

9. Environment and Natural Hazards

9.1 INTRODUCTION

The urban areas of the country are facing problems of deterioration of environmental and socio-economic conditions. The major concerns are unplanned and haphazard development, poor sanitary and living conditions, urbanization and associated problems including slums, poor/inadequate infrastructure and pollution problems. While there are several causes for urban degradation such as population migration, environmental considerations not adequately being incorporated into plans (Master Plans), uncoordinated and haphazard development, weak implementation of plans and laws and inadequate institutional competences, one of the major concerns is resource crunch.

9.2 NATURAL RESERVES

Ranchi is a quiet little city in between the hilly regions of Jharkhand. It is famous for its temples and waterfalls. City is nestled in the backdrop of the hilly terrain of Chota Nagpur Plateau and dense tropical forests. Ranchi is blessed with vast reserves of natural wealth like iron, coal, copper, mica etc. abundant water supply from river Subarnarekha and rich biodiversity making it a priceless industrial centre. Another facet, which adds to the allure of Ranchi, is the several tantalizingly beautiful waterfalls, which are active throughout the year.

9.2.1 River System

The important river basins of the region are the Subarnrekha, the South Koel, the Damodar and the kharkhai. The kanchi, Damar and Raru are the tributaries of river Subarnrekha. The South Koel originates from Piska near Ranchi. The Karo and the Bomhani are its tributaries.

9.2.1.1 The Subernarekha River

The Subernarekha River originates near Nagri village in the Chhotanagpur plateau of Jharkhand State at an elevation of about 610 m at latitude 23° 18' N and longitude 85° 11' E. Subernarekha literally means golden line. According to legends, in ancient times, gold was being extracted in the river's bed close to its origination point near Piska village, close to Ranchi city. Before falling in the Bay of Bengal, the river flows through Ranchi and Singhbhum districts of Jharkhand, Midnapore district of West Bengal and Balasore district of Orissa.



Figure No. 9-1: Catchment Basin of Subernarekha River

Subernarekha River flows for a total length of 395 km. Out of this, 269 km lies in Bihar, 64 km in West Bengal, and 62 km in Orissa. The Subernarekha basin covers an area of 19,300 sq. km. This area is nearly 0.6% of the total national river basin area and yields 0.4% of the country's total surface water resources. In respect of state wise distribution, Subernarekha drains an area of 14,600 sq. km in Jharkhand (75.6% of total catchment area), 2,500 sq. km (12.9%) in Orissa and 2,200 sq. km (11.5%) in West Bengal. Its important tributaries are the Kanchi, Karkari and Kharkai.

9.2.1.2 The Sankh River



It rises in the north-west of the district, flows through the centre of the Rajadera plateau, then turns abruptly south, and descends to the plains of Barwe by a beautiful waterfall known as Sadnighagh. After crossing the plains of Barwe in a south-westerly direction, it flows almost due south, forming for some distance the boundary between Ranchi and Raigarh (M.P.), then passing through the hills which separate Barwe from Biru, it flows in a Westerly direction and passing into Gangpur near village of Samsera in the extreme south of the district, unites with Koel. The important tributaries of the Sankh are the Chirra, the Lawa, the Kok, the Kodar in Chainpur area, and the Kasgor, the Utial, the Palamara, the Girma, the Saijor, the Banda, the Dangajar in Simdega and Kurdeg areas.

9.2.1.3 The North Koel River

This river rises within a very short distance of the Sankh, it flows northward through the narrow valley of Bishnupur into Palamau, where after a course of 300 kms, it joins the Son under the plateau of Rohtas.

9.2.2 Water Bodies

9.2.2.1 Rukka Dam

It is located across the Subernarekha, 25 kilometres east of Ranchi and about 50 kilometres (31 mi) from its point of origin. Completed in 1971, this multi-purpose reservoir was envisaged mainly to meet municipal water demands of Ranchi city and the adjoining industrial area.



9.2.2.2 Kanke Dam

Kanke Dam in Ranchi is placed perfectly at a picturesque spot at the foothills of the Gonda Hills. The Dam assumed to be originated many decades back. The tranquil atmosphere, unpolluted air, secluded environment and nice weather makes this lake very attractive for tourist looking for relaxation and seclusion. It is ideal tourist destination for nature lovers, holiday picnic makers and for casual visitors mainly due to its charming scenic surroundings.

