ರಾಜ್ಯ ನಗರಾಭಿವೃದ್ಧಿ ಸಂಸ್ಥೆ

ನಗರ ವಿಕೋಪ ನಿರ್ವಹಣೆ

ತರಬೇತಿ ಕಾರ್ಯಕ್ರಮದ

ಕೈಪಿಡಿ

ರಾಜ್ಯ ನಗರಾಭಿವೃದ್ಧಿ ಸಂಸ್ಥೆ

ಅಡಳಿತ ತರಬೇತಿ ಸಂಸ್ಥೆ ಆವರಣ, ಲಲಿತಮಹಲ್ ರಸ್ತೆ, ಮೈಸೂರು - 570 011

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ಡಾ॥ ಶ್ರೀಮತಿ ಅಮಿತಾ ಪ್ರಸಾದ್, ಐ.ಎ.ಎಸ್., ಮಹಾನಿರ್ದೇಶಕರು, ಆಡಳಿತ ತರಬೇತಿ ಸಂಸ್ಥೆ, ಮೈಸೂರು.

ಶ್ರೀ. ಪ್ರಾಣಲಿಂಗ ಶಿವಸಾಲಿ, ಕೆ.ಎಂ.ಎ.ಎಸ್., ನಿರ್ದೇಶಕರು, ರಾಜ್ಯ ನಗರಾಭಿವೃದ್ಧಿ ಸಂಸ್ಥೆ, ಮೈಸೂರು

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ಡಾ. ಜಿ. ವಿಶ್ವನಾಥ್, ಬೋಧಕರು, ವಿಕೋಪ ನಿರ್ವಹಣಾ ಕೇಂದ್ರ, ಆ.ತ.ಸಂ. ಮೈಸೂರು.

ಕೈಪಿಡಿಗೆ ಪೂರಕ ಮಾಹಿತಿ ಒದಗಿಸಿದವರು.

1. ವಿನೋದ್ ಶರ್ಮ ಮತ್ತು ಚಂದ್ರಾಣಿ ಬಂಡೋಪಧ್ಯಾಯ್
2. ಸಿ. ಘೋಷ್
3. ಡಾ॥ ಅಶೋಕ್. ಎಸ್. ಸಂಗನಾಲ್
4. ವೆಬ್ ಸೈಟ್ :www.wikipedia.com

ಪ್ರಕಟಣೆ

ರಾಜ್ಯ ನಗರಾಭಿವೃದ್ಧಿ ಸಂಸ್ಥೆ
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ಪುಟಗಳು : 106 + viii
ಪ್ರಥಮ ಮುದ್ರಣ ೨೦೧೦

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Dr. (Smt) AMITA PRASAD,
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Date : _____

ಮುನ್ನುಡಿ

ಪ್ರಸ್ತುತ ಭಾರತದ ಒಟ್ಟು ಜನಸಂಖ್ಯೆ 116.5 ಕೋಟಿಯಿದ್ದು, 2011ರ ವೇಳೆಗೆ 35.00 ಕೋಟಿ ಅಂದರೆ ಶೇಕಡ 29 ರಷ್ಟು ಜನರು ನಗರ ಪ್ರದೇಶದಲ್ಲಿ ವಾಸಿಸುತ್ತಾರೆಂದು ಅಂದಾಜಿಸಲಾಗಿದೆ. ನಗರಗಳ ಅತಿಯಾದ ಜನಸಂದಣಿಯಿಂದಾಗಿ ನೈಸರ್ಗಿಕ ಮತ್ತು ಮಾನವ ನಿರ್ಮಿತ ವಿಕೋಪಗಳು ಹೆಚ್ಚಾಗಿ, ಪ್ರಾಣ ಹಾಗೂ ಆಸ್ತಿಯ ಹಾನಿಯುಲ್ಲದೆ, ಘಟನೆಯಲ್ಲಿ ಬದುಕುಳಿದ ವ್ಯಕ್ತಿಗಳ ಆತ್ಮಸ್ಥೈರ್ಯ ನಷ್ಟವಾಗುತ್ತಿದೆ. ಉತ್ತರ ಕರ್ನಾಟಕದಲ್ಲಿ ಸಂಭವಿಸಿದ ಭೀಕರ ಮಳೆ ಹಾಗೂ ಪ್ರವಾಹಕ್ಕೆ ನೂರಾರು ಜೀವಗಳು ಹಾಗೂ ಲಕ್ಷಾಂತರ ಜಾನುವಾರುಗಳು ಬಲಿಯಾಗಿ, ಕೋಟ್ಯಾಂತರ ರೂ. ಮೌಲ್ಯದ ಆಸ್ತಿ ನಷ್ಟವಾಯಿತಲ್ಲದೆ ಸರಿಸುಮಾರು ಒಂದುವರೆ ಲಕ್ಷಕಿಂತಲು ಅಧಿಕ ಜನರು ವಸತಿ ಹೀನರಾಗಿದ್ದು ನೈಸರ್ಗಿಕ ವಿಕೋಪಕ್ಕೊಂದು ಉದಾಹರಣೆಯಾಗಿದೆ.

ವಿಕೋಪ ಘಟಿಸಿದ ನಂತರದಲ್ಲಿಯೇ ಕಾಪಾಡುವಿಕೆ, ಪರಿಹಾರ ಹಾಗೂ ಪುನರ್ ವಸತಿಯಂತಹ ಕಾರ್ಯಕ್ರಮಗಳು ಜರುಗುತ್ತದೆ. ಇಂತಹ ದುರಂತಗಳ ಸಾಕ್ಷಿಯಾಗಿ ಬದುಕುಳಿದ ಜನರಿಗೆ ಮನೋಸಾಮಾಜಿಕ ನೆರವು ಅಗತ್ಯವಾಗಿರುತ್ತದೆ. ಅದಕ್ಕೆ ನೆರವು ನೀಡುವ ಮಾನವ ಸಂಪನ್ಮೂಲವನ್ನು ಸಿದ್ದಪಡಿಸುವುದು ಸರ್ಕಾರ ಹಾಗೂ ನಾಗರೀಕ ಸಮಾಜದ ಆದ್ಯ ಕರ್ತವ್ಯವಾಗಿದೆ. ಇಂತಹ ಮನೋಸಾಮಾಜಿಕ ನೆರವು ಪವಿತ್ರ ಕಾರ್ಯ ಇದನ್ನು ಕಾಳಜಿ, ಪ್ರೀತಿ ಹಾಗೂ ಕರುಣೆಯಿಂದ ನಿರ್ವಹಿಸಿದಲ್ಲಿ ವಿಕೋಪದ ಪರಿಣಾಮದಿಂದ ಜನರನ್ನು ಸಾಮಾನ್ಯ ಸ್ಥಿತಿಗೆ ಅತಿ ಶೀಘ್ರವಾಗಿ ತರಲು ಸಾಧ್ಯ. ಇದನ್ನು ಗಮನದಲ್ಲಿಟ್ಟುಕೊಂಡು ರಾಜ್ಯ ನಗರಾಭಿವೃದ್ದಿ ಸಂಸ್ಥೆಯು, ಕೆ.ಎಂ.ಆರ್.ಪಿ ಯೋಜನೆಯಡಿ ನಗರ ಸ್ಥಳೀಯ ಸಂಸ್ಥೆಯ ಅಧಿಕಾರಿಗಳಿಗೆ ವಿಕೋಪ ಸಂಭವಿಸುವ ಮೊದಲು ಮತ್ತು ನಂತರ ಯಾವರೀತಿಯ ಕಾರ್ಯಕ್ರಮಗಳನ್ನು ಹಮ್ಮಿಕೊಳ್ಳಬೇಕು ಎನ್ನುವ ಬಗ್ಗೆ ನಗರ ವಿಕೋಪ ನಿರ್ವಹಣೆ ಕುರಿತು ಮೂರು ದಿನಗಳ ತರಬೇತಿ ಕಾರ್ಯಕ್ರಮವನ್ನು ಹಮ್ಮಿಕೊಂಡಿದೆ. ಈ ನಿಟ್ಟಿನಲ್ಲಿ ನಗರ ಸ್ಥಳೀಯ ಸಂಸ್ಥೆಯ ಅಧಿಕಾರಿಗಳಿಗೆ ವಿಕೋಪ ನಿರ್ವಹಣೆಯಲ್ಲಿ ಈ ಕೈಪಿಡಿಯು ಪೂರಕವಾಗುತ್ತದೆ ಎಂದು ಭಾವಿಸಿದ್ದೇನೆ.

ಸದರಿ ಕೈಪಿಡಿಯನ್ನು ಸಿದ್ದಪಡಿಸಲು ಶ್ರಮಿಸಿದ ಡಾ. ಆರ್. ಧರ್ಮರಾಜು, ಮತ್ತು ಡಾ. ಜಿ. ವಿಶ್ವನಾಥ್, ಭೋದಕರು, ವಿಕೋಪ ನಿರ್ವಹಣಾ ಕೇಂದ್ರ, ಆಡಳಿತ ತರಬೇತಿ ಸಂಸ್ಥೆ, ಮೈಸೂರು ಇವರಿಗೆ ಧನ್ಯವಾದಗಳು.

ದಿನಾಂಕ:
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ಮೊದಲ ಮಾತು

ಏಷ್ಯಾದ ಜ್ಞಾನಕೇಂದ್ರವಾಗಿರುವ ಕರ್ನಾಟಕವು ವಿಶ್ವದ ಬಂಡವಾಳ ಹೂಡಿಕೆದಾರರನ್ನು ತನ್ನತ್ತ ಸೆಳೆಯುತ್ತಿದ್ದು, ತೀವ್ರಗತಿಯಲ್ಲಿ ನಗರೀಕರಣಗೊಳ್ಳುತ್ತಿರುವ ದೇಶದ ಪ್ರಮುಖ ರಾಜ್ಯಗಳಲ್ಲಿ ಒಂದಾಗಿದೆ. ರಾಜ್ಯದಲ್ಲಿ ಶೇಕಡ 32 ರಷ್ಟು ಜನಸಂಖ್ಯೆ ಇಂದು ನಗರ ಪ್ರದೇಶಗಳಲ್ಲಿ ಕೇಂದ್ರೀಕರಣಗೊಂಡಿದ್ದು ಹಲವಾರು ಸಮಸ್ಯೆಗಳ ಅಸ್ಥಿತ್ವದ ಮೂಲಕೇಂದ್ರವಾಗಿದೆ. ದೇಶದ ಆರ್ಥಿಕತೆಗೆ ಶೇಕಡ 60 ರಷ್ಟು ಕೊಡುಗೆ ನೀಡುತ್ತಿರುವ ನಗರ ಪ್ರದೇಶಗಳಿಂದು ಪ್ರಾಕೃತಿಕ ಹಾಗೂ ಮಾನವನಿರ್ಮಿತ ವಿಕೋಪಗಳಿಗೆ ತುತ್ತಾಗುತ್ತಿದ್ದು ಅಮೂಲ್ಯ ಮಾನವ ಸಂಪತ್ತು, ಕೋಟ್ಯಾಂತರ ರೂ ಮೌಲ್ಯದ ಚರ ಸ್ಥಿರ ಆಸ್ತಿಗಳ ನಾಶದ ಜೊತೆಗೆ, ಲಕ್ಷಾಂತರ ಜನರನ್ನು ವಸತಿ ಹೀನರನ್ನಾಗಿಸಿದೆ. ವಿಕೋಪಗಳ ಮೂಖಸಾಕ್ಷಿಗಳಾಗಿ ಬದುಕುಳಿದ ಜನರು ಮಾನಸಿಕವಾಗಿ ಮತ್ತು ದೈಹಿಕವಾಗಿ ಜರ್ಜರಿತರಾಗುತ್ತಿದ್ದಾರೆ.

ರಾಜ್ಯವು ಹೆಚ್ಚಾಗಿ ನೈಸರ್ಗಿಕ ಹಾಗೂ ಮಾನವ ನಿರ್ಮಿತ ವಿಕೋಪಗಳಿಗೆ ಒಳಪಡುವುದಲ್ಲದೆ, ಅಧಿಕವಾಗಿ ಬರಗಾಲವನ್ನು ಎದುರಿಸುತ್ತಿದೆ. ನಗರ ಪ್ರದೇಶಗಳು ಹೆಚ್ಚಾಗಿ ಬೆಂಕಿ ಆಕಸ್ಮಿಕ ಹಾಗೂ ಅಧಿಕ ಮಳೆಯಿಂದುಂಟಾಗುವ ಪ್ರವಾಹಗಳಿಗೆ ತುತ್ತಾಗುತ್ತಿದು, ಜನದಟ್ಟಣೆ ಮತ್ತು ವಸತಿದಟ್ಟಣೆಯಿಂದಾಗಿ ಉಂಟಾಗುವ ದುಷ್ಪರಿಣಾಮಗಳು ದ್ವಿಗುಣವಾಗಿವೆ.

ಸಂವಿಧಾನದ 74 ನೇ ತಿದ್ದುಪಡಿಯು ಅನುಸೂಚಿ 12ರಲ್ಲಿ ನಗರ ಸ್ಥಳೀಯ ಸಂಸ್ಥೆಗಳು ನಿರ್ವಹಿಸಬೇಕಾದ ಪ್ರಮುಖ 18 ಕಾರ್ಯಗಳನ್ನು ಪಟ್ಟಿಮಾಡಿದ್ದು, ಈ ಕಾರ್ಯಗಳು ಸಮರ್ಪಕವಾಗಿ ನಿರ್ವಹಿಸಲ್ಪಟ್ಟಲ್ಲಿ ವಿಕೋಪಗಳು ಸಂಭವಿಸಿದಾಗಲು ಉಂಟಾಗುವ ಪರಿಣಾಮಗಳ ಪ್ರಮಾಣವನ್ನು ತಗ್ಗಿಸಬಹುದಾಗಿದೆ. ಈ ಉದ್ದೇಶವನ್ನೊಳಗೊಂಡು, ರಾಜ್ಯ ನಗರಾಭಿವೃದ್ಧಿ ಸಂಸ್ಥೆಯು, ಆಡಳಿತ ತರಬೇತಿ ಸಂಸ್ಥೆಯ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಕೇಂದ್ರದ ಸಹಯೋಗದಲ್ಲಿ, ನಗರ ಸ್ಥಳೀಯ ಸಂಸ್ಥೆಗಳ ಅಧಿಕಾರಿಗಳಿಗೆ, ನಗರ ವಿಕೋಪಗಳು ಸಂಭವಿಸುವ ಮುನ್ನ ಹಾಗೂ ಸಂಭವಿಸಿದ ನಂತರ ಯಾವ ಕ್ರಮಗಳನ್ನು ಯಾರು ತೆಗೆದುಕೊಳ್ಳಬೇಕೆಂಬುದರ ಕುರಿತು 'ನಗರ ವಿಕೋಪ ನಿರ್ವಹಣೆ' ಎಂಬ 3 ದಿನಗಳ ತರಬೇತಿ ಕಾರ್ಯಾಗಾರವನ್ನು ಹಮ್ಮಿಕೊಂಡಿದೆ. ಸದರಿ ಕಾರ್ಯಕ್ರಮವು ನಗರ ವಿಕೋಪ ನಿರ್ವಹಣೆ ಕುರಿತು ಒದಗಿಸುವ ಜ್ಞಾನವು, ವಿಕೋಪಗಳು ಘಟಿಸಿದ ಸಂದರ್ಭದಲ್ಲಿ ಉಪಯುಕ್ತವಾಗಿದೆ ಎಂದು ಆಶಿಸುತ್ತೇನೆ.

