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An Integrated Approach of Disaster Management (A Case Study of Kota District)

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Abstract

Disaster management is a multi-disciplinary area in which a wide range of issues that range for forecasting, warning, evacuation, search and rescue, relief, reconstruction and rehabitation are included. Kota is an industrial and educational city of Rajasthan. It covers 5217 square km area of Rajasthan. Various disasters like flood, drought, earthquake, industrial accident, pollution, are natural and man-made hazard that kill many people and destroy habitat and property every year.

The paper is based on the secondary data. This paper is an attempt to know the various disasters and studying the techniques which is used to reduce the frequency of disaster and also play a vital role in disaster management of the Kota district.

Keywords: Disaster Management, Industrial accident, Urbanization, Hazard, Flood.

Introduction

Disaster is a very common phenomenon to the human society. It has been experienced by them since time immemorial. A disaster is a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impact, which exceeds the ability of the affected community or society to cope using its own resources.

In contemporary academia, disasters are seen as the consequences of inappropriately managed risk. Being risk are the product of a combination of both hazard and vulnerability.

Hazards that strike in area with low vulnerability will never become disasters. Developing countries suffer the greatest costs when a disaster hits, more than 95% of all deaths caused by hazard occur in developing countries, and losses due to natural hazard are 20times greater (as a percentage of GDP) in developing countries than in industrialized countries.

There are two type of disaster

Natural Disaster

A natural disaster is a natural process or phenomena that may causes loss of life, injury or other health impact, property damage, loss of livelihood and services, social and economic disruption, or environmental damage.

Various phenomena like earthquakes, landslides, volcanic eruption, floods, hurricanes, tornadoes, tsunami, and cyclones are all natural hazard that kill thousands of people and destroy billion of dollar or habitat and property each year. However, the rapid growth of world population and its increased concentration often in hazardous environment has escalated both the frequency and severity of disaster.

Manmade Disaster

Manmade disaster is the consequences of technology hazards. Eg: Include stampedes, fires, transport accident, industrial accident, oil spills and nuclear explosions. Manmade disasters are examples of specific cases where manmade disasters have became reality in an event.

Disaster Management

Disaster Management is the creation of plans through which communities reduce vulnerability to hazard and cope with disaster. Disaster management does not await or eliminate the threat, instead it focus or creating plans to decrease the intense of disaster, currently in the unites states 60% business do not have emergency management plan.

Integrated Approach

An approach that combines all aspects (like social-economical development, urban development techniques, financial and legal aspect) that are relevant to disaster management are included.

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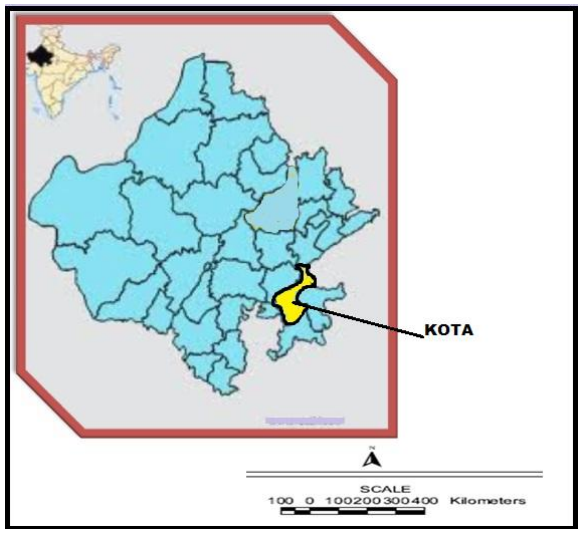

Fig No. 1

Study Area

The town of Kota was once the part of the erstwhile Rajput Kingdom of Bundi. It became a separate princely state in the 17th century.

Kota district is located along eastern bank of the Chambal River in the southern part of Rajasthan. Kota district is located at 24°25′ and 25°51′ North and 75°15′ and 76° East. It covers an area of 5217 square km area (3.63% of Rajasthan state). It has average elevation of 271 meters. It is surrounded by Sawai Madhopur, Tonk and Bundi district in the North and NorthWest; by Chittorgarh District in the SouthWest; by Jhalawar district in the SouthEast. Kota district is situated along the bank of Chambal river on a high sloping table land forming a part of the Malwa Plateau.