9.2.2.3 Dhurwa Dam

This dam is one of the most popular man-made water reservoirs in Ranchi region just because of its scenic beauty. This dam is located in the Dhurwa in Ranchi city. Dam is situated about 1 km from the proper Dhurwa village settlement.

9.2.2.4 Ranchi Lake

Lakes are conspicuous by their absence in the Ranchi District. Artificial lakes and tanks have been formed at some places by erecting embankments across the bed of rivers. The largest of these are the Ranchi Lake in the centre of the city. The Ranchi Lake offers a beautiful and unique experience to the visitors. Located far away from the hustle and bustle of city life, this lake is visited by many people during their tour of Ranchi. Lake at Ranchi can be developed as picnic spot. As it is located at the base of the Ranchi Hill, people can have a splendid view of the hill while visiting the lake at the same time. The high level of siltation is seen in Ranchi Lake, which must be taken care to protect it.

9.2.3 Wetlands

Wetlands, particularly those in floodplains and in coastal areas, contribute to flood control by storing and decreasing the velocity of excess water during heavy rainfall. Wetland vegetation also provides a natural barrier to fast moving water and therefore aids in flood speed reduction. There are three main wetlands in Ranchi i.e. Dhurwa dam, Getalsud reservoir and Kanke reservoir. Rapid population growth and industrialization of the Ranchi city have caused considerable change in the weather pattern and rise in average temperatures.

It was observed that during the year 1994, the area covered by Dhurwa Dam, Getalsud Reservoir and Kanke Dam is 474 HA, 1579.44 HA and 112.30 HA respectively, which decreased to 366 HA, 1392.38 HA and 108.49 HA during the year 2004.

There are drastically change in wetland land areas between 1996 and 2004 of existing water bodies of the Ranchi. About 22.78% of areas reduction was noticed for Dhurwa dam followed by 11.84 % area reduction in case of Getalsud Reservoir. There was a minor 3.39 % reduction in area of Kanke dam during 1996 -2004