ಮೂರು ದಿನಗಳ ತರಬೇತಿ ಕಾರ್ಯಕ್ರಮ ರೂಪಿಸಲು ನಮಗೆ ಮಾರ್ಗದರ್ಶನ ನೀಡಿದ ಸರ್ಕಾರದ ಮಾನ್ಯ ನಗರಾಭಿವೃದ್ಧಿ ಸಚಿವರಾದ ಶ್ರೀ ಎಸ್. ಸುರೇಶ್ ಕುಮಾರ್ ರವರಿಗೆ, ಮಾನ್ಯ ಪೌರಾಡಳಿತ ಸಚಿವರಾದ ಶ್ರೀ ಬಾಲಚಂದ್ರ ಲ. ಜಾರಕೀಹೊಳಿ ರವರಿಗೆ, ಶ್ರೀ ಸುಬೀರ್ ಹರಿ ಸಿಂಗ್, ಐ.ಎ.ಎಸ್. ಸರ್ಕಾರದ ಅಪರ ಮುಖ್ಯ ಕಾರ್ಯದರ್ಶಿಗಳು, ನಗರಾಭಿವೃದ್ಧಿ ಇಲಾಖೆ, ಸರ್ಕಾರದ ಕಾರ್ಯದರ್ಶಿಗಳಾದ ಶ್ರೀ ಶಂಭು ದಯಾಳ್ ಮೀನಾ, ಐ.ಎ.ಎಸ್. ನಗರಾಭಿವೃದ್ಧಿ ಇಲಾಖೆ ಇವರಿಗೆ ಹಾಗೂ ಶ್ರೀ ಅಂಜುಮ್ ಪರ್ವೇಜ್, ಐ.ಎ.ಎಸ್. ಆಯುಕ್ತರು, ಪೌರಾಡಳಿತ ನಿರ್ದೇಶನಾಲಯ, ಬೆಂಗಳೂರು ಇವರಿಗೆ ನಾನು ಕೃತಜ್ಞನಾಗಿದ್ದೇನೆ. ತರಬೇತಿ ಕಾರ್ಯಕ್ರಮ ವಿಷಯಗಳ ಪಟ್ಟಿ ಸಿದ್ದಪಡಿಸುವ ಪ್ರತಿ ಹಂತದಲ್ಲು ಮಾರ್ಗದರ್ಶನ ಮಾಡಿದ ಮತ್ತು ಸಲಹೆ ಸೂಚನೆಗಳನ್ನು ನೀಡಿ ಪ್ರೋತ್ಸಾಹಿಸಿದ ನಮ್ಮ ಆಡಳಿತ ತರಬೇತಿ ಸಂಸ್ಥೆಯ ಮಹಾ ನಿರ್ದೇಶಕರಾದ ಡಾ. (ಶ್ರೀಮತಿ) ಅಮಿತಾ ಪ್ರಸಾದ್ ರವರಿಗೆ ನಾನು ಕೃತಜ್ಞನಾಗಿದ್ದೇನೆ. ಸದರಿ ಕೈಪಿಡಿಯನ್ನು ತಯಾರಿಸಲು ಶ್ರಮಿಸಿದ ಡಾ. ಆರ್. ಧರ್ಮರಾಜು, ಡಾ. ಜಿ. ವಿಶ್ವನಾಥ್, ಭೋದಕರು, ವಿಕೋಪ ನಿರ್ವಹಣಾ ಕೇಂದ್ರ, ಆಡಳಿತ ತರಬೇತಿ ಸಂಸ್ಥೆ, ಮೈಸೂರು ಇವರಿಗೆ ಧನ್ಯವಾದಗಳು.

ದಿನಾಂಕ:
ಸ್ಥಳ: ಮೈಸೂರು

(ಪ್ರಾಣಲಿಂಗ ಶಿವಸಾಲಿ)

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TRAINING PROGRAMME ON URBAN DISASTER MANAGEMENT

About the Course

Karnataka is one of the most highly urbanized states with over 30% of the people living in urban areas. A few cities like Bangalore, Mysore, Hubli-Dharwad etc., are growing very fast and other small and medium towns are faced with inadequate infrastructure. The increasing population coupled with development activities in these areas is the cause of concern as there is increasing the risk due to various manmade and natural disasters. The result is the increased vulnerable population and infrastructure. There is need for comprehensive training to the functionaries to effectively plan and mitigate the disaster risks and prepare for immediate response during disasters.

The unique geophysical setting, unplanned development activities and population increase make this region vulnerable to all types of natural as well as human induced disasters. Each one of them impinges its own signature with variation in terms of destruction, death, disability, diseases, panic and fear among the population at risk and creates a "complex emergency" to bring back normalcy for the victims. In this context, following issues needs to be addressed.

- Urban vulnerability
- Urban Flood and Control measures
- Bomb blasts and disposal safety
- Chemical disasters
- Urban fires and management
- Earthquake and cyclone- resistant buildings and infrastructure
- Incorporation of disaster vulnerability into land-use planning, and multi-hazard planning for cities
- Introduction of regulatory measures in industrialized Crosscutting issues, which are directly influencing the vulnerability of urban population, such as rapid urbanization, environmental degradation, climate variations, etc., also have contributed negatively.

There is need to build the capability of the functionaries to face the disasters.

Methodology

The course uses participatory techniques such table top exercises, case studies, projects, demonstrations, mock drills, action planning, micro-films and lessons in the course.

Aim of the Course

The course aims at developing skills of the officers working as disaster management teams to effectively manage different phases of disasters in urban areas.

Objectives

At the end of the course, participants will be able to;

- Identify various urban disasters
- Conduct urban HRVC analysis
- Prepare urban disaster risk mitigation plans
- Develop response action plans during disasters in urban areas

Outcome

- Participants would prepare city disaster management plan as follow up of the course
- Apply tools for Urban Risk Analysis
- Practice and rehearse the implementation of mitigation, relief and response action plans

Target Group

The Group A and B officers – Commissioners, Chief Officers, SE, AEE, Health Officers, AEs and JEs of Urban Local Bodies.

Validation

Apart from daily assessment, the course will be validated by using immediate reaction questionnaires and oral feedback by the participants at the end of the course.

Certification:

The participants will be awarded Certificate on successful completion of the course in the validation session.

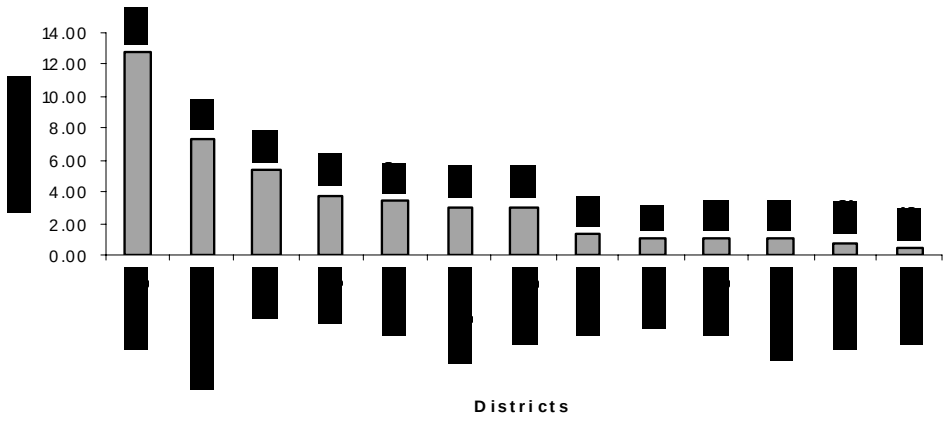
DISASTER VULNERABILITY PROFILE OF KARNATAKA

Cyclones and Severe Cyclones, Winds and Coastal Erosion

Karnataka state has been confronting various natural hazards. The coastal districts namely Dakshina Kannada, Udupi, Uttara Kannada with a coastal line of 350 kms and coastal population of 43.64 Lakhs are under the direct threat of cyclones and severe cyclones originating in Arabian Sea and indirect attack of cyclones originating along the Eastern coastline. The high density of population along the coastline of Karnataka has made the population highly vulnerable to the storm surge and high speed wind accompanied with cyclone. Any severe cyclone along the eastern coastline causes heavy rainfall in the interior Karnataka region resulting in damages to crops, buildings, and infrastructure services such as roads and often the impact would be severe disruption in the socio-economic life in these regions. It is important to note that infrastructure such as rail and road networks which are adjacent to the sea coast are constantly threatened by the erosion caused by giant sea waves particularly during storm surges and cyclones The state is incurring huge expenditure almost every year on prevention of coastal erosion for the 350 Kms of coastal line. The State has been placed under Category (II) A - Low Vulnerability along with other states of Maharashtra, Kerala and Tamil Nadu.

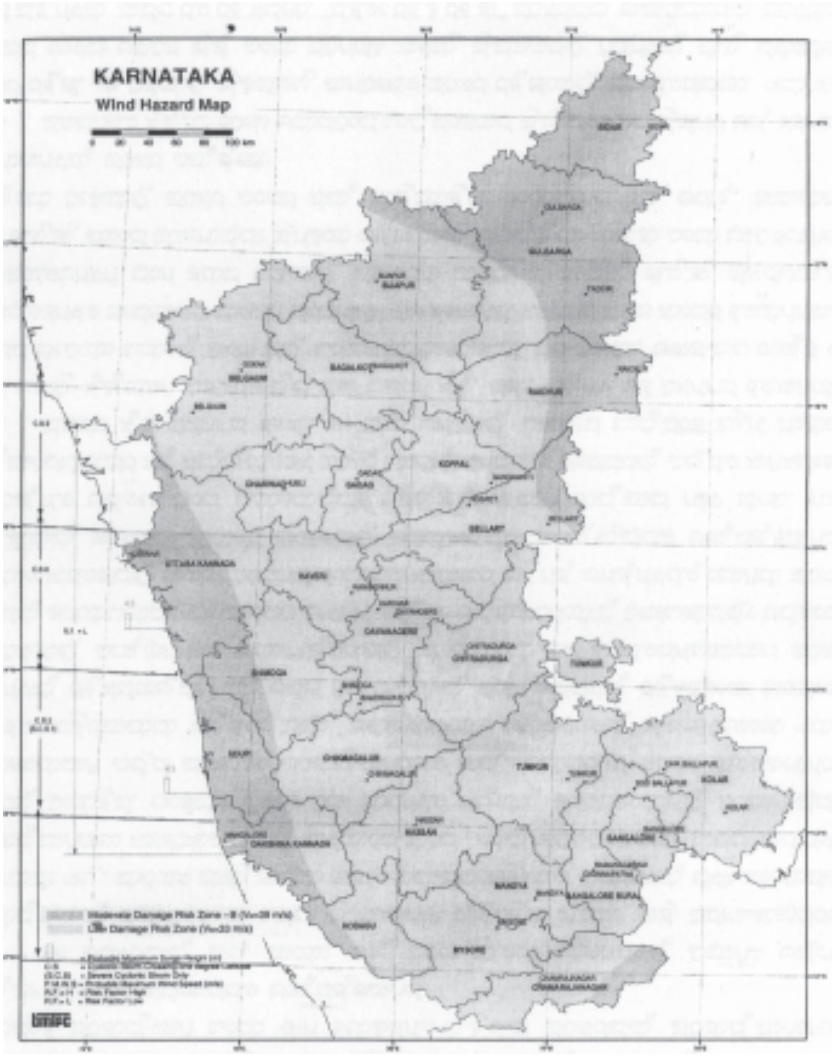
Out of total geographical area of 190.238 Lakh ha, about 44.92 lakh ha area covering 15 districts and 50 taluks is affected by winds and cyclones which is falling under moderate risk zone (Vs=39m/s) and remaining area falls under low damage risk zone (33m/s).

Districts affected by Cyclones and Wind in Karnataka



Apart from coastal erosion, the coastal areas are facing disasters such as boat capsizing due to extreme weather conditions in the sea. The recent boat capsizes on 29th May, 2006 at Malpe Port at Udupi and Oil spillages at Karwar Port are a few examples. The incident of Boat capsizing on 29th May, 2006 has lead to a loss of property of Rs. 1.34 Crores and death of 6 fishermen. The Oil spillage incident near Karwar Port is a different experience in Karnataka as it happened for the first time on 30th May, 2006.

These coastal areas are surrounded by western Ghats, west flowing rivers, high rain fall, Konkan railway running close to sea, land bars between sea and rivers with minimum road link between land bars and main land, higher coastal population density with most of the coastal area at the mean sea level.



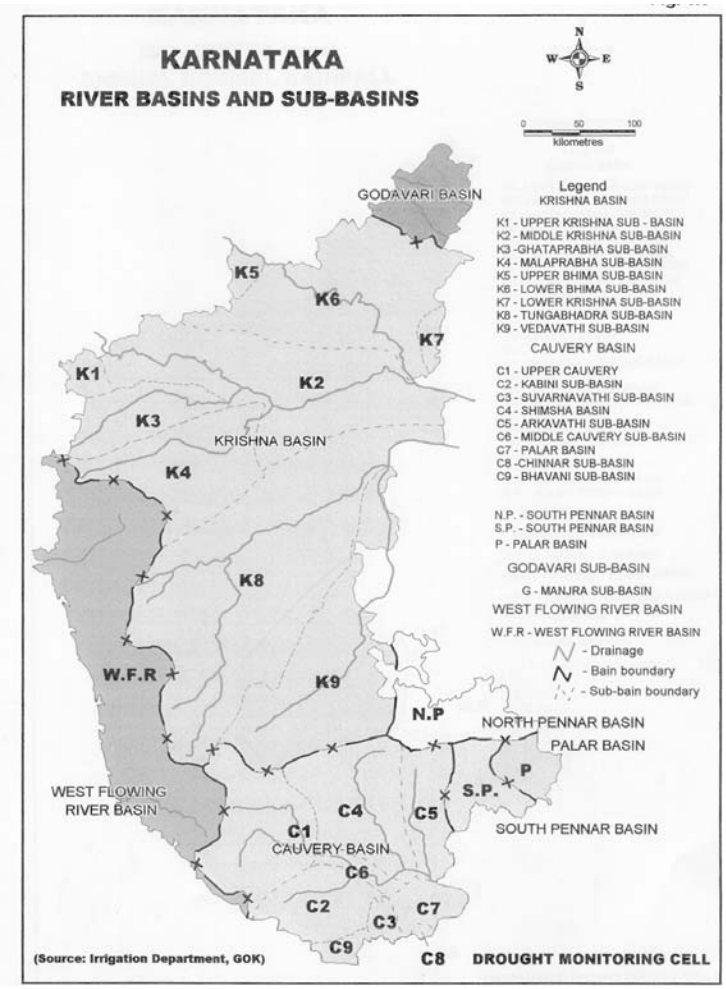
BMTPC : Vluinerability atias-2nd Edition: Poor Group.
MoH&UPA:Mao is Baslc Wind Sceed Map.IS875(3)-1987; Cvclone Data, 1877-2005. IMD.GOI

Floods

Almost all the districts in Karnataka are facing the brunt of moderate to severe floods. Floods are associated with cloud bursts, cylones or depressions in the Bay of Bengal and Arabian Sea. The floods are quite common in the following districts;

1. Belgaum, 2.Bijapur, 3. Bagalkote, 4.Raichur, 5.Gulbarga, 6.Shimaoga, 7.Chikkamagalur, 8. Udupi, 9. Coorg, 10. Bellary, 11. Dakshina Kannada, 12. Dharwad, 13. Davanagere, 14. Gadag, 15. Hassan, 16. Uttara Kannada, 17. Koppal, 18. Bidar, 19. Bangalore (R), 20. Bangalore(U), 21. Kolar, 22 Mandya, 23. Mysore, 24. Chamaraja-nagara. In the North Karnataka region covering the Krishna and Godavari Basins, even when the state was suffering under drought like conditions, heavy discharges from Maharashtra caused floods. The floods in the Districts of Gulbarga, Belgaum, Bijapur, Bidar, Bagalkot, Raichur etc., as a result of outflow of excess water from the Krishna and Bheema Basins from Maharashtra have affected 12 lakh people leaving behind 20,000 damaged houses, 1.6 Lakhs hectares of damaged crops in 2006 and 2005. Cities are facing floods causing severe damages to infrastructure services and loss of life.