Kota has a semi-arid climate (Koppen classification Bsh) with high temperature throughout the year. The average annual rainfall in the Kota is 660.6mm. About 93% of annual rainfall is received during the Southwest monsoon season.

In 2011, Kota had a population of 19, 51,014 of which male and female are 1021161 and 929853 respectively. The sex ratio was 906 and 12.74% were less than six years of age. The effective literacy rate was 66.55%, male literacy was 74.95% and female literacy was 57.32%. Population density of Kota district was 374 persons per square kilometre and population growth rate over the decade (2001-11) was 24.35%.

Objective

1. For reducing the effects of disaster, information regarding disaster can be collected which can help in developing programs.
2. To analyze the effects and losses from disaster.
3. To make plans for reducing the effects of disaster.
4. By analyzing the effects of different disaster, a management plan can be made.
5. From the records and analyze of previous disasters an outline can be made for dealing it.

Methodology

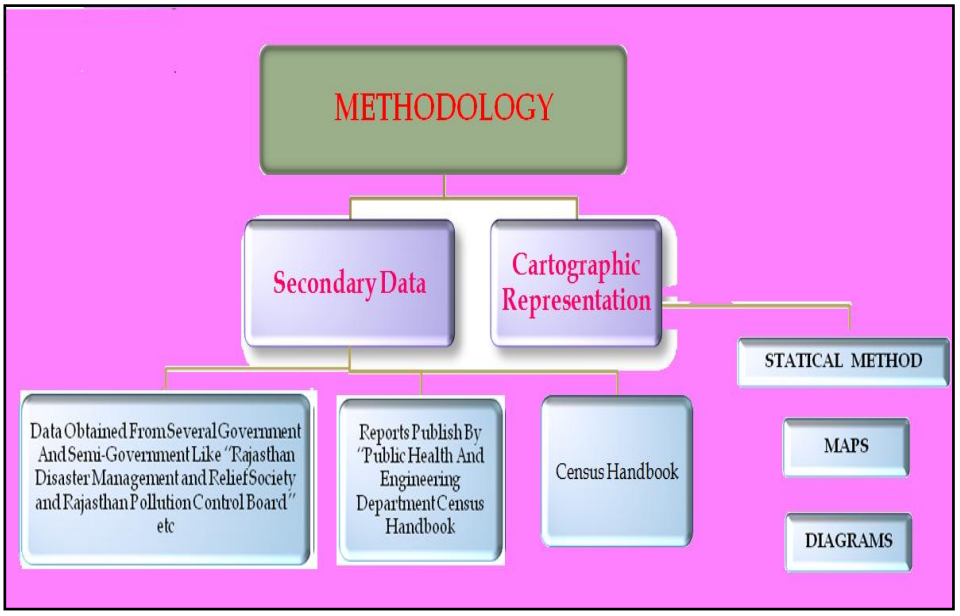

Fig No 2

Disaster in Kota District

Kota is known educational as well as industrial city of Rajasthan and is one of the fastest growing city in country. Rapid urbanization and industrialization has led to immense pressure on resources and has resulted disaster in Kota district.

Flood

Flooding may occur as an overflow of water, water bodies, such as river or lake in which the water overtops or breaks levees resulting in some of that water escaping its usual boundary. Flooding is the common natural disaster and also very common in many places where heavy rainfall occur.

There is no accute flooding problem in this district. Some problem of flooding at low lying areas like Sangod (area near Ujar and Parwan) are comes under flood prone region.

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Table - 1
Flood Problem in Kota

Year	Average Annual Rainfall	Departure from Average Rainfall	Percentage of Departure	Category of flood
2006	818.55	294.97	56.34	Sever flood
2007	660.33	136.75	26.12	Moderate flood
2008	692.81	169.23	32.32	Moderate flood
2009	449.21	113.24	19.18	Moderate flood
2010	550.2	120.68	21.9	Moderate flood
2011	1060	312.18	60.8	Sever flood
2012	615	132.91	25.24	Moderate flood
2013	1267.12	362.84	64.18	Sever flood

Source – Department of Water Resource, Jaipur

The table shows in 2006, 2011 and 2013 district have very heavy rainfall, in 2006 average annual rainfall was 818.55mm and percentage of water departure was 56.34%. In 2011 average annual rainfall was 1060mm and percentage of water departure was 60.8 %. In 2013 average annual rainfall was 1267.12 mm and percentage of water departure was 64.18%. All three years suffered from severe floods.