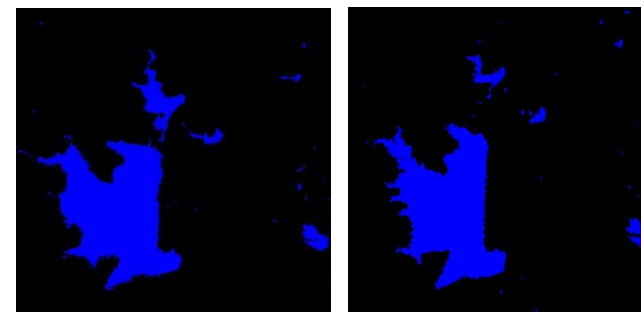


Figure No. 9-2: Dhurva Reservoir during 1996 and 2004

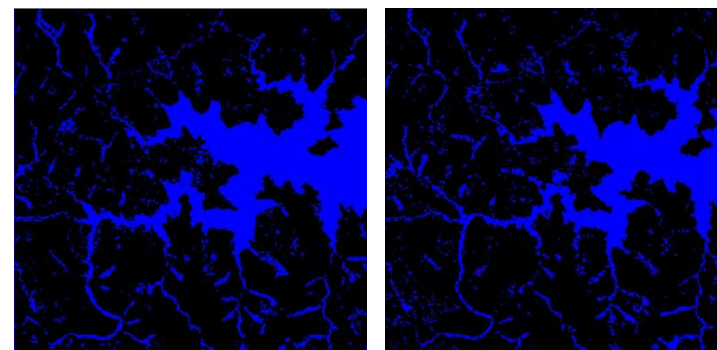


Figure No. 9-3: Getalsud Reservoir during 1996 and 2004

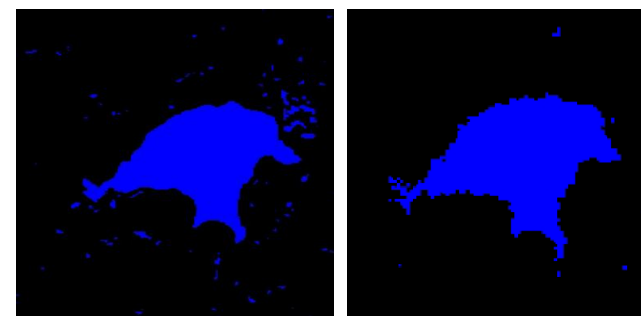
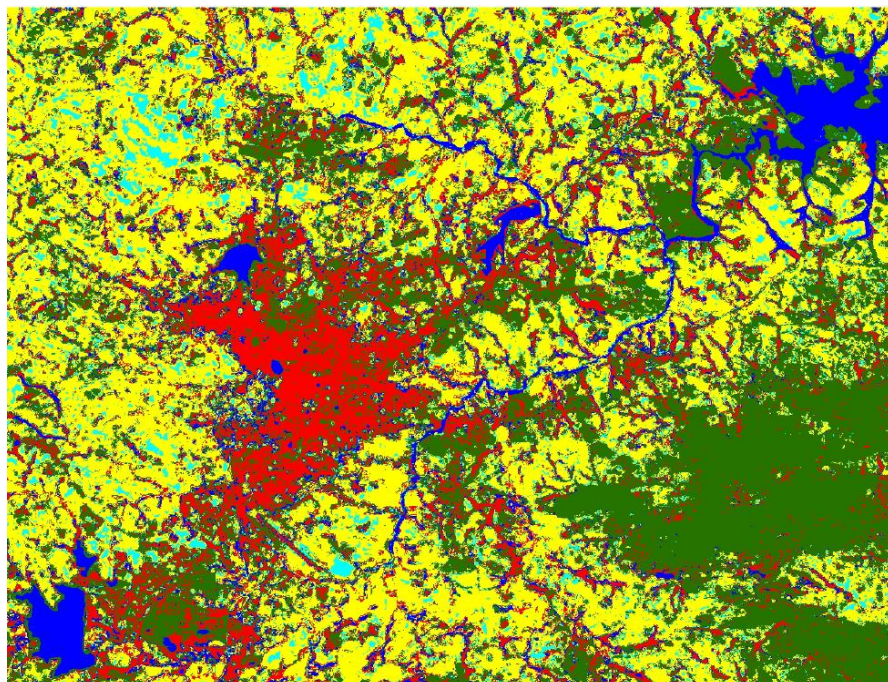


Figure No. 9-4: Kanke Reservoir during 1996 and 2004



Source: Journal of Geographical Information System, 2011

9.2.4 Hills and Forests Area

The Planning Area of Ranchi has good area under hillocks (dotted in the planning area) and forests (located towards Southeastern and South-Western direction). Because of high intensity of urbanization, these areas are under tremendous pressure.

The hills and large water bodies are categorised as Eco-sensitive zone in the Ranchi Master Plan (RMP)-2037. These areas are to be conserved with no urban developments.

9.2.5 Actions envisaged

- To check depletion of wetlands, earth filling in the wet and low-lying areas should be stopped;
- The water quality of Ranchi Lake, Kanke Dam is highly polluted mainly because of the dumping of untreated sewage and other wastes from the residential areas. This dumping of wastewater in the water bodies should be stopped. The area could be used as tourist attraction;
- The Getalsud and Dhurwa Dams could be the major possible recreational areas for the city;
- To overcome sewage entering into the water bodies, the complete solution would be to provide sewage treatment and solid waste management for all residential and other urban areas

Refer to **Map 9.1** for the proposed Eco-sensitive areas in RMP-2037.

9.3 POLLUTION

9.3.1 Water Pollution

The Subarnarekha and small rivulets are becoming sites for indiscriminate disposal of municipal, household and industrial wastes, which may contaminate the groundwater. Due to lack of proper drainage system most of the household liquid waste finds its way to aquifers, which can introduce high concentration of BOD, COD, nitrate, organic chemicals, and possibly bacteria into ground water. The underground water in most of the Ranchi region has reported to contain high percentage of iron contents.

The depth to water level registered wide variation throughout Ranchi Urban Area. The depth of water level has been recorded as 5.49 mbgl to 22.08 mbgl at

different locations of the planning area, which depends on the rainfall receives by the region. The water level at localities like Birsa Chowk, Pundag, Lowadih, Chauri basti, Chutia, Bara Ghagra, Balsiring, the water level shows declining trend. The rate of decline varies from 0.017 m/yr at Piska More to 1.025 m/yr at Chiraundi.