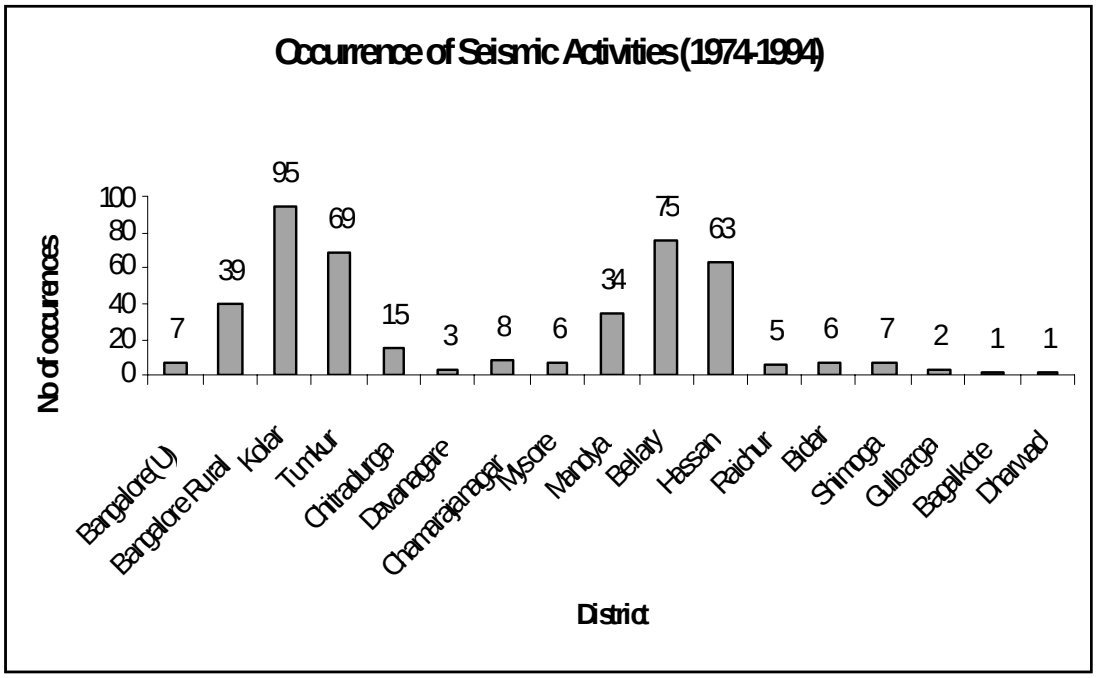
As against the annual average rainfall of 830.5 mm in Bangalore Urban district , 568.5 mm, which is 75% of the average annual rainfall occurred in a period of two months in September and October, 2005. An excess of 289.2 mm rainfall is reported in just 3 days, As per the assessment report of Bangalore Urban District, 3 persons died, 7491 houses collapsed and 10,000 houses were inundated. Apart from these effects, about 253 tanks were overflowing and basic infrastructure such as water supply, roads, bridges, electricity, telephones etc., were cut off in most parts.

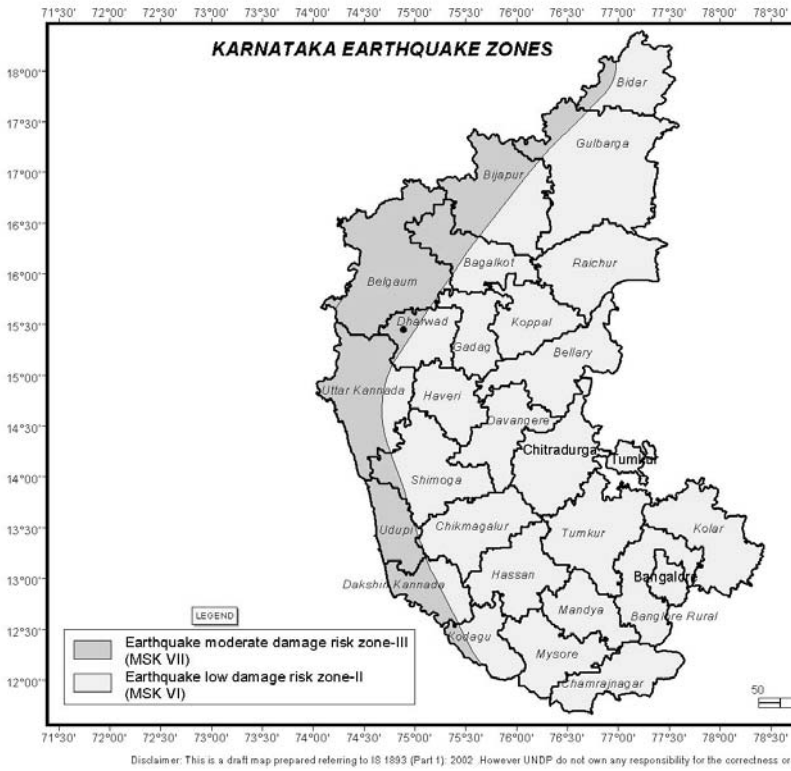


Earthquakes

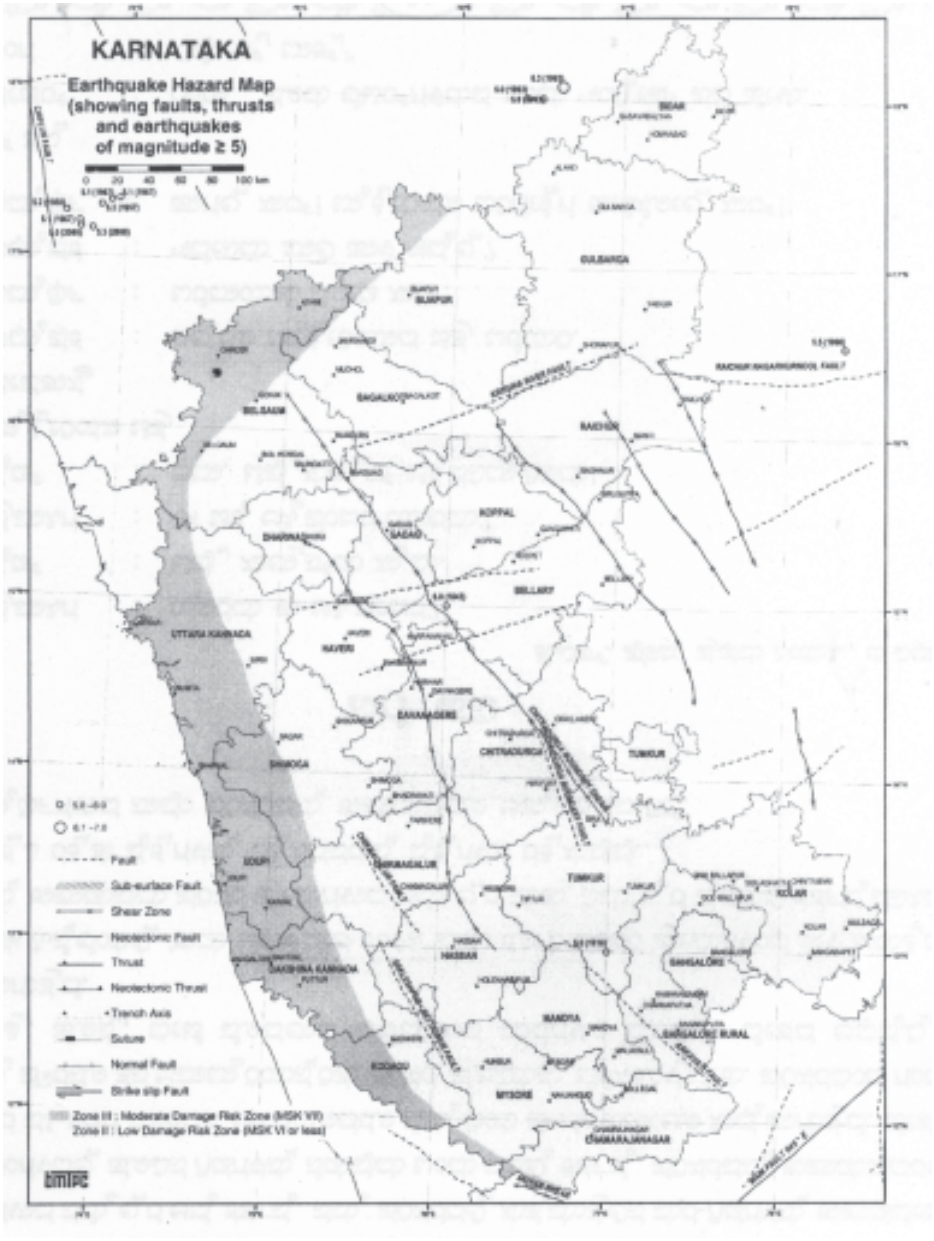
As per the Revised Earthquake Hazard Mapping, 22.13% of the total geographical area is under Moderate earthquake damage risk zone & remaining area of the state is under low damage risk zone. The state of Karnataka has reported more than 500 earthquake tremors in the last three decades with most of them having low magnitude. It is found that the weak zones around the northern Karnataka bordering Maharashtra could cause heavy damages in future. The areas of southern part of Karnataka are also not free from frequent tremors. The Karnataka state is categorized as moderate to low seismic risk zone. The following Districts are falling in Zone III (Moderate Damage Risk Zone (MSK VII);

Bidar, Gulbarga, Bijapur, Bagalkot, Belgaum, Dharwad, Uttar kannada, Shimoga, Udupi, Dakshina Kannada, Kodagu. All other Districts are falling under Zone II (Low Damage Risk zone MSK VI). The chart shows the occurrence of earthquake activities in Karnataka.


Occurrence of Seismic Activities (1974-1994)
No of occurences
100
80
60
40
20
0
7
39
95
69
15
3
8
6
34
75
63
5
6
7
2
1
1
Bangalore(U)
Bangalore Rural
Kolar
Tumkur
Chitradurga
Davanagere
Chamarajanagar
Mysore
Mandya
Bellary
Hassan
Raichur
Bidar
Shimoga
Gulbarga
Bagalkote
Dharwad
District

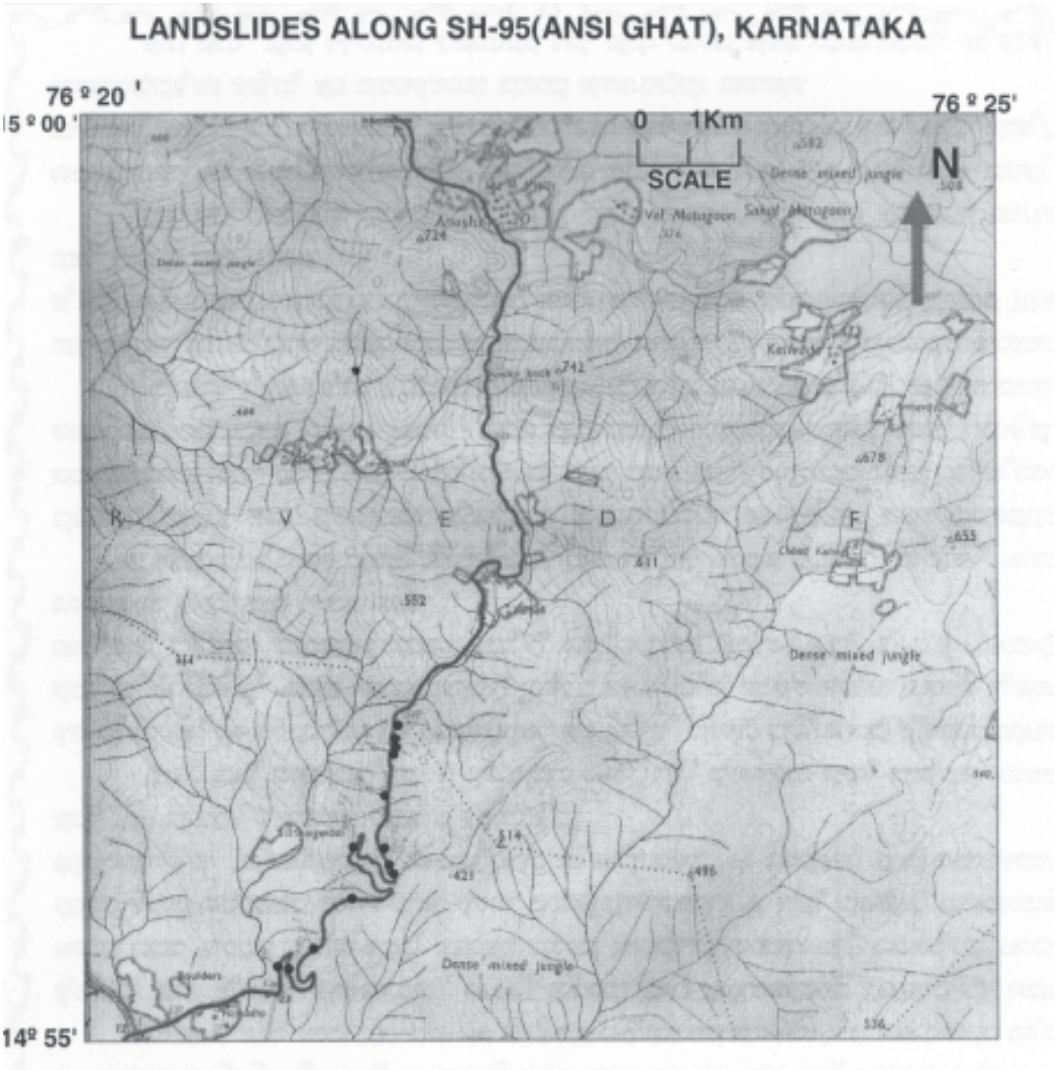

KARNATAKA EARTHQUAKE ZONES
Bidar
Gulbarga
Bijapur
Bagalkot
Raichur
Belgaum
Dharwad
Koppal
Gadag
Bellary
Uttar Kannada
Haveri
Davangere
Chitradurga
Tumkur
Shimoga
Udupi
Chikmagalur
Tumkur
Kolar
Hassan
Bangalore
Dakshin Kannada
Mandya
Bangalore Rural
Kodagu
Mysore
Chamrajnagar
LEGEND
Earthquake moderate damage risk zone-III (MSK VII)
Earthquake low damage risk zone-II (MSK VI)
50
Disclaimer: This is a draft map prepared referring to IS 1893 (Part 1): 2002. However UNDP do not own any responsibility for the correctness or

Seismic Zones of Karnataka - Indicating Earthquakes Vulnerability of Areas



Landslide

Hilly regions of Western Ghats spread in the districts of Kodagu, Chikmagalur, Hassan, Shimoga, D.Kannada and U.Kannada record a very high normal rainfall of 2000mm to 4000mm. Landslides are common in these districts. During the rainy periods these hilly regions regularly experience displacement of rocks and soils causing widespread damage to property, infrastructure such as rails, roads and loss of human life.



Landslide Profile of Western Ghat in Karnataka

Landslides recorded along NH-206 and SH-50 between Jog fall and Honavar: 37 Land slides

- 37 land slides are recorded in this ghat section in between nearly 60 km stretch.
- The majority of the slides were found to be debris slides
- The slides are shallow with less than 2m depth.
- The general slope angle varies from25° to 35°
- The slopes are moderately vegetated.
- The overburden thickness varies from 1-5m and consists of soil and weathered rock.
- The cut slope angle is 70° to 80° with height varying from 2-15m.

- The cut slopes have failed due to heavy rain in the Ghat section during monsoon.
- Geologically the area comprises of weathered granite, gneisses and laterite.
- One rock slide with planner failure is observed in this section.

Landslides recorded along Shiradi Ghat, NH-48- 20 land slides

- The majority of the slides were found to be debris slides
- The slides are shallow with less than 2m depth.
- The general slope angle varies from25° to 35°
- The slopes are moderately vegetated.
- The overburden thickness varies from 1-5m and consists of soil and weathered rock.

The cut slope angle is 70° to 80° with height varying from 2-15m.

- The cut slopes have failed due to heavy rain in the Ghat section during monsoon.
- Geologically the area comprises of weathered gneisses and granulites.
- One rock slide with wedge failure is observed in this section

Landslides along SH 88-Madikere Mangalore Road-24 Slides

- The majority of the slides were found to be debris slides
- The slides are shallow with less than 2m depth.
- The general slope angle varies from25° to 30°
- The slopes are thickly vegetated.
- The overburden thickness varies from 1-5m and consists of soil and weathered rock.
- The cut slope angle is vertical with height varying from 2-15m.
- The cut slopes have failed due to heavy rain in the Ghat section during monsoon.
- Geologically the area comprises of weathered granite.
- Few rock slides with planner and wedge failures are observed in this section.

