its mangroves between 1995 and 2005, some to builders and some to encroachment(slums). Sewage and garbage dumps have also destroyed mangroves. The Bandra-Kurlacomplex in particular was created by replacing such swamps. The most acclaimed Mind space CBD (INORBIT MALL) in Goregaon&Malad has been built by destroying a large patch of mangroves in Maharashtra.

In popular culture --

1) The disaster was featured in a National Geographic Documentary.

2) Tum Mile - A 2009 Indian Hindi drama film, set against the backdrop of the disaster.

Aundh Shikshan Mandal , Aundh

RAJA SHRIPATRAO BHAGWANTRAO MAHAVIDYALAYA AUNDH

Arts & Science

NAAC'B',NIRF MHRD Rank band 151-200)(Established on 19th September 1994 – recognized by UGC U/s2(f)and 12 (B))

RENEWABLE AND NON-RENEWABLE ENERGY SOURCES

A Project Submitted to

SHIVAJI UNIVERSITY KOLHAPUR

For partial fulfillment in bachelor of science

In

ENVIRONMENT SCIENCE

By

Miss. Phadatare Arti

Miss.Shinde Shivanjali

Under the guidance of

Shri. Kharatmol R.M.

Raja Shripatrao Bhagwantrao Mahavidyalaya

Aundh(Satara)

(2019-2020)

RENEWABLE AND NON- RENEWABLE ENERGY SOURCES

INTRODUCTION

Renewable Energy:

Energy generated from natural resources -

e.g.

•Sunlight

•Wind

• Rain

•Tides

•Geothermal heat

ALSO □Sunshine, wind and water power are considered almost limitless resources while fossil fuels are limited in their supply, and their price will increase as they become scarcer .

Coal has negative impact on environment.

Mining can damage ground and surface waters .

Coal burns as the fuel it releases CO2 which is one of the main greenhouse gas that causes global warming.

INDEX

POTENTIAL OF RENEWABLE ENERGY IN INDIA

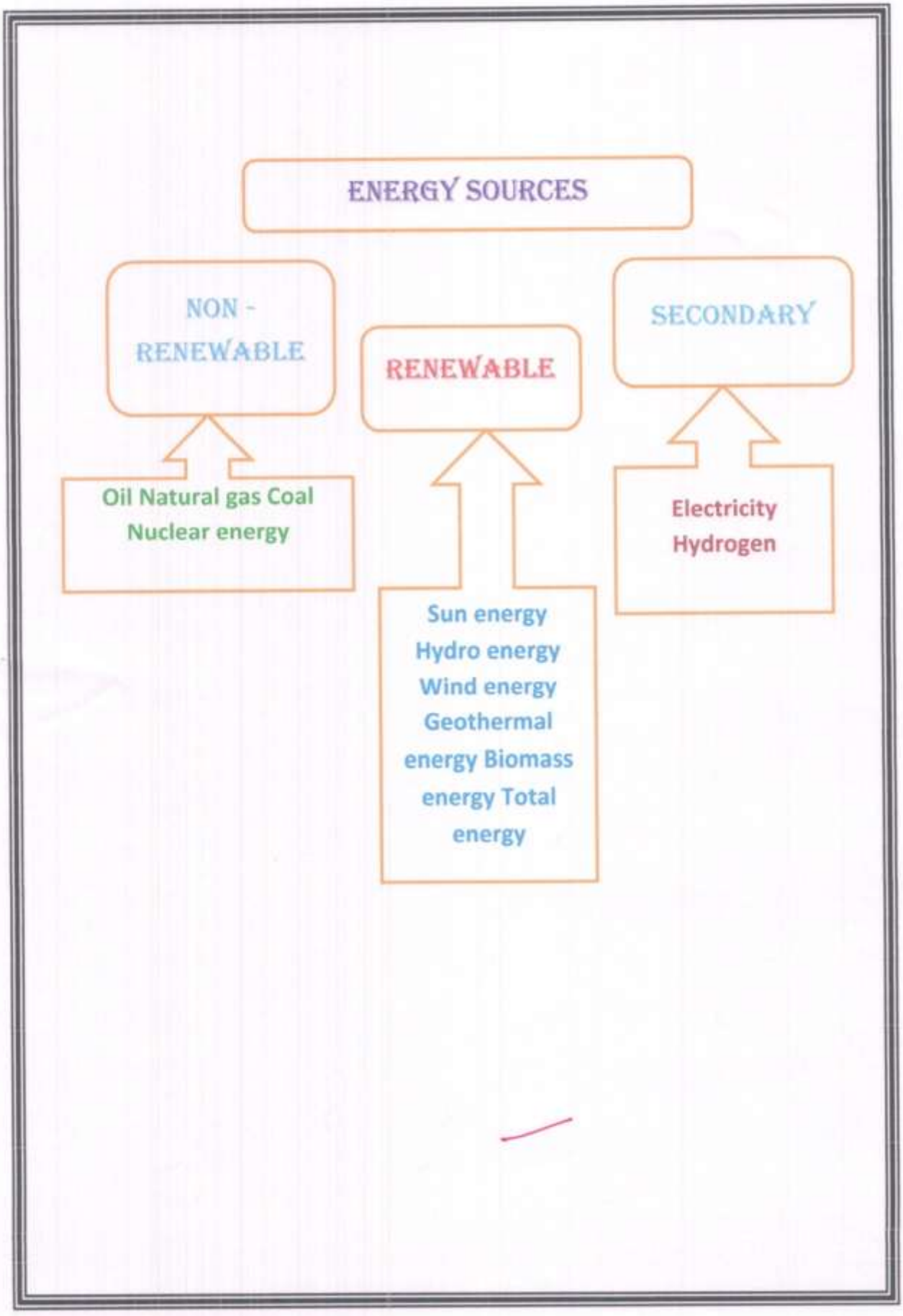
- India is well situated for exploring renewable energy resources. Being a tropical country, it receives solar insolation of the order of 1650-2100 kw/m2/year for nearly 250-300 days.
- Daily solar energy incidence varies between 5-7 kwh/m2 in different parts of country.
- The total solar energy received by India is 19 trillion kwh per day which is about 2.2 million tons of coal to 1.5 million tons of oil equivalent.
- There is average wind density of 35 kwh/ m2/ day at number of places at India.
- India has an over 6000 km long coastline and so tremendous prospects of harnessing energy from ocean tool.