The study reveals the following major outcomes about the quality of water in the Planning Area:

- The concentrations of pH, Total solids and Total Dissolved Solids are within the permissible limits of Water Quality Standards (WQS) for Rivers and Lake;
- The Biological Oxygen Demand (BOD) concentration is on higher side of Subarnarekha River at Hatia Road Bridge;
- Alkalinity is higher at Kanke dam and in river Subarnarekha River at near Rukka Reservoir, Near Tatisilwai and Near Namkum;
- Very High concentration of Chemical Oxygen Demand (COD) in all the surface water bodies in the city;
- High concentration of Total Suspended Solids in entire surface water system of Ranchi;
- High concentration of Total Coliforms in Subarnarekha River and at Hatia Dam, which shows the mixing of untreated sewage into these water bodies;
- Total hardness parameter is higher than permissible limit at Hatia Dam, in Subarnarekha River at Hatia road bridge, at Namkum and at Muri road bridge

Rain Water Harvesting

It is evident from the discussion that the aquifer beneath the planning area is getting overexploited and as consequence ground water resources are being depleted. Quality deterioration, associated phenomena, of overexploitation, may be encountered. This quality deterioration will be relatively high in the overexploited and thickly populated areas. Once pollution has occurred, the

water has to be treated at the point of abstraction. The cleanup of an aquifer is a very difficult task. It follows that every effort should be made to prevent the contamination of the ground water in the first instance. Rain water harvesting, should be mandatory for all new buildings to harvest surface runoff and ground water recharge.

9.3.2 Air Pollution

After formation of Ranchi as a new capital, its environmental condition suddenly Change in many ways - traffic increasing, the high influx of population to urban areas, increase in consumption patterns, higher levels of energy consumption, unplanned & rapid urban, industrial & economic development has led to a higher rate of increase of air pollution in Ranchi city. The following is observed from the Ambient Air Quality Analysis of the Planning Area:

- High concentration of RSPM and SPM are recorded at Albert Ekka, in comparison of prescribed limit of National Ambient Air Quality Standard (NAAQS) of the Central Pollution Control Board;
- No violation of NAAQS (24-hourly avg.) with respect to SO₂, and NO₂ at mixed landuse of Albert Ekka area of Ranchi City. The city also shows the decrease trend of concentration of these pollutants from the year 2010 to 2011

9.3.2.1 Action Envisaged

- Relocation of polluting industries, phasing out older polluting vehicles, introduction of mass rapid transportation, etc;
- Develop a Road map for control of emissions from new and in-use vehicles developed up to year 2011-12;
- Use of Alternate fuel (CNG, LPG, Ethanol petrol, Bio-diesel, Hydrogen, etc;
- Prepare strategies for major industries to control air pollution;
- Initiatives for small scale industrial sector;
- Prepare a City specific AQM action plans

9.3.3 Noise Pollution

The average day noise level was found to be exceeding the standard noise limits in industrial and along the major commercial streets of the urban area. This is due to the commercial activities taking place in these areas and due to high density of population and the resulting congestion in the area.

9.3.3.1 Actions Envisaged

- Mass rapid transport system to reduce the vehicle on the road to reduce the air pollution;
- Industries in the region and within Ranchi to follow the Pollution Control Board (PCB) norms;
- Preparation of landscape plans, and large-scale plantation

9.4 NATURAL HAZARDS

The prevention of loss to life and property due to natural calamities is being viewed very seriously by the Government of India. In the past, the main role played by the Government in the case of various disasters was confined mainly to post-disaster activities that included providing relief and organizing rehabilitation. The need was felt for a proactive approach rather than waiting for a disaster to occur. As a part of this strategy, the Government decided to institute task forces for hazard zoning, geotechnical investigations, and land use zoning and regulation.

9.4.1 Hailstorm and Thunderstorm

Hailstorm rarely involve physical injury their economic impact can be severe. The damage appears to be a function of the severity, intensity and duration of storms and the size of hailstones, which they produce. Some of the damages are also caused by high winds and torrential. It is a regular phenomenon in Ranchi and mostly occurs during months of March-April every year.

9.4.2 Floods

The record reveals that the Ranchi has not experienced any dreadful flood and it is not a regular phenomenon in Ranchi. However, the city is prone to flash floods

during the heavy rainy seasons. On 11 July 1999, Ranchi recorded a rainfall of 1440 mm, which broke the record of 20 years. Jumar River near Kanke was flooded. The Kadru Bridge was washed away and Idris Colony was evacuated. Excess rains during 2006 also caused flood like situation in several parts of Ranchi. Harmu River was flooded and four persons died in the swirling waters. More than hundred kuchha houses were damaged. Flash flood in Ranchi is mainly caused due to blockade of the drainage system of the city due to dumping of garages and unauthorised settlements in low-lying areas of the city.