Landslides along Sh 89-Madikere- Siddapura Road-5 Slides

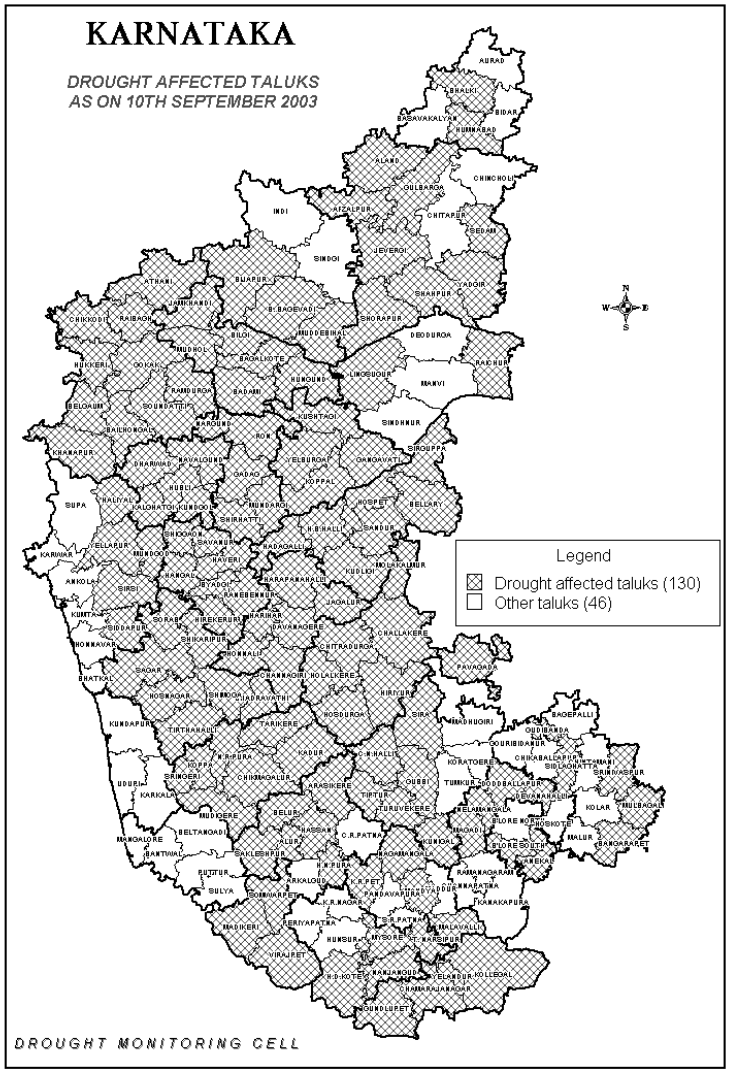
- All are debris slides
- Triggered by heavy rainfall. The vertical cut slopes have failed due to toe cutting.

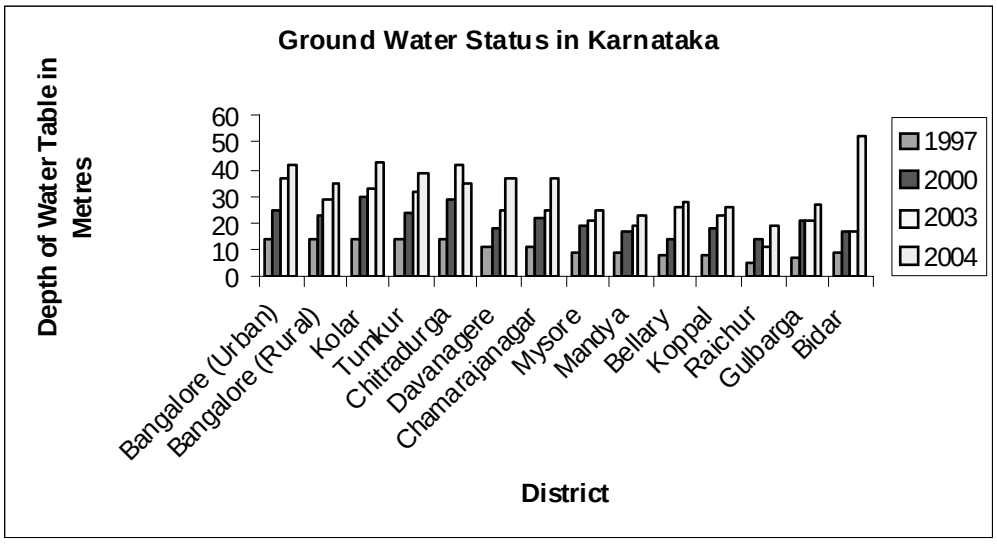
Landslides along Sh 95-Karwar-Kumbarwada Road (Ansi Ghat)-14 Slides

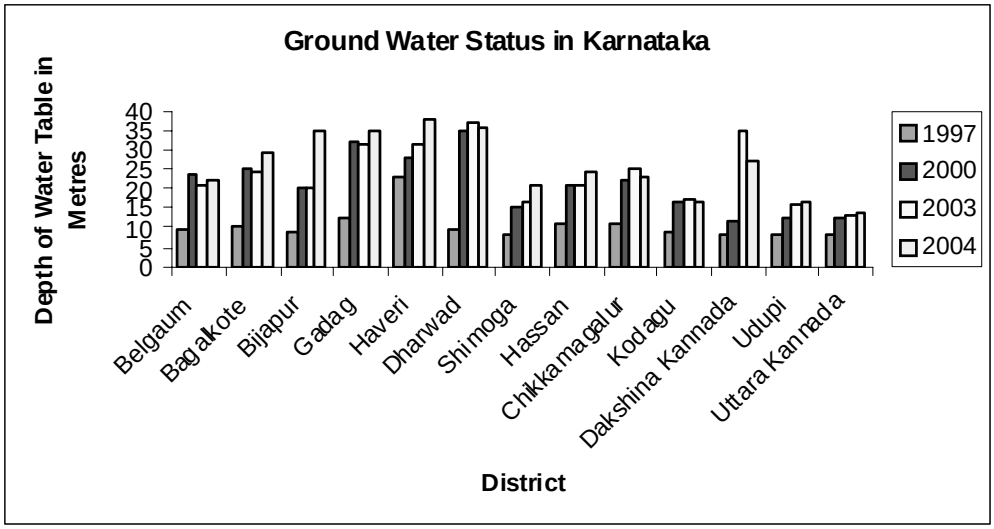
- All are debris slides
- Triggered by heavy rainfall. The vertical cut slopes have failed due to toe Cutting.

Drought

Drought is meteorologically related disaster. Karnataka stands Second only to Rajasthan in terms of Drought Affected areas. The state is highly vulnerable to drought as compared to its neighbouring states. About 152.1 Lakhs ha (80%) out of 190.238 Lakh ha is affected by drought in Karnataka. Groundwater levels are depleting due to successive droughts and quality of water is getting deteriorated in terms of Fluoride, Nitrate and Salinity. Although, drought may not pose great danger immediately within a few minutes as could happen in case of a severe earthquake, it has huge impact on the occurrence of loss of livelihoods, exodus, poverty, unrest, terrorism, robbery etc. The map below shows 130 drought affected taluks in Karnataka in 2003.



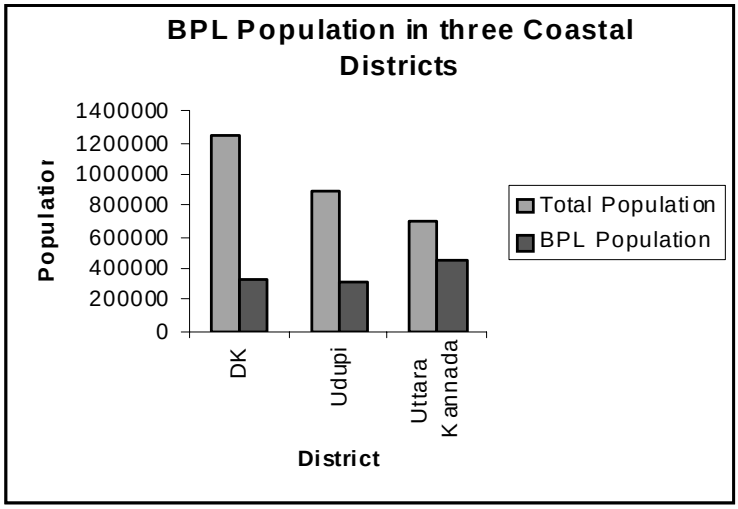




Population in the Coastal Districts of Karnataka Vulnerable to Cyclone Risk

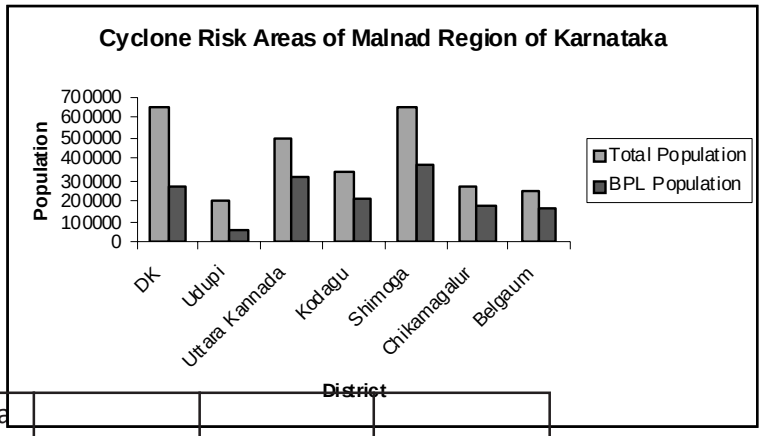
The table illustrates the no. of Taluks, GPs and population. The vulnerability of population living below the poverty line in coastal districts of Karnataka is very high.

District	No. of Taluks	No. of Grama Panchayats	Total Population	BPL Population	% of BPL Population
DK	2	91	1243211	316800	25.48
Udupi	2	99	904923	315820	34.90
Uttara Kannada	5	97	704764	460665	65.36



Population in the Malnad Zone Districts of Karnataka Vulnerable to Cyclone Risk

The chart and table below indicate the details of cyclone vulnerable areas in Malnad region comprising the districts of DK, Udupi, Uttara Kannada, Kodagu, Shimoga, Chikamagalur and Belgaum.

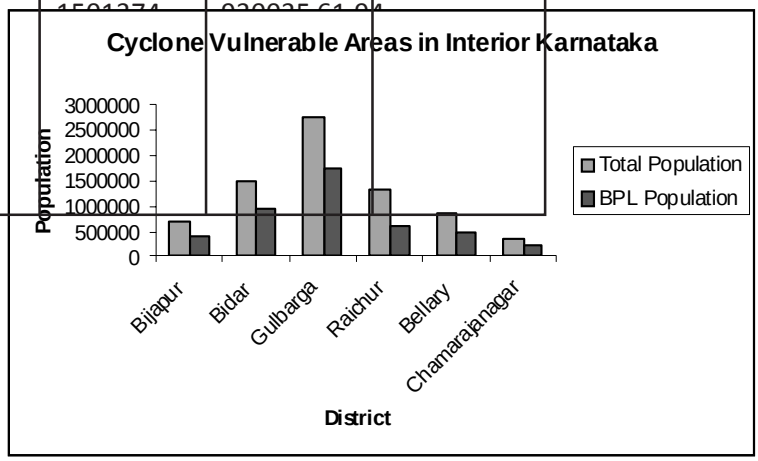


District	No of Taluks	No. of Grama Panchayats	Population	Population	Population
DK	3	108	653192	271490	41.56
Udupi	1	40	204571	64540	31.55
Uttara Kannada	5	99	504541	311584	61.75
Kodagu	2	58	339341	212230	62.54
Shimoga	4	141	642467	373435	58.13
Chikamagalur	3	59	265850	177040	66.59
Belgaum	1	51	243154	160000	65.80

Population in the Districts of Interior Karnataka Vulnerable to Cyclone Risk

The following chart and table provides the details of Districts, taluks, GPs and the cyclone vulnerable population in the interior Karnataka

District	No of Taluks	No. of Grama Panchayats	Total BPL Population	% of BPL Population	Population
Bijapur	2	84	683114	414105	60.62
Bidar	5	177			
Gulbarga	9	295			
Raichur	4	131			
Bellary	2	66			
Chamarajanagar	1	38			



DISASTERS IN URBAN AREAS – ISSUES AND OPTINS FOR EFFECTIVE MANAGEMENT

Dr. Ashok S Sanganal

May it refer to the disposal of solid waste, water supply, epidemic control, disposal of dead bodies, floods during rainy season, fires etc., the Urban Local Bodies have been providing crucial inputs in the management of disasters. The Karnataka Municipal Acts of 1965, 1976 and amended there on have given ample responsibilities to ULBs to manage the disasters almost on daily basis. The 74th CAA has stressed on the major functions for Urban Local Governments which include planning including multi-hazard planning, fire services, epidemic control, disposal of dead bodies and maintenance of crematoria, water supply, public health and sanitation, emergency works etc. The impact of an earthquake would be very high in a densely populated urban centre as compared to a rural area in terms loss of human lives, damage to property and other core infrastructure. The urban population is growing at the rate of 3% per annum and the urban slum population is increasing at an average of 5 to 8% in major cities predominantly with unsafe shelters.

Urban Flood Management

Floods are increasing both in urban and rur
Heavy rainfall and consequent rise in flood lev
areas, inadequate capacity of drains, encroach
and debris in the drains, asphalting or concret
water are the important causes.

The picture above shows the natural drain where the rain water used to flow freely. Over a period, these natural drains have been encroached and inadequate drains have

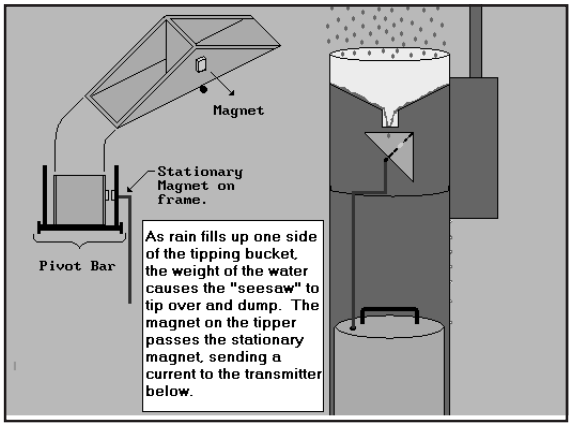
been constructed by occupying the area. The picture below illustrates how a natural drain is converted into a small drain in which debris is being thrown.

Important Actions for Flood Management

Early Warning

- All villages and wards must have rain gauzes: the sophistication of these rain gauzes may vary in relation to vulnerability.

Type of terrain	Recommended number of rain gauges
Flat	1 + 1 per 4 sq km
Average	1 + 1 per 2 sq km
Mountainous	1 + 1 per sq km

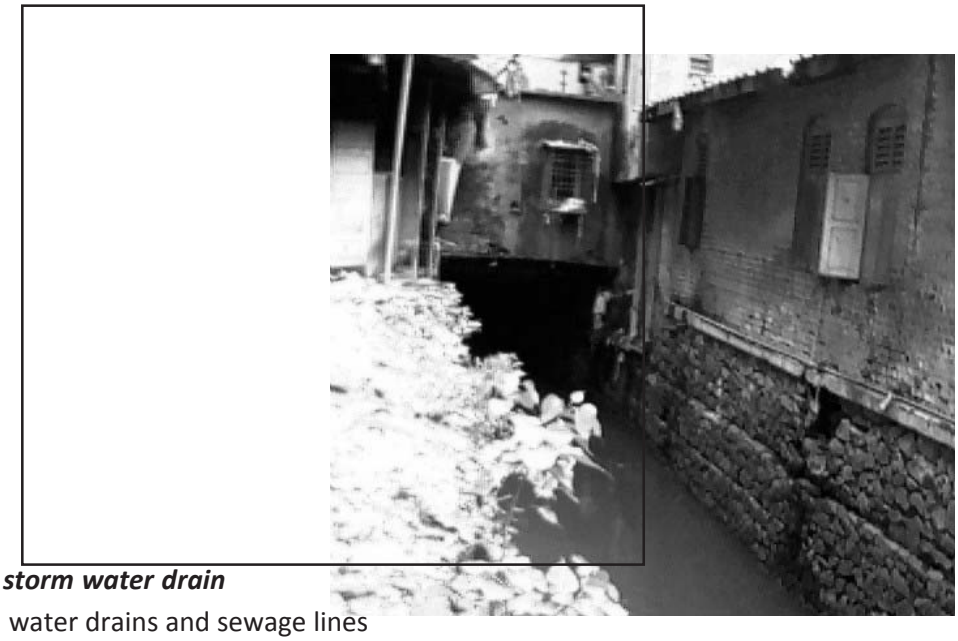


- In all medium and big cities and flood-prone sites, telemetric weather stations and flow gauzes be installed, which provide real-time information to the control rooms in district and state capitals.

- Satellite-based communication network reinforced by wireless network be set up in all districts and state. Wireless network should have multi-media capabilities. It must include public broadcast facility.
- Arrangement with Ham radio operators
- Radio, television, and mobile networks to be used for disseminating early warning messages
- Area to be affected by floods, Information upon intensity of rainfall and rising waters
- Specify helpline and control room telephone numbers

Preparedness and Response

- Identify flood shelters: it should generally be a public building like school or community hall situated on a higher level
- Prepare for food and drinking water, either through pre-contracting or through NGOs / CBOs / local institutions / cooperatives
- Conduct pre-monsoon meetings and direct all the agencies to prepare their own contingency plans for fuel, generators, medicines, boats, buses and trucks
- Remove encroachments on Storm water drains



Encroachment on storm water drain

- Clean storm water drains and sewage lines
- Clean nallas / natural drainage channels
- Identify flood-prone areas: provide information upon these areas to the people
- Identify direction of flow of floodwaters and caution people on the basis of run-off
- Strengthen first responders: constitute search and rescue teams, strengthen fire brigade and equip police and para-military battalions for search and rescue teams.