APPLICATIONS OF SOLAR ENERGY

- Solar energy is the energy derived from the sun through the form of solar radiation.
- Solar cooking
- Day lighting
- Solar hot water systems
- Space heating and cooling
- Solar desalination
- High temperature process heat for industrial purposes.
- Solar technologies are broadly characterized as either passive solar or active solar depending on the way they capture, convert and distribute solar energy.
- Active solar techniques include the use of photovoltaic panels and solar thermal collectors to harness the energy.
- Passive solar techniques include orienting a building to the Sun, selecting materials with favorable thermal mass or light dispersing properties, and designing spaces that naturally circulate air.

ENERGY RESOURCES

Today the greatest attention in the world is devoted to energy resources because their use is usually irreversible, but the supplies of traditional fossil fuels (oil, natural gas) are running out fast. This is why over the last decades attention is focused on renewable energy resources and ways to increase energy efficiency.


ENERGY SOURCES
NON - RENEWABLE
RENEWABLE
SECONDARY
Oil Natural gas Coal Nuclear energy
Sun energy Hydro energy Wind energy Geothermal energy Biomass energy Total energy
Electricity Hydrogen

COAL

coal id looked traditionally upon as the most typical fossil fuel. Today coal is primarily used for energy and coke production for a producing iron and sheet.

Coal of a lower quality is used in cement and food production as well as in several less important industrie

EXTRACTION OF THE COAL IN A OPEN MINE

THE TOTAL EXPLORED WORLD COAL RESERVES

comprised 795 billion tons in 2005.

There are a number of adverse health and environmental effects of coal burning especially in power stations, and of coal mining.

These effects include:

- coal-fired power plants shortened nearly 24,000 lives a year in the United States, including 2,800 from lung cancer,
- generation of hundreds of millions of tons of waste products, including fly ash, bottom ash, flue gas desulfurization sludge, that contain mercury, uranium, thorium, arsenic, and other heavy metals,

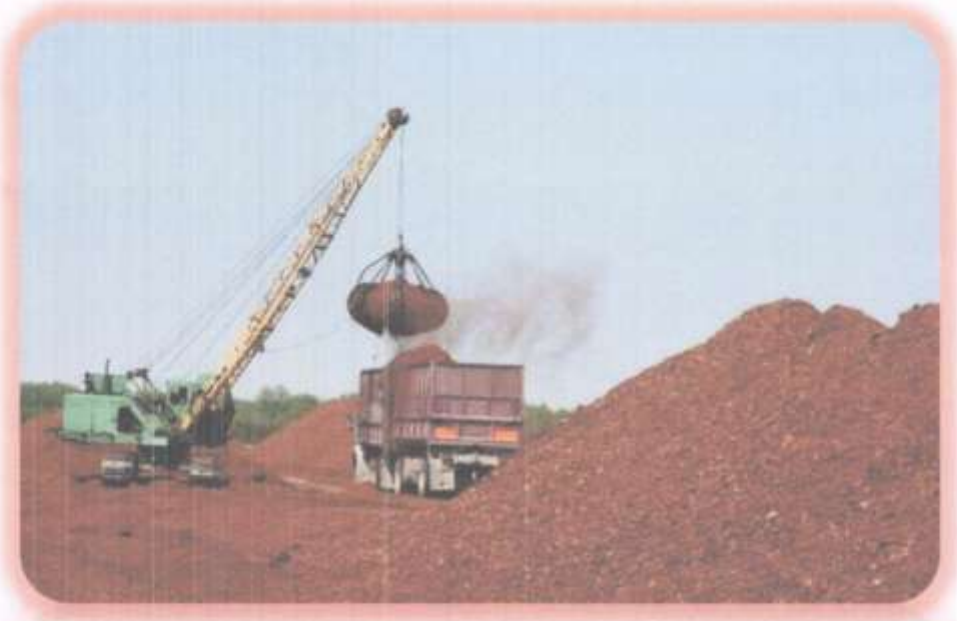
Aerial photograph of Kingston Fossil Plant coal fly -: acid rain from high sulphur coal,