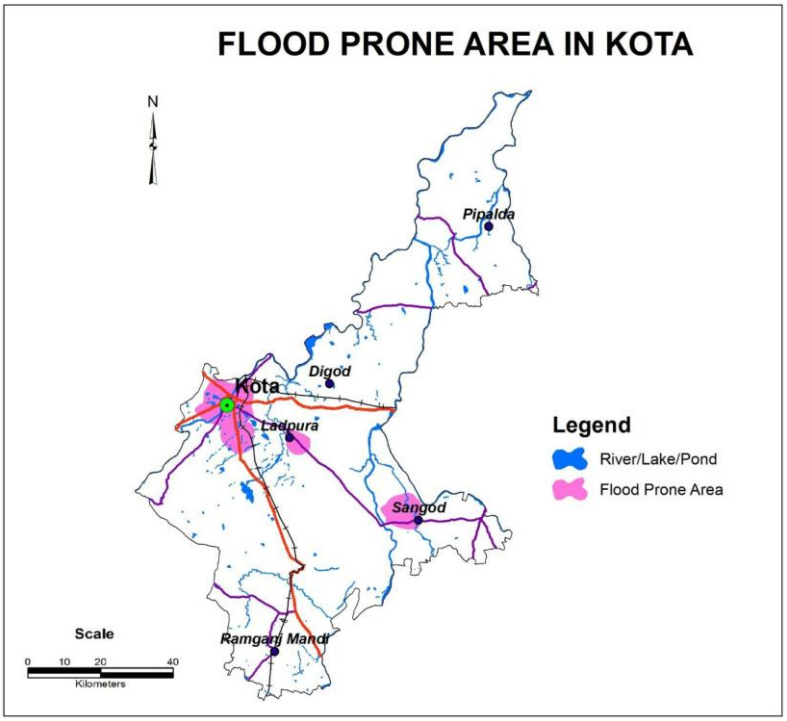

Fig No 3

Table - 2
Flood Prone (Low Lying) Area of Kota District

Tehsil / Nagar nigam	Basin /Sub basin	Low lying areas
Nagar nigam Kota	Chambal	Sanjay nagar, harizan basti, nayapura, bapu nagar, kansowa, adarsh nagar, gumanpura, prempura, shivpura and bajrang basti
Ramganj Mandi	Chambal	Chechat, Kharabad,Chandrapura, Pawali, Pipalda, Mohanpura
Sangod	Kalisind, parvan	Mahatma Gandhi circlem, sangod town, kailashpura, hingi road
Ladpura	Chambal	Allania, kawal nagar, kaithon, arjunpura, notana, nawa nohar, and jawlpura

Source- Disaster management centre, Jaipur

Drought

Drought is an extended time when a region receives or deficiency in its water supply, whether atmospheric, surface or ground water. Generally this occurs when a region receives constantly below average precipitation. The Kota district has alternate drought year during 1987 and 1989 and consecutive drought year during 1997, 1998 and 1999. The moderate drought year are 1987, 1993, 1999,2002 and 2005 with average rainfall 97.4, 28.2 ,34.7, 25.5,

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and 26.7% below average respectively. The severe drought years are 1989, 1997, 1998, with average annual rainfall below the average by 52.6, 55.8 and 76.3 percent respectively.

Pollution

The existing industries the traffic volume within the town along the highways and burning of fossil fuel and fire wood in residential area are probable source of pollution in the district. There are fifteen industrial estates in Kota district.