- A centralized facility for training search and rescue teams.
- Develop an institutionalized interface with the Armed Forces and Para-military forces through annual preparedness meetings

Mitigation Efforts

- Floodplain mapping: needs to be undertaken for all the flood-prone areas. It provides the basis for vulnerability analysis. Local engineering colleges to prepare floodplain maps.
- Maps to be prepared on GIS platforms. These maps need to be updated on the basis of satellite images and ground checking.
- Floodplain management has to be an independent specialization through courses and career positions
- Protecting and improving natural drainages constitute the most important mitigation measure. For every metropolitan city and district, natural drainage system be mapped, and all the developments which interfere or interrupt the natural drainage, must be disallowed legally. The locus standi for the enforcement of these regulations should lie with the people. The existing encroachments on natural drainage systems are removed, and the capacity for run-off be enhanced.
- Rainwater harvesting: Rainwater harvesting to be made mandatory through legislation- this would reduce flooding during the monsoons and act as sources of water during the summers. All government buildings and other buildings > 500 Sq m to have rainwater harvesting.
- Solid waste management: Adequate measures to prevent solid waste coming into urban drainage systems. Adequate penal measures supplemented by structural measures in drainage systems to arrest the solid waste from clogging the drains. Unnecessary packaging to be taxed.

manages and protects all the wetlands in consultation with the state governments

- State-funded mitigation and insurance program be instituted which provides financial assistance and cheaper insurance to the people relocating from floodplains. All the floodplains should then be no-development zones.
- Assistance for private housing and household recovery: Soft loans be made available for private housing reconstruction and household recovery.
- Embankments: Embankments / bunds actually aggravate the flooding. Embankments / bunds need to be constructed on a very selective basis. Many existing embankments / bunds must be retired.

Breaching of embankment due to flood

The embankments/bunds of natural tanks and irrigation channels have to be strengthened and renovated periodically to prevent breaching and resultant damage and losses due to flood.

The flood planes and natural water bodies in most of the cities and towns are occupied and developed. As a result, the cities are facing severe floods during rainy season. Cities are also facing poor storm water drainage management and during incessant and heavy rainfall, the storm water rushes on the asphalt roads and low lying areas resulting in flash floods since the storm drains do not have the capacity to drain such huge quantity of water. Most of the roads do not have proper camber and adequate inlet drain points. This leads to flooding and stagnation of rain water on the surface of roads which results in potholes on the roads and road accidents. The settlements located at low lying areas in cities are facing submergence during rainy season.

The most frequently occurring disasters in urban areas are floods. The most vulnerable tend to live on low-lying land, have low-incomes, less employment opportunities and less access to essential services. Generally marginalized and often impoverished groups, tend to be the most affected. Poverty affects people's capacity to cope with floods. Factors contributing to poverty and vulnerability to flood disasters are:

- Low income
- Poor shelter
- Lack of access to public services
- Lack of savings or insurance

During medium and severe floods, many of these people are the most vulnerable, and incur significant losses and damages. Large and costly structural interventions would contribute to convincing the people into a false sense of security 'through encouraged unimpeded development in areas where devastating floods would nevertheless inevitably occur'. Therefore the urban policies should aim at addressing factors contributing to vulnerability, such as urbanization, poverty, poor environmental management and uncontrolled development.

The important reasons for flooding in urban areas are;

- Inadequate storm drainage and clogging of drains
- Poor quality of housing
- Uncontrolled development on flood plains
- Slums and squatters coming up on low lying and marginal areas such as embankments, natural drainage paths etc.
- Lack of awareness among public about the flood hazard
- Lack of warning system

Many cities have come up on floodplains as the lands provided ideal conditions for growth. The costs involved in the flood protection structures, relief and rescue operations are very

high. Some times, land usage upstream affects the downstream areas. The urban local bodies need to prepare the vulnerability profile of the city by studying the physical, geological, chemical, social and other processes. In some cases, the untreated sewage water is discharged into natural water bodies and valleys resulting in health risks.

The development activities and priorities by the Urban Local Government in the city should be determined by proper land use planning. The settlement expansion should be away from the flood plain area. Land-use planning can be used to control human development on the floodplain, which in turn, aims to reduce the vulnerability of its inhabitants to flooding. The land use planning should bring about the effective use of flood plain and regulate land use in such a manner that the development activities and infrastructure are not located on the flood plain. The following are the important measures;

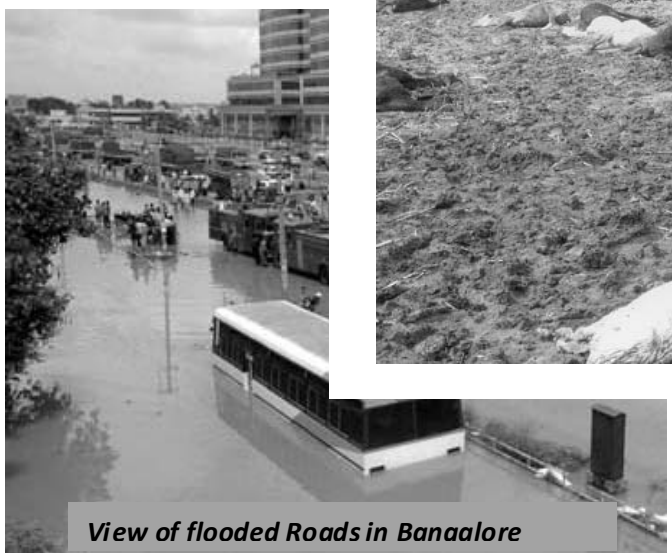
- Prevent illegal settlements on flood plains
- Use flood plain for activities such as forestry, gardening, tree plantation, vegetation etc.
- No reclamation of land falling on flood plain should be allowed
- New settlements should be avoided on flood plains
- Flood water detention facilities and rain water harvesting structures, porous road surface could be done
- Construction of embankment along the natural water tanks/rivers to prevent inundation of densely populated city areas.
- Awareness to people on the dangers of drainage blockage and responsibility of public to keep them unclogged.
- Relocate the people to safer areas who have settled in flood plain areas
- Grow more plants and trees around the housing colonies
- Adopt rain water harvesting structures for all houses in the settlement
- Storage ponds could be constructed for storing access flood water. Such area could be reserved for such purpose throughout the year to reduce the risk of floods

Though these regulations are important to reduce the flood risk in urban areas, they are not easily done by the Urban Local Governments as most of the areas are built up and social structures well developed. People resist any new location or occupation or practice. If these regulations are to be implemented, then there is a need for adequate compensation, which could be enormous and beyond the capacity of the Urban Local Government.

Karnataka has experienced severe floods. The floods in the Districts of Gulbarga, Belgaum, Bijapur, Bidar, Bagalkot, Raichur etc., as a result of outflow of excess water from the Krshna and Bheema Basins from Maharashtra have affected 12 lakh people leaving behind 20,000 damaged houses, 1.6 Lakhs hectares of damaged crops in 2006 and 2005. Other districts namely Uttarakannada, Udupi, Mangalore, Shimoga, Kodagu, Chikkamagalur have also faced flood damages.

As against the annual average rainfall of 830.5 mm in Bangalore Urban district, 568.5 mm, which is 75% of the average annual rainfall, occurred in a period of two months in September and October, 2005. An excess of 289.2 mm rainfall is reported in just 3 days, As per the assessment report of Bangalore Urban Distric
10,000 houses were inundated. Apart from th
and basic infrastructure such as water supply, r
cut off in most parts.

Livestock loss at Ukumnal Village



View of flooded Roads in Banaalore

Role of Urban Local Government in City Disaster Management Plan

In the event of a disaster, the services rendered already by the Local Bodies could be extended to the disaster site in a most efficient manner and within the quickest possible time as they are trained and experienced in the delivery of these services. It is noteworthy to see that under the Municipality Act, one of the special functions of Local Bodies is to take immediate action to manage any emergency/disaster situations within their jurisdiction.

In respect of Earthquake Disaster Management, the role of Local Government particularly in the pre-disaster stage is essential. As poor planning and construction practices by the public have resulted in massive deaths and destruction of buildings due to earthquakes, floods and cyclones. The local authority such as Village Panchayat/Municipal Corporation/ Development Authority have to evolve building bye-laws that regulate the people, private developers and the Government agencies to adopt earthquake and flood/cyclone resistant planning and design parameters in the building construction. The pre-disaster planning requires mitigation, preparedness and prevention measures. The standard operating procedure for the Local Governments for pre-disaster stage could include the following important functions;

- Preparing and up-dating of vulnerability profile of the area
- Maps of the city and communication network to easily locate the sites
- Set up local teams incorporating the elected representatives, community, officials of different departments to ensure the implementation of bye-laws
- Set of guidelines for issuing building license for safety against disasters
- Instructions to Banks and financial institutions to loan only if the safety measures are taken in the plans, designs and construction
- Inspect the existing buildings and assess the strength against earthquake forces
- Initiate action to retrofit the buildings by the owners if the buildings are weak against earthquake, cyclone, flood etc. depending on the type of vulnerability
- Organise awareness training among the public on construction practices and safety rules
- Conduct training for masons, contractors, engineers on safe and simple construction practices
- Identify important buildings such as hospitals, schools/colleges etc., and retrofit such buildings for safety and for use as relief shelters during the event.
- Identify prepare inventory of various resources manpower, materials and equipment and if possible acquire them for immediate deployment during the disasters.

The city disaster management plan has to be prepared considering the severity of both man made and natural disasters. The plan should be prepared taking into account the vulnerability analysis, hazard and disaster analysis, inventory of resources and standard operating procedures. The directory of all the institutions, departments, key individuals, location of resources etc., are very important in urban disaster management.

No doubt, the response has to come from all the line departments responsible for disaster management such as Police, Revenue, Fire, Paramilitary forces, Health, Forest, Food and Civil Supplies, Public works etc., the Local Governments along with these departments should initiate effective immediate response action on rescue, relief and rehabilitation. Following are some of the important operating procedures for urban local bodies.

- Mechanism to locate the victims and ensure their safety
- Removing victims from debris and evacuating to safer areas/relief shelters
- Setting up of relief shelters for the victims
- Arrangement of equipment and vehicles necessary such as loaders, bulldozers, ambulances, transport vehicles etc.
- Immediate medical aid/treatment to the injured and place for treatment
- Setting up of road, transport and other infrastructure and removing and clearing the rubble and debris
- Coordinating the humanitarian assistance such as food, clothing, water, medicines etc.
- To ensure water supply, public sanitation and epidemic control at the site
- Psyco-social care to the victims through the community volunteers and arranges counseling by the professionals.
- Arrange for disposal of dead
- Arrange for treatment of animals and disposal of dead animals

In anticipation of any disaster, the Urban Local Governments and all the line departments such as health, public works, agriculture, veterinary, police and fire etc., need to be geared up with all the measures to face the consequences. The precautionary measures such as control room, VHF stations, telephones, power supply, food & water supply and health care etc., should be ready within minimum possible reaction time.

Role of Elected Representatives of Urban Local Bodies in Preparedness and Mitigation Plans

The elected representatives including presidents of Local Bodies should be involved in the preparation of Local and District Disaster Management Plans. The past history of disasters, extent of severity and damage, rescue and restoration need to be done by seeking the opinions and advise of the representatives of the Local Bodies. Since they are closer to the people and more familiar with geographical area, they could be of great help in mapping the risk prone areas town-wise and habitation-wise. The elected representative along with NGOs and Officials of the concerned departments could effectively identify and map the natural resources, liveli-hoods, properties, housing type (houses that are weak), location/identification of possible hazards, identification of poor, old aged, disabled, children and pregnant women, cattle population and crops. The past history of disasters can also be obtained from them.

Role of Local Governments in Multi-Hazard Planning and Building Bye-laws

It is matter of great concern that the existing building bye-laws and land use zoning regulations do not adequately provide for multi-hazard safety provisions. Combined with this is the fact that the safety provisions were not strictly enforced.

The local Governments need to prepare and modify their building bye-laws and zoning regulations to be accountable for the safety provisions. The building license and occupation certificates should be issued to the owners only if the requirements of fire safety norms in buildings including the fire fighting arrangements and installations required in building conform to the provisions of National Building Code of India. If the height of building is 15 m and more, clearance of the Director of Fire Services needs to be obtained. It is the duty of the Local Government/Municipality to examine the unsafe buildings in the city and initiate strict action on the owners to take measures to retrofit or repair such structures. The buildings which are unsafe against the forces of earthquakes, floods, cyclones, fires, self and live loads need to be assessed and action to be taken until such buildings are made strong by additional strengthening and repairs.

The Local Governments/Municipalities should ensure that all buildings built either of local materials such as mud and stones or of materials such as cement and steel should be constructed with earthquake resistant features. Proper monitoring is required to plan, design and construct earthquake resistant buildings. Simple thumb rules for ordinary load bearing masonry buildings and earthen buildings are necessary since such buildings constitute 80 to 90% of the total building stock.

There are many instances of fires in high rise buildings, schools, cinema halls, factories, circus, huts etc., It is therefore necessary to ensure proper exit points free from obstructions with clearly marked signs and illumination so that occupants could easily escape safely in the event of fire or any disaster. Fire fighting equipment and alarm devices are to be installed at suitable locations. In high rise buildings the safety requirements such as fire lift, fire staircase, and fire water tank, internal and external fire hydrants with booster pumps and necessary water supply connection as per the norms of National Building Code need to be installed. If the height of building is more than 25 meters, diesel generators are required in case of failure of electricity. At least two fire extinguisher of capacity of 5 kg each should be made available at each floor in high rise buildings.

Urban Local Government to Ensure General Building Requirements for Earthquake and Flood Prone Areas

- Wherever soils are subjected to liquefaction under earthquake shaking, Such soils should be improved by compaction to desired density

- Whenever buildings are to be constructed on steep slopes, slope stability has to be ensured by soil nailing, terracing and by retaining walls.
- The life line buildings and other important buildings such as schools, hospitals, Government Offices, community centers, industrial and commercial buildings, cinema halls, kalyana mantapas need to take special care for earthquake resistant construction
- The buildings which are used for evacuation shelters in the event of disaster should be constructed with disaster resistant features.
- In black cotton soils, it is preferable go for pre-cast pedestal or under reamed piles for foundation
- In flood prone areas, embankments/bunds construction and raising the area above the flood level are to be done.
- Proper drainage paths to drain the water
- Construction on deep foundations below the depth of scour
- Flood proofing works such as revitalization of drainage channels, providing additional water ways, clearing of clogged cross drainage etc., are required
- Accommodation at higher elevation for evacuating the people during floods should be planned in advance

The following precautions should be taken while constructing masonry and earthen buildings in urban areas. Proper monitoring is required by the ULB in implementation of these guidelines.

Role of Urban Local Government at Different Phases of Disaster

District Disaster Management Authority (DDMA) is entrusted with the overall responsibility of disaster management with the support of local authority and line departments and other agencies. Yet, the Local Government plays key role at all three phases of disaster. Following functions although overlap with various other stake holders, the Local Government assumes greater role along with the support of various players/agencies. Following table illustrates the roles of Urban Local Government.

Functions of Urban Local Government "Before, During and After" the Disaster

Before the Disaster	During the Disaster	Post-disaster
Review the disaster situation in the town Identify, prepare and update the map of disaster prone areas and evolve strategies	Municipal Commissioner/ Chairperson as Disaster Manager Recast and implement the standard operating procedures Provide basic facilities such	Construction and restoration of temporary roads with support of PWD and other departments Assessing damage

Assign the roles and responsibilities to different functionaries Ward task forces to mobilize resources and deploy at the site. Develop early warning system Develop IEC materials and disseminate through TV, Radio posters, phamplets and Cinema and news papers on preparedness and mitigation measures by the community Utilize resources of other line departments Locating alternative routes, relief shelter, storage points, facilities available, most vulnerable points etc. Develop Standard operating procedures for each functional section within the urban local body Formation of disaster management task force at every ward level comprising elected councilor, NGO/CBO members, Community members, Municipal Officials, Officials of other concerned departments	as water, cloth, food and blanket etc. Arrange and deploy vehicles Co-ordinate with other line departments and NGO/CBO/Police etc., for support Evacuate people to disaster shelters Arrange for emergency and medical relief such as blood, medicines etc. with help of Medical dept. Deployment of fire brigade Call National Disaster Response Force for rescue and relief and for specialized jobs. Ensure proper utilization of rescue and relief materials through logistic arrangement Distribution of Relief materials Record keeping of affected people and damage assessment Procurement and transportation of relief materials Monitoring all activities systematically in co-ordination with all other line departments by setting functional sections such as information and communication, safety, Operations, Planning, Logistics, Administration and Accounts	Interim supply of food, drinking water, medicines, lighting facility to the affected victims in relief shelters Maintain law and order with the help of police Start restoration work Disburse the relief package as per the standards to the victims Identify safer and potential location for resettlement Use the opportunity to convert the resettlement into a developed area Provide livelihood & income generation opportunities to the victims Provide psycho-social care and trauma counseling to affected victims Take up disaster resistant housing Setting up of community kitchen if required Restore communication, electricity, schools, roads etc. Develop a long term plan for the overall development of the resettlement Documentation of experiences and best practices Work with all the line departments, NGOs, CBOs, Community, Donors etc., to provide the most effective rehabilitation project

The masonry and earthen load bearing buildings need to be retrofitted with all round

lintel band, plinth band and through stones/through concrete elements/bond stones. The wire mesh and cement mortar are used for bands.