9.4.3 Droughts

The record reveals that the Ranchi has not experienced any dreadful flood and it is not a regular phenomenon in Ranchi. However, the city is prone to flash floods during annual rainfall of 1400 mm but less than 800 mm of rainfall causes drought like situation. The district has experienced drought situation in 2004 and 2005.

9.4.4 Earthquakes

Ranchi district falls in Zone-II of the Earthquake Hazard Map of India. The region has experienced micro-earthquake activities followed by subsurface rumbling sound, on many occasions. All these phenomena highlighted the need for preparedness and mitigation measures in the Ranchi region.

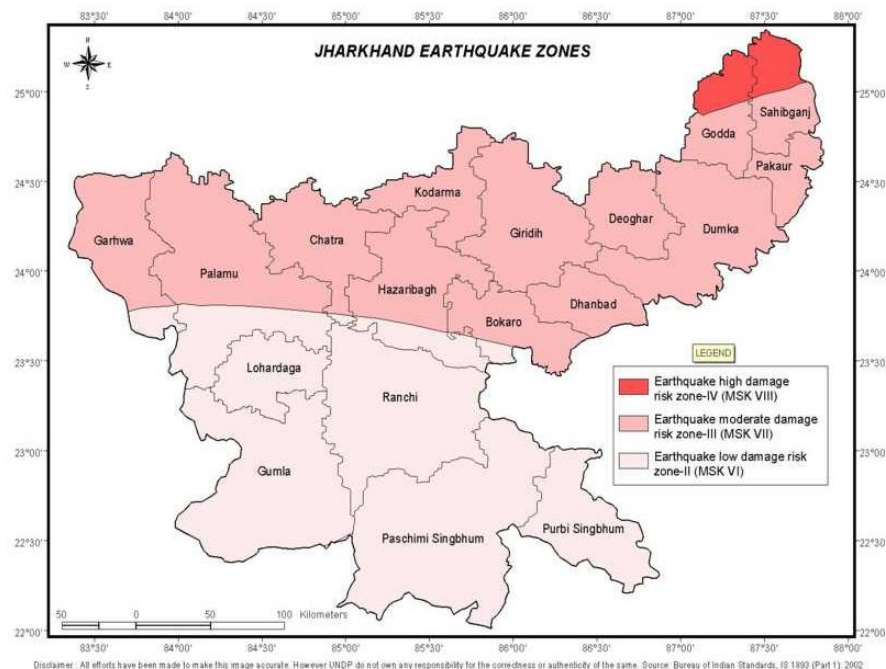


Figure No. 9-5: Jharkhand State Earthquake Zones

9.5 DISASTER MANAGEMENT PLAN

The Disaster Management Department of the State came in to existence from October 2004. The Department primarily works to provide timely relief to disaster affected people through releases from state disaster response fund to various line departments and District collectors directly at the time of Disaster. The state disaster response fund comprises of 75 % contribution from the central govt. and 25% from the state government. The State Disaster Management Authority and District Disaster Management Authorities in all the 24-Districts have already been constituted. Department as mandated has developed State Disaster Management Plan in the year 2009, however the capacity of line departments, institutions and non-government organisations and their

functionaries on Disaster Management need to be strengthened further. In the year 2010-11 department received a central share of Rs. 194.59 crores. The outlay for the financial year 2011-12 is Rs. 204.32 crores. Apart from this, an additional fund of Rs. 5 crores has been provided from 13th Finance commission for the first time for capacity building. This will continue for next five years till 2014-15.

Existing Schemes:

- Calamity relief fund distribution and monitoring;
- National program of capacity building for Engineers / Architects in Earthquake risk management

Future Schemes:

- Capacity building of Emergency Operation Centre (EOC) in the state;
- Capacity building of Human resources, Govt. Institutions, Urban local bodies and Panchayat Raj Institutions;
- Development of Disaster Management Knowledge cum Demonstration Centre (SRIJAN);
- Strengthening Fire fighting capacity in the 94-Tribal schools of Jharkhand to meet the Health needs of the Tribal residential schools from the savings;
- Developing the response capacity of Flood affected region EOCs with Life Jackets;
- Information, Awareness and Communication on Community based Disaster risk reduction;
- Ensure strict control on mineral mining and coal mining agencies;
- Penalty to be imposed on defaulting industrial units;
- Enforce strict pollution norms on factories;
- Afforestation schemes;
- Encourage schemes relating to energy conservation;
- Tap the Potential of Specialist Agencies & Impart Environmental Education;
- Liaise with Urban Development