ash slurry spill site taken the day after the event. -: interference with groundwat and water table levels.

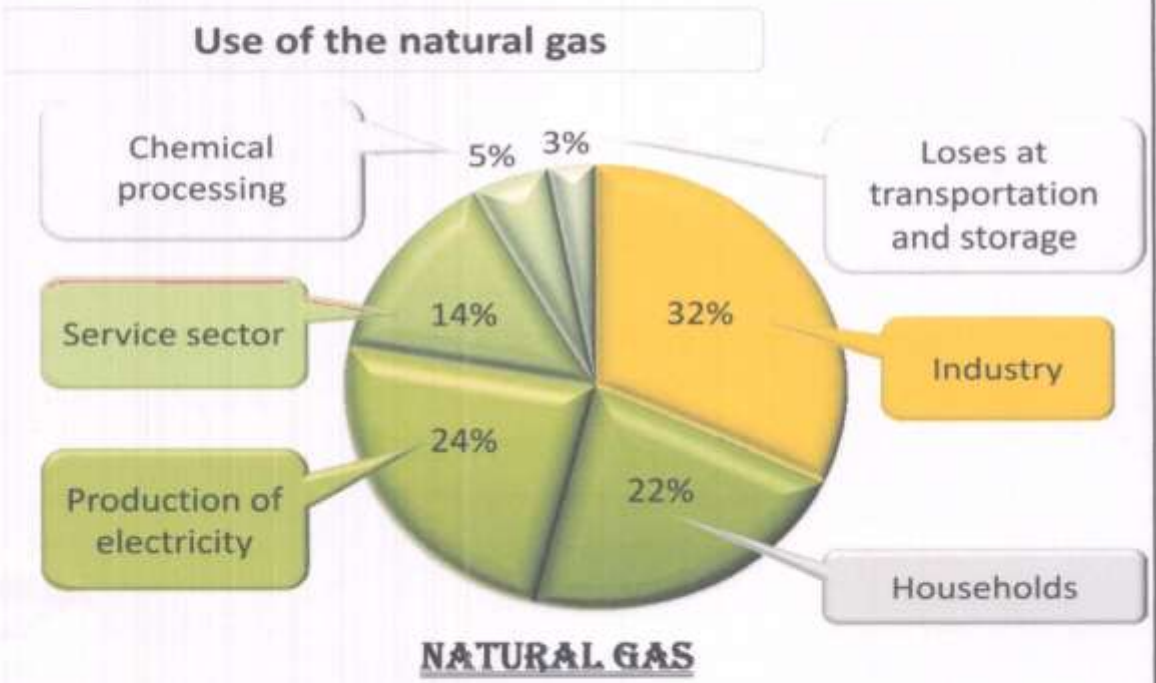
peat

Peat is black, brown or yellowish-brown sedimentary rock which, when dry, consists of over 50% organic substances. It is formed of plant material at different stages of decomposition, having accumulated in extremely wet conditions

According to historical data, peat extraction has fundamentally changed throughout the world in the last century. After World War I, peat extraction amounted to slightly less than 15 million tons a year. In the 1930s this figure grew to 31 million tons, while the development of agriculture caused a rapid rise at the end of the 1950s and after the first oil crisis in 1974. The last peak – 370 million tons of air-dry peat a year – was the absolute maximum, which persisted for almost a decade. After that peat extraction became economically unprofitable as oil products and, since the 1980s, also natural gas were cheaper and more easily available. Thus, since the mid-1990s, the world peat extraction has only slightly exceeded the amount extracted in the early years of the 20th century.



Natural gas



NATURAL GAS

Gas Exporting Countries

Since the beginning of the new millennium, the role of the major gas-exporting countries in the global market has essentially changed compared to the previous decades.