The Urban Local Governments have to identify the buildings such as hospitals, schools/ colleges, Industrial structures, residential buildings, Government buildings including the Municipality etc., and some measures need to initiate by the ULB to retrofit the buildings if they are unsafe.

Conclusion

The Urban Local Government has to take major responsibility as compared to any other agency/department in the area of disaster management. Since most of the services that are needed before, during and after the disaster of any kind are falling within the domain of these Local Governments, appropriate powers, functions and a management structure is required for each ULB. The assistance of additional funds, rescue and relief support from the Police/ Forces or any other department or NGO or the community needs to be dovetailed with the Urban Local Government.

As seen from the discussion, the framework for urban multi-hazard planning has to be strengthened. All municipalities need to revise their building bye-laws and zoning regulations to incorporate the safety provisions. Training, awareness, and drilling programmes for the Officials, engineers, doctors and all others involved including ward level task force members are required on a regular basis.

URBAN FLOOD MODELLING AND DISASTER RISK MANAGEMENT

Brief description

A change to proactive management of water-related disasters in urban areas requires an identification of the risk, the development of strategies to reduce that risk, and the creation of policies and programmes to put these strategies into effect. Computer-based modelling is invaluable for this purpose. It is used for assessing the potential for a hazard to occur and a vulnerability analysis to provide an understanding of the consequences should an event of a certain magnitude and frequency occur. Based on model results, various mitigation measures can be evaluated to assess their ability for reducing risk exposure.

This course introduces current theory and practice of flood risk estimation and modelling of floods in urban areas. It provides hands-on practice with industrial standard software. The main objective of this course is to provide the most up-to-date information on the topic of urban flood modelling and disaster management and to enable participants to be more effective in applying modelling tools and techniques for urban flood management.

Different modelling approaches are considered and they range from data driven to physically based, from conceptual to detailed 1D-2D modelling. These approaches are then embedded in the wider context of flood risk assessment and disaster management. This wider context considers everything from how the urban planning process should take place in areas with potential flood risks, to urban hydrology, climate change, flood hazards, environmental impacts, public health issues and the conceptual design of flood protection schemes.

Target group

The course is designed for professionals (engineers, scientists and managers/planners) active in the urban water sector, especially those involved in using simulation models for planning of drainage networks and water-related disaster management activities. Participants will be familiar with planning, design, operation and maintenance of urban drainage systems. Pre-requisites are a basic knowledge of hydraulics and hydrology.

Additional information

Key subject areas include:

Urban Development Planning and Asset Management	The course starts with the wider picture and considers how flood risk is managed as part of the urban development planning and asset management process.
Urban Hydrology and Climate Change	This will give participants an understanding of how the rainfall-runoff process occurs and what would be the implications of different climate change scenarios.

System Performance Assessment	This part of the course will consider the procedure of how to build safe and reliable urban drainage models and how to evaluate a system's performance against different standards (design, environmental, public health, etc.).
Flood Risks	Flood risks due to the following types of urban floods will be considered: (Fluvial) Flooding resulting from rivers breaching or overtopping flood defences and inundating urban areas; (Coastal) Flooding resulting from tidal or storm surges in cities close to the coast or deltas; (Pluvial) Flooding caused by heavy rainfall exceeding the capacity of the drainage systems; Flash floods caused by rapid response of ephemeral streams to heavy rainfall, related, inter alia to steep slopes.
Flood Inundation Modelling	1D, 1D-1D and 1D-2D flood inundation modelling approaches will receive particular attention during the lectures and hands-on exercises.
Supporting Technologies	The course will discuss and demonstrate the benefits of using supporting technologies such as GIS and Remote Sensing, Flood Forecasting and Early Warning Systems, Decision Support and Information Systems. Particular attention will be given to the use of in-situ flow/level and rainfall gauges and the use of weather radar.
Flood Risk Estimation and Management	In this part of the course, the participants will be introduced into different ways of assessing and managing urban flood risks through a source-pathway-receptors framework. Special attention will be given to the selection of different structural and non-structural measures including Sustainable Drainage Systems (SuDS).
Modelling Uncertainty	It is important to note that evolution of floods in urban areas is caused by several interrelated

	factors and as such modelling of their dynamics and impacts should not be considered as a precise activity. This part of the course will address different sources of modelling uncertainty and its influence on estimation of flood impacts.
Theory and Practice of Disaster Management	This part of the course will discuss both theoretical and practical aspects of proactive disaster management practice. It will connect all previously covered aspects for formulation of strategies for disaster prevention, mitigation, response and recovery. Particular attention will be given to the vulnerability analysis and model-based estimation of flood damages. Different probabilities of floods and depth-damage curves will be considered. Also, practical aspects with respect to design and implementation of real-life information systems will be discussed.

Examination

It is possible to take part in the examination of this short course. If you obtain a passing mark for this examination and return to UNESCO-IHE within four years after completion of the short course to follow a full MSc programme, you will receive exemption for this short course/module. The costs for this exam are •250 extra and should be borne by yourself. Taking part in the examination is not compulsory.

PERSPECTIVES OF URBAN DISASTER MANAGEMENT

Vinod Sharma
Chandrani Bandyopadhyay

Disasters have been mankind's constant companion since time immemorial. The unfailing record of regularity and destruction of most disasters have made it an area of serious concern throughout the world. Extensive human interference in natural processes often act as detonators to other disasters, natural or otherwise. It is sad but true that "development" of the humankind has, in more ways than one, exacerbated the hazard conditions, giving rise to disaster situations. The environmental concerns voiced today have the possibility of becoming disasters tomorrow, if immediate measures for prevention and mitigation are not undertaken in right earnest.

In India, the concern relates to multi-hazard vulnerability. This is mainly on account of its geographical position, climate and geological setting, which makes it one of the most disaster-prone areas of the world. The heavy concentration of rainfall within a span of three months in most areas of the country causes heavy runoff, leading to high floods, uprooting people, disrupting livelihoods and damaging infrastructure. On the other hand, non-availability of moisture during the greater duration of the year, particularly in the arid and semi-arid regions makes 68% of the country's landmass vulnerable to drought. The fragility of the Himalayan mountain ranges is a continuing source of concern for their high vulnerability to earthquakes, landslides and avalanches. Cyclones strike the coastal regions of the country nearly every year.

Urbanization Process and its Implications

Increased urbanisation has been one of the most prominent features of the society in the post- Industrial Revolution era. Almost half of the world's population lives in cities, where all kinds of human activities are concentrated. In India and other parts of the developing world, the urbanisation pattern has been marked by rapid development of metropolitan areas and urban agglomerations and stagnation of small and medium towns. In India, more than a quarter of the urban population lives in metropolises and mega-cities. It is estimated that by 2025, the urban component, will be more than 50%. This trend shows a migration pattern to metros not only from rural areas but also from smaller urban areas.

Excessive urbanisation of metros as witnessed in India has resulted in occurrence of major disasters, both natural and man-made. The continuous process of migration to these centres in search of better livelihood and living conditions manifest in slums and squatter settlements as the basic services are inadequate and unavailable. In most of the larger cities, 30-60% people reside in squatter settlements. The carrying capacity of land and infrastructure is greatly compromised with due to excessive pressures of population. In

cities like Delhi and Kolkata, population density in some areas often exceed 150,000 p/sq. Km; for example, the Walled City of Delhi has a density of 166,300 p/sq. Km. The demand for land in cities has led to the use of marginal land, prone to natural hazards such as floodplains, unstable slopes and reclaimed land unsuitable for habitation. While deterioration of environment and the local eco-system becomes the direct fallout of this uncontrolled expansion, greater vulnerability to disasters are an added complication. Moreover, most disasters have more complex ramifications in urban areas. Added to this is the threat of dangers like fires, building collapse etc, the vulnerability of urban areas acquires new dimensions. Infact, the inherent complexities of urban settlements result in cities that are often more vulnerable than surrounding rural areas.

Nature of Urban Risks

Most prominent among the disasters striking urban settlements frequently are floods and fire, with occasional incidences of earthquakes, landslides and cyclones. Urban seismic risk is rapidly increasing, particularly in developing countries, where a number of mega-cities are growing. Cities are vulnerable to disasters, particularly to earthquakes, which can strike any city suddenly without warning. Once an earthquake takes place in a large city, the damage can be tremendous both in human and economic terms. Even an intermediate earthquake can cause destructive damage to a city as in the cases of the 1995 earthquake in Kobe, Japan and the 1999 earthquake in Kocaeli, Turkey.

Studies indicate that the loss of life and property due to floods has been increasing over the past decades. The prime reason for this is unplanned urban growth on the banks of the rivers and in other low-lying areas. The floods of Punjab in 1993 and those of Haryana and Delhi in 1995 are cases in point. The slum clusters adjoining the banks of the Yamuna in Delhi have to go through the ritual of periodic shifting to another location when the water level of the river rises every monsoon. On return, they have to face water-borne diseases. Recovery from this annual ritual takes a long time in the absence of economic means, community support structures and facilities that aid recovery.

Fires have more localised effects but have emerged as a critical issue in urban planning due to the rising frequency of fire accidents, leading to huge losses of life and property. While the Uphaar Cinema Fire Tragedy of June 1997 that led to the death of 57 people out to enjoy a movie show, the Sadar Bazar Fire last month is a fresh example of uncontrolled urban growth. The high-rise buildings all over the city may become raging inferno any moment. While fire-fighting abilities are essential, they are basically curative measures. Preventive measures like land use zoning, land sub-divisions, implementation of building regulations are required to address this issue effectively.

Urban areas suffer from constant environmental hazards, which may take the form of a disaster at any point of time. The quality of air, water, sanitation and infrastructure often pose to be health risks. Delhi is the world's fourth most polluted city. The health costs of

ambient air pollution in Delhi alone is reported to be US$ 100-400 million. The poor environmental conditions in many areas often lead to epidemics like dengue, gastroenteritis etc.

The location of industrial units within the cities lead to urban pollution and increased risk from toxic emissions and effluents. While the Bhopal Gas Tragedy of 1981 is a moot case of an industrial disaster with far-reaching impacts, small-scale and hazardous industries in urban villages (Laldora areas) are veritable storehouses of hazardous chemicals.

Recent Disasters and their Ramifications in Urban Areas

Disasters, more often than not, transcend geographical and political boundaries. Thus both urban and rural areas face the brunt of disasters that strike the area. However, the inherent complications in urban areas manifest in more complex issues and problems in managing disasters. This aspect was brought to the fore by the two recent catastrophic events faced by this country: Orissa Supercyclone in 1999 and Gujarat Earthquake in 2001. Both the events saw near complete devastation of the respective state capitals and the state administrative machinery rendered ineffective.

Gujarat Earthquake: 21 of the total 25 districts of Gujarat were affected in the devastating earthquake of 6.9 magnitudes on the Richter scale. Around 18 towns and 182 talukas in the affected districts saw large-scale destruction. The effect was particularly severe in the Kutch district, where its four major urban centres of Bhuj, Anjar, Bachau and Rapar suffered near-total destruction. Urban areas of Gandhidham, Morvi, Rajkot, Jamnagar and the state capital of Ahmedabad suffered extensive damage. While earlier moderate earthquakes which have struck the country since 1988 consistently demonstrated the vulnerability of rural constructions, this event is significant in that it illustrated the failure of engineered structures to withstand the quake. The collapse of modern RCC frame buildings and damage to dams, bridges and industrial facilities serve to portray the need for strict adherence of building codes and vulnerability studies before construction.

Orissa Super Cyclone: Orissa has a low urbanisation rate of 13.43%, which is lower than the national average. The Supercyclone that struck and ravaged 12 coastal districts of Orissa with a wind velocity of 260-300 Kmph affected an urban population of 1.9 million. About 20 urban settlements were badly affected, among which pilgrim town of Puri, commercial centre of Cuttack, port town of Paradip and state capital of Bhubaneshwar merit attention. It may be mentioned that after a week of the catastrophe, power supply could be restored to only 28% of Bhubaneshwar and 13% to Cuttack.

Bhopal Gas Leak: This incidence at the Union Carbide Chemical Plant in Bhopal, Madhya Pradesh that occurred on 3rd December 1984 was the worst possible industrial disaster in India. Over 40 tons of methyl iso-cyanate and other lethal gases including hydrogen cyanide leaked from chemical plant and caught people unawares, immediately killing 8000 people. 36 municipal wards were affected and have caused lasting and damaging effects to the victims and also future generations.

Some Recent Initiatives in Urban Risk Reduction

Urban Risk Reduction, India: The project aimed at developing a method for integrating risk reduction into urban planning with community participation. Its main objective was to develop and test a methodology combining risk identification with action planning to integrate sustainable risk reduction measures into existing urban planning practices for improving urban settlements vulnerable to environmental degradation and natural hazard. The project sought to test this application in four vulnerable urban communities in Delhi and Ahmedabad and was conducted by Oxford Centre for Disaster Studies (OCDS), National Centre for Disaster Management (NCDM) and Sustainable Environment & Ecological Development Society (SEEDS) in 1997-98.

RADIUS: Risk Assessment Tools for Diagnosis of Urban Areas against Seismic Disasters) initiative was initiated by the secretariat of the International Decade for Natural Disaster Reduction (IDNDR 1990-2000), in 1996, with financial assistance from the Government of Japan. It aimed to promote worldwide activities for reduction of seismic disasters in urban areas, particularly in developing countries. Nine case-study cities were selected and based on the experiences practical tools for earthquake damage estimation and implementation of similar projects were developed so that any earthquake-prone cities might start similar efforts as the first step of seismic risk management.

India Earthquake Safety Initiative: In October 2001, Geo hazards International and the United Nations Centre for Regional Development released a report on the pilot study of the Global Earthquake Safety Initiative (GESI) applied to 21 cities worldwide. The aim of the study, which attempts to measure earthquake lethality potential in selected cities, is to devise appropriate disaster mitigation strategies for urban areas. The process of application of the GESI method to major earthquake prone cities in India is on presently.

Sustainable Urban Development through Preventive Planning

There is a tendency to think that disaster prevention would cost much more than relief activities. However, the reality is the reverse. Our society has been spending a lot of resources for response activities after disasters; these resources could have been drastically reduced if some had been spent for disaster prevention. Relief activities can never save human lives that have already been lost. Response activities can never help immediately resume functions of urban infrastructures that have already been destroyed. The bottom line is that buildings should not kill people by collapsing and infrastructure should not halt social and economic activities of the city for a long time. The stress should be on making cities sustainable through preventive planning and management mechanisms: issues relating to disaster management should be considered within the entire gamut of urban development and management. Sustainable development would ensure that the rainwater that causes water logging relieves the water scarcity problems by rainwater harvesting. The focus should be on a positive interaction between the state and other stakeholders

including the most vulnerable sections. Development activities need to be examined from the perspective of disasters - development should help prevent disasters, development should not become a disaster itself. Immediate and extensive risk assessment studies should be done in all urban areas and a participatory approach adopted for safer cities and a safer tomorrow.

References:

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3. UNISDR: United Nations Initiative towards Earthquake Safe Cities (2001)

ABOUT BOMBS

A bomb is any of a range of explosive devices that typically rely on the exothermic chemical reaction of an explosive material to produce an extremely sudden and violent release of energy. The word comes from the Greek word ?????? (bombos), an onomatopoetic term with approximately the same meaning as "boom" in English. A nuclear weapon employs chemical-based explosives to initiate a much larger nuclear-based explosion.