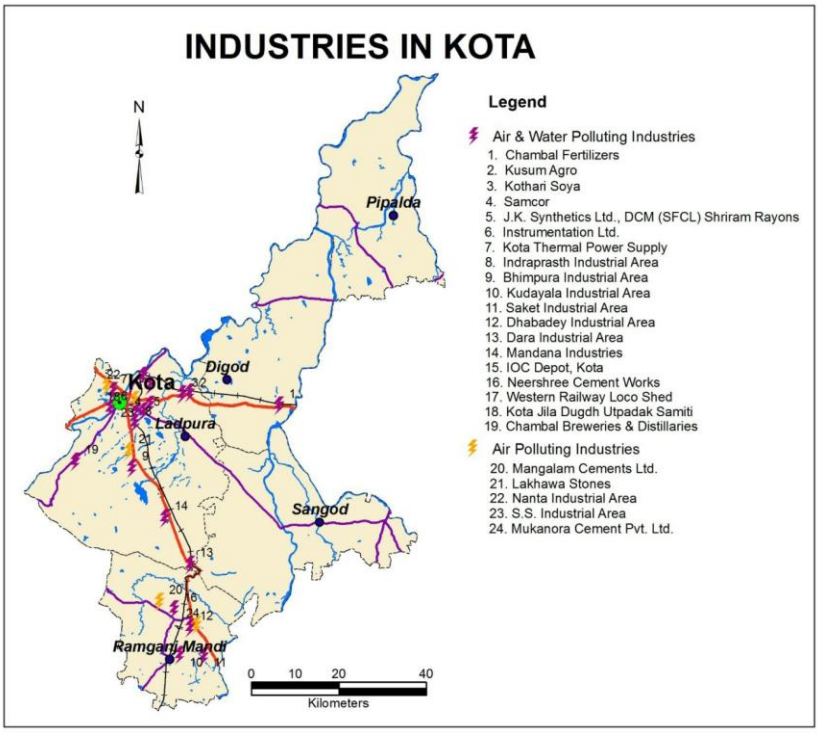

Fig No. 4

Table - 3

List of Large and Medium Water Polluting Red Category Industries in Districts Kota

Sl No.	Name	Size	Category	Product	Pollution Potential
1.	Om metals and minerals ltd., B-118, kota	M	Red	M S Ingots	W3
2.	J.k. Steam and Power, kota	L	Red	Steam and power	W1
3.	J.k. Tyre Cord, kota	L	Red	Nylon tyre cord	W1
4.	Gopal synthetics, kota	L	Red	Polyester chips	W1
5.	J.k. Staple and tows,, kota	L	Red	Polyester staple fiber	W1
6.	Padam synthetics, kota	L	Red	Polyester yarn	W1
7.	J.k. Acrylics, kota	L	Red	Acrylic staple fiber	W1
8.	Kothari global ltd., kota	L	Red	Refined oil	W2
9.	Kota thermal power station, kota	L	Red	Power	W1
10.	Kota zila dugdh u.s.s. Rawatbhata Road, kota	L	Red	Milk	W2
11.	Tilam sangh, Rajasthan, kota	L	Red	Soybean oil	W2
12.	Multimetals ltd. , kota	L	Red	Copper	W1
13.	Chambal fertilizers & chem.ltd, Gadepan, kota	L	Red	Urea	W1
14.	Kusum agrotech ltd.Tator, kota	L	Red	Refined oil	W2
15.	Makan agrooils ltd. C-402-403 indraprasth ind. Area, kota	L	Red	Refined oil	W2
16.	Neershree cement, Morak, kota	L	Red	Cement	W3
17.	Manglam cement ltd. Morak, kota	L	Red	Cement	W3
18.	Samcor glass ltd. Naya nohra, kota	L	Red	Glass sheet	W3
19.	Instrumentation ltd., Jhalawar road kota	L	Red	Electronic items	W1
20.	Shri ram rayons, Shriram nagar , kota	L	Red	Rayon yarn	W1
21.	Shriram fertilizers & chem. Shriram nagar, kota	L	Red	Urea	W1
22.	National thermoplast ind. Bhimpura, kota	S	Red	Cpw	W1

Source- District Environment and Pollution Control Board Report

According to pollution of industries, ministry of environment and forest government of India had divided three categories of polluting industries.

Red category

Heavily polluting industries are include in red category like sugar, fertilizer, pesticides, thermal power plant, tyre and tubes glass and oil refineries etc.

Orange category

Cotton spinning and weaving, automobile, servicing, floor mill, hotels and restaurants, fish processing and stone crushes are including in orange category industries.

Green category

Very low polluting industries are including in green category industries like aatta chakkis, dal mills, ice cream, ice making, handloom weaving, sports goods, bakery product.

Above table show that all the industries of study area are in red category (heavy polluting) industries.

Bridge Collapse

In 2009 under construction bridge collapsed in the Chambal river of Kota district. Approximately 28 people got dead due to poor engineering and construction.