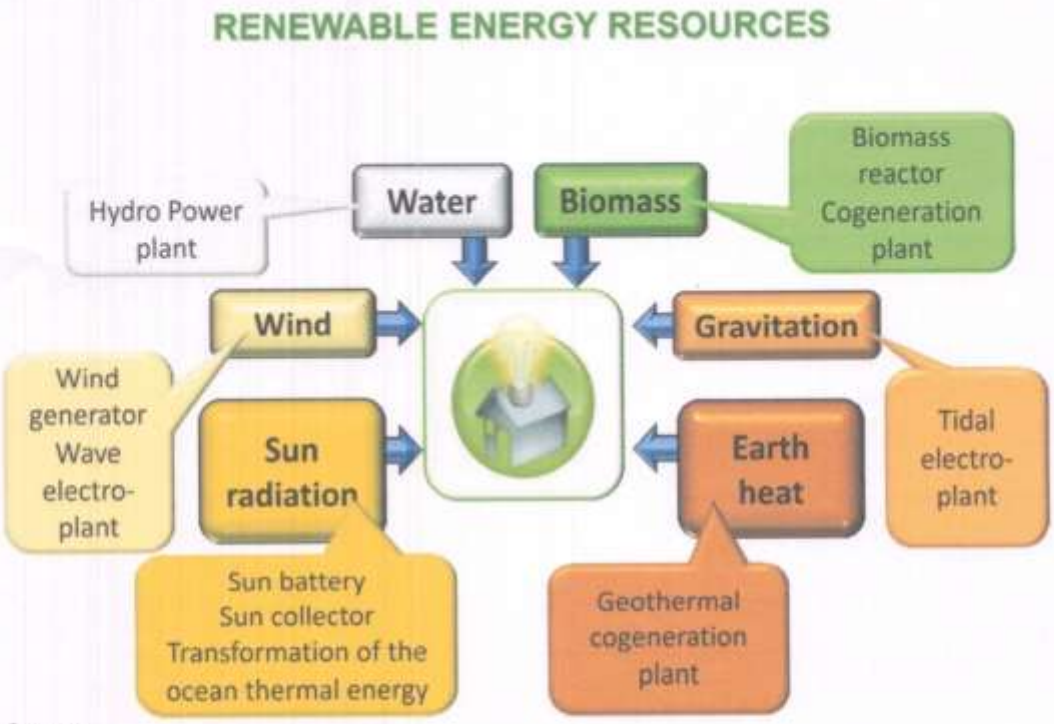
In recent years Russia has exported 25% of the world gas reserves, the USA 22%, Canada 7%, the United Kingdom 4%. Algeria and the Netherlands export smaller amounts, while the share of other countries amounts to less than 1%.

It is noteworthy that the USA, Canada and the United Kingdom also are the biggest natural gas importers, which is yet another aspect of globalisation of the modern world.

Nucler Energy

In 2006, 61 countries extracted uranium, however, uranium extraction has decreased in many countries because of the overproduction of the ore.Although the actual amount of the exploited nuclear energy sources is on theincrease, only some of the raw material is mined; instead, reserves of nuclearweapons are being intensively reprocessed (65% of the total amount ofsources).These energy sources have an essential impact on the competitiveness ofthe mining industry, but it is estimated that they will have been reprocessedby 2020.In 2005, the volume of mined uranium ore amounted to 40 251 tons (converted intopure uranium), most of it in Canada (28.8% of the total world uranium extraction).On average, nuclear power produces 17% of the world's electricity, and since 1990its role has changed little.In the European Union countries nuclear power used for electricity generationcomprises about one-third of the total amount of

energy, but in severalmember states it constitutes over 60%, and there is no reason to believe thatthe consumption of nuclear energy might decrease in the

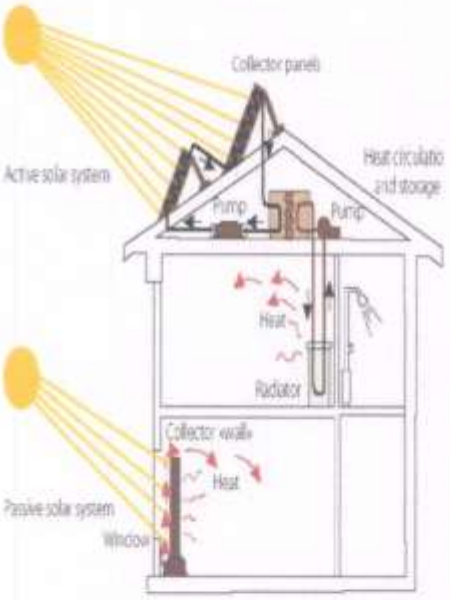


future.

SOLAR ENERGY

In an hour the surface of the Earth receives nearly the same amount of energy that the whole humanity consumes in a year.

More intensive use of solar energy is limited by the costly technologies and their insufficient ability to absorb solar radiation, especially in the regions where the flow of solar radiation is less intensive.



Use of the solar building

THANK YOU