The term "bomb" is not usually applied to explosive devices used for civilian purposes such as construction or mining, although the people using the devices may sometimes refer to them as bombs. The military use of the term "bomb", or more specifically aerial bomb, typically refers to airdropped, unpowered explosive weapons most commonly used by air forces and naval aviation. Other military explosive devices not classified as "bombs" include grenades, shells, depth charges (used in water), warheads when in missiles, or land mines. In unconventional warfare, "bomb" can refer to any of a limitless range of explosive devices used as booby traps or offensive weapons.

Effects

Detonation causes injury and/or death within the blast radius through three distinct yet inter-related phenomena: shock wave (a.k.a. detonation wave, pressure wave or overpressure), thermal wave and fragmentation.

A shock wave is produced when an explosive event suddenly displaces a volume of air spherically outward from the point of detonation. At its initial creation this phenomenon might best be visualized as a round, thick "shell" of highly compressed air enclosing a vacuum. This shell of pressurized air will expand outward at a speed described by the Chapman-Jouguet condition, typically several to many times the speed of sound.

Even brief exposure to overpressure conditions can cause severe damage, crush injury and death. 1psi overpressure can shatter windows, 5psi can rupture eardrums and shatter a 12-inch concrete wall, and 15psi can cause severe lung damage. Shock waves dissipate as they expand, and the greatest defense against shock injuries is distance from the source of shock. As a point of reference, the overpressure at the Oklahoma City bombing was estimated in the range of 4000psi.

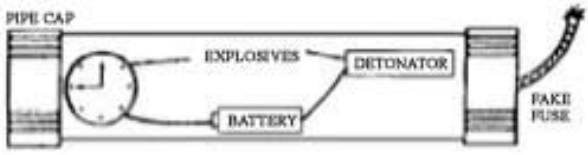
Shock waves produced by explosive events actually have two distinct components, the positive and negative wave. The positive wave shoves outward from the point of detonation, followed by the trailing vacuum space which "sucks back" towards the point of origin as the shock bubble collapses back on itself. This is most clearly observed in footage from the Trinity nuclear test where both the positive and negative effects on buildings are evident.

A thermal wave is created by the sudden release of heat caused by an explosion. Military bomb tests have documented temperatures of 3000 to 4500?F. While capable of inflicting severe to catastrophic burns and causing secondary fires, thermal wave effects are considered

very limited in range compared to shock and fragmentation. This rule has been challenged, however, by military development of thermo baric weapons, which employ a combination of negative shock wave effects and extreme temperature to incinerate objects within the blast radius.

Fragmentation is produced by the acceleration of shattered pieces of bomb casing and adjacent physical objects. This is technically distinct, although practically indistinguishable, from shrapnel, which is physical objects, such as steel balls or nails, added to a bomb specifically to increase injury. While conventionally viewed as small metal shards moving at super- to hypersonic speeds, fragmentation can occur in epic proportions and travel for extensive distances. When the S.S. Grand camp exploded in the Texas City Disaster on April 16, 1947, one "fragment" of that blast was a two ton anchor which was hurled nearly two miles inland to embed itself in the parking lot of the Pan American refinery.

Device originally thought to be a pipe bomb, found to be a time bomb. From a United States government publication.



Experts commonly distinguish between civ
always mass-produced weapons, developed
standard components and intended to be depl
civilian bombs are usually custom-made, developed to any number of designs, use a wide range of explosives of varying levels of power and chemical stability, and are used in many different ways. For this reason, civilian-made bombs are generally referred to as improvised explosive devices (IEDs). IEDs are divided into three basic categories by basic size and delivery. Type 1 IEDs are hand-carried parcel or suitcase bombs, type 2 are "suicide vests" worn by a bomber, and type 3 devices are vehicles laden with explosives to act as large-scale stationary or self-propelled bombs, also known as VBIED (vehicle-borne IEDs).

Improvised explosive materials are typically very unstable and subject to spontaneous, unintentional detonation triggered by a wide range of environmental effects ranging from impact and friction to electrostatic shock. Even subtle motion, change in temperature, or the nearby use of cellphones or radios, can trigger an unstable or remote-controlled device. Any interaction with explosive materials or devices by unqualified personnel should be considered a grave and immediate risk of death or dire injury. The safest response to finding an object believed to be an explosive device is to get as far away from it as possible.

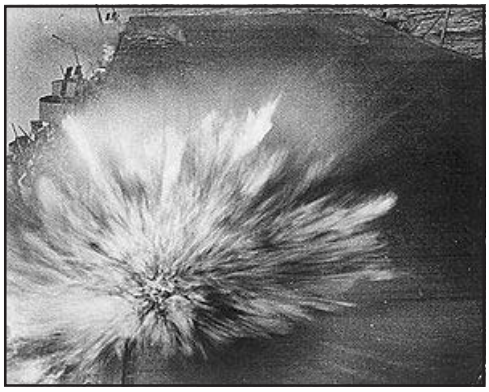
Atomic bombs are based on the principle of nuclear fission, that when a large atom

splits it releases a massive amount of energy. Hydrogen bombs use the energy from an initial fusion explosion to create an even more powerful fusion explosion.

The term dirty bomb refers to a specialized device that relies on a comparatively low explosive yield to scatter harmful material over a wide area. Most commonly associated with radiological or chemical materials, dirty bombs seek to kill or injure and then to deny access to a contaminated area until a thorough clean-up can be accomplished. In the case of urban settings, this clean-up may take extensive time, rendering the contaminated zone virtually uninhabitable in the interim.

The power of large bombs is typically measured in megatons of TNT (Mt). The most powerful bombs ever used in combat were the two atomic bombs dropped by the United States to attack Hiroshima and Nagasaki, and the most powerful ever tested was the Tsar Bomba. The most powerful non-nuclear bombs are the United States Air Force's MOAB (officially Massive Ordnance Air Blast, or more commonly known as the "Mother of All Bombs") and the Russian "Father of All Bombs".

Bombs can also be classified according to the way they are set off and radius of effect.



A Japanese bomb explodes on the flight deck of USS Enterprise, 24 August 1942, during the Battle of the Eastern Solomons, causing minor damage.

The first air-dropped bombs were used by the Austrians in the 1849 siege of Venice. Two hundred unmanned balloons carried small bombs, few bombs actually hit Venice.

The first bombing from a fixed wing aircraft took place in 1911 when the Italians fought Arabs in what is now Libya. The bombs were dropped by hand.

The first significant terrorist bombing in the United States took place nine years later at noon on September 16, 1920 when an explosives-laden horse-drawn wagon, detonated on the lunchtime-crowded streets of New York's financial district. The Wall Street bombing employed many aspects of modern terrorist devices, such as cast-iron slugs added for shrapnel, in a horrific attack that killed 38 and injured some 400 others.

Modern military bomber aircraft are designed around a large-capacity internal bomb bay while fighter bombers usually carry bombs externally on pylons or bomb racks, or on

multiple ejection racks which enable mounting several bombs on a single pylon. Modern bombs, precision-guided munitions, may be guided after they leave an aircraft by remote control, or by autonomous guidance. When bombs such as nuclear weapons are mounted on a powered platform, they are called guided missiles.

Some bombs are equipped with a parachute, such as the World War II "parafrag", which was an 11 kg fragmentation bomb, the Vietnam-era daisy cutters, and the bomblets of some modern cluster bombs. Parachutes slow the bomb's descent, giving the dropping aircraft time to get to a safe distance from the explosion. This is especially important with airburst nuclear weapons and in situations where the aircraft releases a bomb at low altitude.

A hand grenade is delivered by being thrown. Grenades can also be projected by other means using a grenade launcher, such as being launched from the muzzle of a rifle using the M203or the GP-30 or by attaching a rocket to the explosive grenade as in a rocket propelled grenade (RPG).

A bomb may also be positioned in advance and concealed.

A bomb destroying a rail track just before a train arrives causes a train to derail. Apart from the damage to vehicles and people, a bomb exploding in a transport network often also damages, and is sometimes mainly intended to damage that network. This applies for railways, bridges, runways, and ports, and to a lesser extent, depending on circumstances, to roads.

In the case of suicide bombing the bomb is often carried by the attacker on his or her body, or in a vehicle driven to the target. The Blue Peacock nuclear mines, which were also termed "bombs", were planned to be positioned during wartime and be constructed such that, if they were disturbed, they would explode within ten seconds.

The explosion of a bomb may be triggered by a detonator or a fuse. Detonators are triggered by clocks, remote controls like cell phones or some kind of sensor, such as pressure (altitude),radar, vibration or contact. Detonators vary in ways they work, they can be electrical, fire fuze or blast initiated detonators and others.

Source: From Wikipedia, the free encyclopedia

EARTHQUAKE RISK MITIGATION STRATEGIES IN INDIA

C. Ghosh

Keywords: Disaster Management, earthquake, mitigation, building codes

ABSTRACT: About 59% of India's land area is under the threat of moderate to severe earthquake shaking intensity VII and higher. In the last 20 years, 8 major earthquakes have resulted in over 25,000 deaths. The regions far away from the Himalaya and other inter-plate boundaries, which were once considered to be relatively safe from strong shaking, have also experienced several devastating earthquakes. The huge losses of life and property in the earthquake-prone areas of the country have shown that the built-environment is extremely fragile, and country's ability to respond to these events is extremely inadequate. Post earthquake damage survey revealed that 90% of casualties result directly from the collapse of buildings that had usually no earthquakeresistant features. Secondary events, such as landslides, fires, and tsunamis, account for the remaining 10% of the casualties. This emphasizes the need for strict compliance of town and country planning bye-laws and compulsory earthquake-resistant infrastructure design in India. In this paper various national initiatives taken up for the mitigation of earthquake and related hazards are discussed.

1 Introduction

Recent earthquake in India has demonstrated the need for seismic risk evaluation of building stock and consequences of future earthquakes. In India, where 90% of the population lives in buildings built without proper guidance from qualified engineers and architects, even a moderate intensity earthquake leads to substantial loss of life and properties. The rapid growth of cities, unplanned habitat, faulty structural design and poor quality construction techniques have also contributed to the proliferation of seismic risk. Evaluation of seismic safety of these constructions and adopting requisite retrofitting measures is a challenging task for the national government. Almost the entire northeast region, northern Bihar, Himachal Pradesh, Jammu & Kashmir and some parts of Gujarat are in seismic zone V (IS 1893 – 2002), while the entire Gangetic plain and some parts of Rajasthan are in seismic zone IV. In the last 20 years the country has experienced 8 major earthquakes that took more than 25000 lives and thereby affecting the local or regional economy. The effect would be substantial if such earthquakes hit metro cities where inappropriate developmental activities are alarmingly high.

After Latur (1993, M6.3, 7928 deaths) earthquake, the state government undertook several post-earthquake risk reduction measures but the lesson has not been replicated to

the neighboring state Gujarat till it was struck with devastating earthquake (M6.9) in 2001, which took more than 13800 lives. Post-earthquake damage survey in Indian context revealed that 90% of the causalities resulted directly from the collapse of buildings, out of which 60% are due to non-structural causes. In Gujarat state most of the buildings that followed Indian Standard guidelines and specifications have suffered little damages. Vulnerability analysis of 80 million housing stock lying in the seismic zone IV and V (Vulnerability Atlas of India, 2006) has not been carried out and so no preliminary estimate of damages is available for devising requisite strengthening measures.

Till recently the Department of Agriculture and Cooperation had the nodal responsibility for managing natural disasters. After the Gujarat (2001) earthquakes this responsibility has been shifted to the Ministry of Home Affairs. However, in view of multidimensional perspectives of various natural and man-made disasters concerned ministries, such as, Droughts, pests, hailstorm - Ministry of Agriculture, Air Accidents - Ministry of Civil Aviation, Railway accidents - Ministry of Railways, Chemical disaster - Ministry of Environment, Biological disaster - Ministry of Health, Nuclear accidents - Department of Atomic Energy; have got the nodal responsibilities (2nd AFC, 2006).

2 Potential earthquake threats in India

The collision of Indian and Eurasian plates gave way to the formation of the great Himalaya. The Indian plate is still penetrating deeper at an estimated rate of about 50mm/year, causing intense seismic activity in the entire region. Five major earthquakes (M>7.5) (1897 Assam, 1905 Kangra, 1934 Bihar-Nepal, 1950 Assam and 2005 Kashmir) and 484 moderate to major quakes in the Himalayan Frontal Arc during the past 110 years have demonstrated the vulnerability of the entire surrounding region to earthquakes (Figure 1). Various scenario analysis have indicated that more than 100 million people are at seismic risks of varying magnitudes in the towns and villages of the hilly areas of the north and north east and the entire Indus-Ganga-Brahmaputra plain. The Koyna earthquake (1967, M6.3) in the stable continental region of India occurred after filling of Shivaji Sagar Lake, which raised the issue of seismic safety of mega hydel projects in India (Bilham et al., 2001).

Earthquake data shows (Table 1) that an average of three earthquakes of magnitude 6.0 or more occur in India every year. In the last 20 years, 8 earthquakes of moderate intensity caused considerably high degree of losses to human life and property, which highlights the vulnerability of the population and infrastructure to earthquakes and the inadequacy of preparedness measures in the country (Arya, 2000; Rai and Murthy, 2006). The North-Eastern part of the country continues to experience moderate to large earthquakes at

frequent intervals including the two great earthquakes mentioned above. Since 1950, the region has experienced several moderate earthquakes. On an average, the region experiences an earthquake with magnitude greater than 6.0 every year.

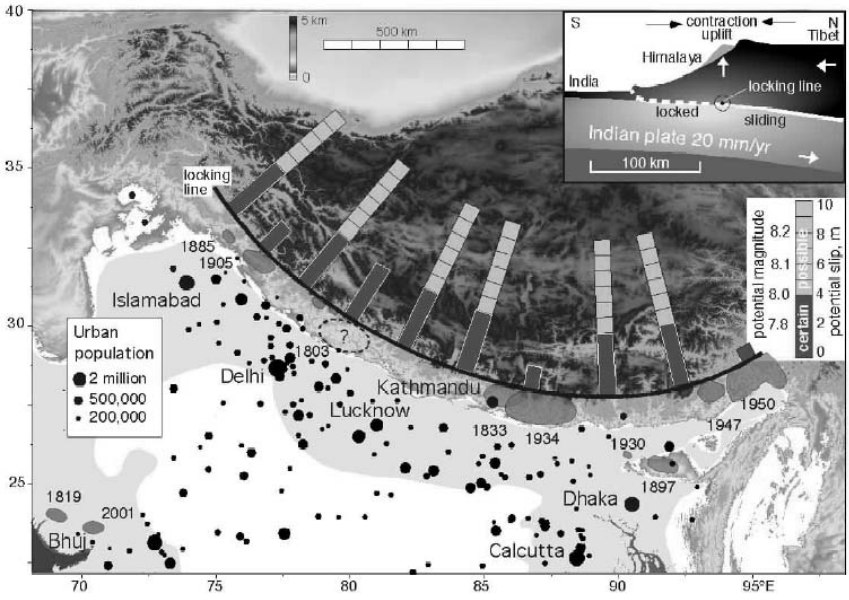


Table 1. Region-wise Occurrences of Earthquakes in India (M>5.0) 1897-2006.

	Seismic region	No. of earthquakes of magnitude				Return period
		5-5.9	6- 6.9	7-7.9	8.0+	
1.	Kashmir and Western Himalaya	25	7	2	2	2.5 – 3 yrs
2.	Central Himalaya	68	28	4	1	1 yr
3.	North East India	200	128	15	4	<4 months
4.	Indo-Gangetic Basin	14	6	-	-	5 yrs
5.	Cambay and Rann of Kutchh	4	4	1	1	20 yrs
6.	Peninsular India	31	10	-	-	2.5-3 yrs
7.	Andaman & Nicobar	80	68	1	1	<8 months
	Whole in India	422 4/yr	249 2.4/yr	23 0.2/yrs	8	<2 months
	World average/yr [>100000 are <M5]	1000	100	20	1	

3 Seismic Zoning

The seismic zoning maps indicate broadly the seismic coefficient that could generally be adopted for design of buildings in different parts of the country. The current map is an ad-hoc revision of 1970 zone map. These maps are based on subjective estimates of intensity from available information on earthquake occurrence, geology and tectonics of the country (Jain, 2007). A substantial effort is required for developing probabilistic zone map. The Indian seismic zoning is a continuous process which keeps undergoing changes as more and more data on occurrence of earthquakes becomes available. Currently efforts are being made towards seismic risk and hazard microzonation of various urban establishments, such as Jabalpur, Sikkim, Guwahati, Delhi.