Table - 4
National and State Government Scheme/Policy

Scheme/policy	National / state	Policy level	Admistrative /delivery mechanism
Indra awaas youjana (IAY)	National	Promoting region specific hazards resilient design Promoting use of eco-friendly and locally available materials, without compromise in the quality of structures Technology Demonstration units(TDUs) with multi-hazard disaster resistant technologies for promotion of safe construction practice	Allocating land which is not hazard prone Ensuring strict enforcement of national and local building laws as well as land allotment laws Developing simplified construction guidelines in regional languages for hazard resistant construction(flood and earthquake) as per National Building Codes/ standards for various seismic and flood zones
Harit rajasthan	State	Greater private participation in crop insurance Climate change adaptation should be considered during planning of projects, less water, intensive crops etc.	Strengthening crop insurance weather insurance linkage with marginal farmers. Provision of grain storage facilities and livestock shelter.
Mahatma gandhi national rural employment guarantee scheme (MGNREGS)	National	Resolution for prioritizing DRR related works in MGNREGS and guidelines for creating shelf of work considering different climatic seismic and geo_hydrological zone Pre positioning of grain and food items for monsoon and inaccessible terrain.	Introducing work place safety regulations.
Jawaharlal Nehru National Urban Renewal Mission	National, state	General development control regulations to address safe construction practice and land use to avoid development that increases hazard risk	Hazard risk assessment in land use planning and zoning
Rajasthan urban infrastructure development project (RUIDP)		Encourage low energy input projects for urban environment facilities	
Sarva shiksa abhiya n (SSA)		Inclusion of learning materials on risk awareness, preparedness and prevention measures in school curricula	Hazard resilient primary and secondary school building and infrastructure Training in life saving skills such as first aid, search rescue and swimming to school children,teacher andeducational administrators

Disaster Management in Kota District Cycle of Disaster Management

1. Prevention
2. Mitigation
3. Prepardness
4. Response
5. Recovery

Prevention

Activities necessary to analyze and document the possibility of disaster and the potential consequences or impact of life property and environment. These are activities design to provide permanent protection from disaster. Not all disaster, particularly natural disaster can be prevented but the risk was loss of life and injury can be mitigated with

good evaluation plan, environmental planning and design standards.

Mitigation

Mitigation refers to measures that reduce the chart of an emergency happening, or reduce the damaging effect of unavoidable emergency. This is achieved through risk analysis, which results in information that provides a foundation for typical mitigation measures include stabilising buildings codes, zoning requirements and constructing various such as levees. Effective mitigation efforts can break the disaster damage, reconstruction and repeated damage. Activities that actually eliminate or reduce the probability of a disaster (for example-legislation that requires stringent building codes in earthquake prone area) it also include long term activities designed to reduce the effects of unavoidable disasters (for example -land use management or building restrictions in potential flood zone.

Prepardness

Preparedness activities increase a communities, ability to respond when a disaster occur. The national incident management system(NIMS) define Preparedness as" a continuous cycle of planning ,organizing, training, equipping excursing and taking corrective action in an effort to ensure effective coordination during incident respond." In the preparedness , phase, government, organizations and individuals develop plan to save lives and minimize disaster damage (for example mounting training exercises, installing early warning system etc)preparedness means uses also seek to enhance disaster response operation (for example by stockpiling vital food and medical supplies or through training exercise.

Response

These activities are designed to provide emergency assistance for victims (for example search and rescue, emergency shelter, medical care and mass feeding) they also seek to stabilize the situation and reduce the probability of secondary damage (for example securing and patrolling areas prone of looting)

Recovery

Action state to return a community to normal or near normal condition, including the restoration of basic services and the repair of physical, social and economic damages. Typical recovery action include debris clean up, financial assistance to individual and government, rebuilding of roads and bridges and e-facilities, and sustained mass care for displaced human and animal population.

1. Identify needs and define resources
2. Provide housing and promote restoration
3. Address long term care and treatment of effective person
4. Develop initiative to mitigate the effect of future incident

Conclusions

Traditionally disaster in Kota has been compounded by climate factor and Industrialization. Being under the monsoon region the study area has faced frequent flood, drought and consequent famines and being of urbanization district has faced pollution, industrial accident, fire, building collapse etc. However the recent development in the field of disaster management and urbanization have overlooked these obvious links and two separate institution structures have evolved to service urbanization and disaster management whilst both frameworks have seen parallel development. However this will require wide scale capacity building in the interface institutions. Integration of adaption concerns in urbanization, industrialization.

Disaster management will need to be taken up at three levels integrating adaption of long term climate scenarios and urbanization with the disaster mitigation and response interventions regularizing policy network to take up. Industrialization adaption with the disaster management frameworks and facilitating permeability among the parallel structures within the common factor in both frameworks

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