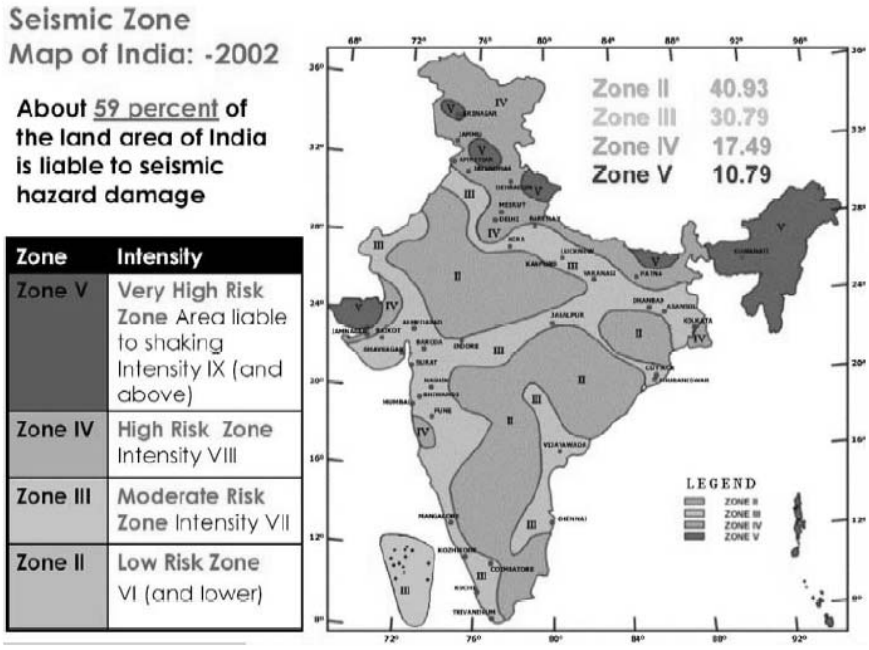


Figure 2. Seismic zone map of India (IS 1893 – 2002)

The regions of the country away from the Himalayas and other inter-plate boundaries were considered to be relatively safe from damaging earthquakes. However, in the recent past, even these areas have experienced devastating earthquakes. The Koyna earthquake in 1967 led to the revision of the seismic zoning map resulting in the deletion of the non-seismic zone from the map. The areas surrounding Koyna were also re-designated to Seismic Zone IV, indicating high hazard. The Latur earthquake in 1993 resulted in further revision of the seismic zoning map in which the low hazard zone or Seismic Zone I was merged with Seismic Zone II, and some parts of Peninsular India were brought under Seismic Zone III consisting of areas designated as moderate hazard zone areas. (Figure 2). Table 2 shows the list of some earthquakes that caused colossal damage in the Indian territory. Recent studies show that as the understanding of seismic hazard of these regions increases, more areas assigned as low hazard may be re-designated to higher level of seismic hazard, or vice-versa. Considering the recorded history of earthquakes in the country, 11% of the land area is in very high risk zone V, 18% in high risk zone IV and 30% moderate risk zone III. The capital cities of Guwahati and Srinagar are located in seismic zone V, while the national capital Delhi is in zone IV and the mega cities of Mumbai, Kolkata and Chennai are in zone III. 38 cities with population of half a million and above each and a combined population of 40 million are located in these three regions (Ambraseys, 2000; Bilham et. Al, 2001).

4 National initiatives

The Yokohama Strategy (1994) emphasized that disaster response alone is not sufficient as it yields only temporary results at a very high cost. Disaster prevention, mitigation, preparedness and relief are four elements that contribute to the implementation of the sustainable development policies of any country. These elements along with environmental protection and sustainable development, are closely inter related. Therefore, in India for more than a decade each state is encouraged to incorporate mitigation strategies in their development plans and ensure efficient follow up measures at the community, sub-regional, regional, national and international levels.

The Disaster Management Act, 2005 (DM Act, 2005) lays down institutional and coordination mechanisms for effective disaster management (DM) at the national, state, and district levels. As per this Act, the Government of India (GoI) created a multi-tiered institutional system consisting of the National Disaster Management Authority (NDMA), headed by the Prime Minister, the State Disaster Management Authorities (SDMAs) by the Chief Ministers and the District Disaster Management Authorities (DDMAs) by the District Collectors and cochaired by elected representatives of the local authorities of the respective districts (Figure 3). These bodies have been set up to facilitate the paradigm shift from the hitherto relief-centric approach to a more proactive, holistic and integrated approach of strengthening disaster preparedness, mitigation and emergency response.

Table 2. List of some significant earthquakes in India and its neighbourhood (source: www.imd.ernet.in)

Date	Earthquake name	Time	Magnitude	Intensity	Deaths in India
16 June 1819	Great Katchh	11:00	8.3	IX	1,500
10 January 1869	Cachar, Assam	??	7.5	IX	Many
12 June 1897	Great Shillong	17:11	8.7	XII	1,500
04 April 1905	Great Kangra	06:20	8.0	X	19,500
8 July 1918	Srimangal, Assam	??	7.6	IX	
15 January 1934	Great Bihar-Nepal	14:13	8.3	X	11,000
26 June 1941	Great Andaman	??	8.1	X	Thousands
15 August 1950	Great Assam	19:31	8.6	XII	1,530
21 July 1956	Anjar	21:02	6.1	IX	115
10 October 1956	Bulandshahar	??	6.7	VIII	Many
28 December 1958	Kapkote	??	6.3	VIII	Many
02 September 1963	Badgam	07:04	5.5	VII	Hundreds
10 December 1967	Koyna	04:30	6.5	VIII	200
23 March 1970	Bharuch	20:56	5.2	VII	30
19 January 1975	Kinnaur	??	6.5	VIII	Not Known
29 July 1980	Pithoragarh	18:28	6.8	??	>150
31 December 1984	Silchar	04:53	5.6	??	20
26 April 1986	Dharamshala	13:05	5.5	??	6
21 August 1988	Bihar-Nepal	04:39	6.6	IX	1,004
20 October 1991	Uttarkashi	02:53	6.4	IX	768
30 September 1993	Killari (Latur)	03:53	6.2	VIII	7,928
22 May 1997	Jabalpur	04:22	6.0	VIII	38
29 March 1999	Chamoli	00:35	6.6	VIII	63
26 January 2001	Bhuj	08:46	7.7	X	13,805
14 September 2002	Diglipur	03:58	6.0	VII	-
26 December 2004	Great Sumatra	06:28	9.3	XII	10,749 (India)
08 October 2005	Kashmir	09:20	7.4	X	1,308 (India)
14 February 2006	Sikkim	06:25	5.7	VII	2

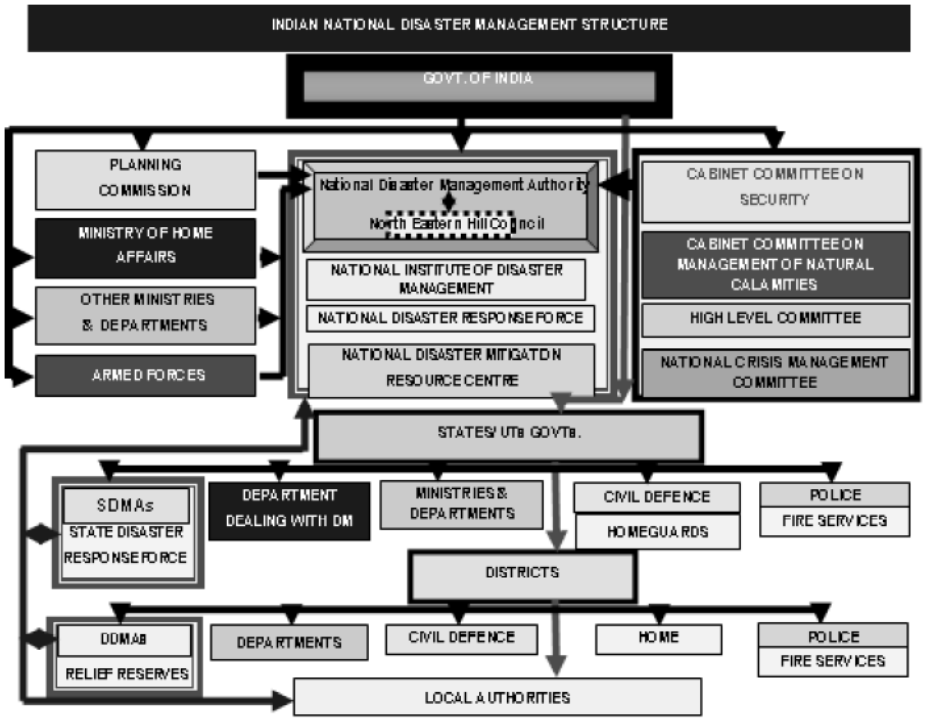


Figure 3. Unification of Crisis Management as per National Disaster Management act 2005

4.1 Review of building bye-laws and their adoption

Structural mitigation measures are the key to make a significant impact towards earthquake safety. In view of this the States in earthquake prone zones have been directed to review, and if necessary, amend their building byelaws to incorporate the BIS seismic codes for construction in the concerned zones. An Expert Committee appointed by the Core Group on Earthquake Risk Mitigation has already submitted its report covering appropriate amendments to the existing Town & Country Planning Acts, Land Use Zoning Regulation, Development Control Regulations & Building Bylaws, which could be used by the State Governments & the local bodies there-under to upgrade the existing legal instruments. The Model Building Bylaws ensures the technical implementation of the safety aspects in all new constructions and upgrading the strength of existing structurally vulnerable constructions. To facilitate the review of existing building byelaws and adoption of the proposed amendments by the State Governments and UT administrations, no. of discussion workshops at regional level in the country have to be been organized. It is stressed that all planning authorities and local bodies are required to have development control regulations and building byelaws which would include multi-hazard safety provisions.

4.2 Revision of codes

An action plan has been drawn up for revision of existing codes, development of new codes and documents/commentaries, and making these codes and documents available all over the country including online access to these codes. An Apex committee consisting of representatives of Ministry of Consumer Affairs, BIS and MHA has been constituted to review the mechanism and process of development of codes relevant to earthquake risk mitigation and establish a protocol for revision by BIS.

4.3 Hazard safety cells in states

The States have been advised to constitute Hazard Safety Cells (HSC) headed by the Chief Engineer (Designs), State Public Works Department with necessary engineering staff so as to establish mechanism for proper implementation of the building codes in all future Govt. constructions, and to ensures the safety of buildings and structures from various hazards. The HSC will also be responsible for carrying out appropriate design review of all Government buildings to be constructed in the State, act as an advisory cell to the State Government on the different aspects of building safety against hazards and act as a consultant to the State Government for retrofitting of the lifeline buildings. Rajasthan, Gujarat, West Bengal, Kerala, Uttarakhand and Chhatisgarh have already constituted these cells and other States are in the process.

4.4 Capacity building of engineers and architects in earthquake risk mitigation

Two National Programmes for Capacity Building in Earthquake Risk Mitigation for Engineers and Architects respectively, have been approved to assist the State Govts in building capacities for earthquake mitigation. These two programmes are being implemented for training of 10,000 engineers and 10,000 architects in the States in seismically safe building designs and related techno-legal requirements. Assistance is being provided to the State/UTs to build the capacities of more than 125 State Engineering Colleges and 110 Architecture Colleges to be able to provide advisory services to the State Governments to put in place appropriate techno-legal regime, assessment of building and infrastructures and their retrofitting. These institutions will function as State Resource Institutions. Twenty-one National level Engineering and Architecture Institutions have been designated as National Resource Institutes to train the faculty members of selected State Engineering and Architecture colleges. 450 engineering faculty members and 250 architecture faculty members of these State Resource Institutions will be trained during the current year. This program has been extended to March 2010.

4.5 Training of masons

A programme to assist the States/UTs in training and certification of 50000 masons has been formulated in consultation with Housing and Urban Development Corporation (HUDCO) and the Ministry of Rural Development. The training module for masons to include multi-hazard resistant construction has also been prepared by an expert committee, and revised curriculum will be introduced in the vocational training programme of Ministry of Human Resource Development.

4.6 Earthquake engineering in undergraduate engineering/architecture curricula

The role of engineers and architects is crucial in reducing earthquake risks by ensuring that the constructions adhere to the norms of seismically safety. In view of this, the elements of earthquake engineering are being integrated into the undergraduate engineering and architecture courses. The model course curricula for adoption by various technical institutions and universities have been developed and circulated to the Universities and Technical Institutions for adoption in the undergraduate curricula. Ministry of Home Affairs is working with All India Council of Technical Education (AICTE) and Council of Architecture (COA) for introduction of revised curricula for engineering and architecture course from 2005-2006. The Ministry of Human Resource Development has initiated the National Program on earthquake Engineering Education in March 2003 (www.nicee.org/npeee).

4.7 Hospital preparedness and emergency health management in medical education

Hospital preparedness is crucial to any disaster response system. Each hospital should have an emergency preparedness plan to deal with mass casualty incidents and the hospital administration/ doctor trained for this emergency. The curriculum for medical doctors does not include Hospital Preparedness for emergencies. Therefore capacity building through in-service training of the current heath managers and medical personnel in Hospital Preparedness for emergencies or mass causality incident management is essential. At the same time, the future health managers must acquire these skills systematically through the inclusion of health emergency management in the undergraduate and post graduate medical curricula. In consultation with Medical Council of India (MCI), two committees have been constituted for preparation of curriculum for introduction of emergency health management in MBBS curriculum, and preparation of in-service training of Hospital Managers and Professionals. Rajiv Gandhi University of Health Sciences Karnataka have been identified as the lead national resource institution for the purpose.

4.8 Retrofitting of lifeline buildings

The problem of unsafe existing buildings stock has been looming large. As it is not possible to address the entire existing building stock, the life line buildings like hospitals, schools or buildings where people congregate like cinema halls, multi-storied apartments are being focused on. The States have been advised to have these buildings assessed and where necessary retrofitted. The Ministries of Civil Aviation, Railways, Telecommunication, Power

and Health and Family Welfare have been advised to take up necessary action for detailed evaluation and retrofitting of lifeline buildings located in seismically vulnerable zones so as to ensure that they comply with BIS norms, Action plan have been drawn up by these Ministries for detailed vulnerability analysis and retrofitting/ strengthening of buildings and structures. The Ministry of Finance have been requested to advise the financial institutions to give loans for retrofitting on easy terms. Accordingly the Ministry of Finance had advised Reserve Bank of India to issue suitable instructions to all the Banks and Financial Institutions to see that BIS codes/bye laws are scrupulously followed while financing/refinancing construction activities in seismically vulnerable zones. Delhi Govt., in association with Geohazard International (GHI, USA) took up retrofitting scheme of 5 lifeline buildings in May 2005. After several consultations and peer review meetings amongst experts from both countries the actual retrofitting works in one the school is in progress.

4.8 Urban earthquake vulnerability reduction programme

An accelerated urban earthquake vulnerability reduction programme has been taken up in 38 cities in seismic zones III, IV & V with population of half a million and above. 474 Orientation programmes have been organized for senior officers and representatives of the local planning and development bodies to sensitize them on earthquake preparedness and mitigation measures. The training programme for engineers and architects are being organized to impart knowledge about seismic safe construction and implementation of BIS norms. So far 1088 engineers and 825 architects have been trained. For enhanced school safety, education programmes have been organized in schools, colleges and other educational institutions. This programme will be further extended to 166 earthquake prone districts in seismic zones IV & V. Awareness generation programmes, community and neighborhood organizations have been started in these cities. These cities are also being assisted to review and amend their building bye-laws to incorporate multi hazard safety provisions. City Disaster Management Plans are being developed under the project. Nine Cities have prepared city Disaster Management Plans.

4.9 Mainstreaming mitigation in rural development schemes

Rural housing and community assets for vulnerable sections of the population are created at a fairly large scale by the Ministry of Rural Development under the Indira Awas Yojna(IAY) and Sampooran Grameen Rojgar Yojna (SGRY). About 250 thousand small but compact housing units are constructed every year, besides community assets such as community centres, recreation centres, anganwadi centres etc. Technology support is provided by about two hundred rural housing centres spread over the entire country. The Ministry of Home Affairs is working with the Ministry of Rural Development for changing the guidelines so that the houses constructed under IAY or school buildings/community buildings constructed under SGRY are earthquake/cyclone/flood resistant; as also that the schemes addressing mitigation are given priority under SGRY. Ministry of Rural Development are

carrying out an exercise for this purpose. This initiative is expected to go a long way in popularization of seismically safe construction at village/block level.

5 National guidelines on earthquake risk management

National Disaster Management Authority has released a national guidelines in May 2007 in which it is mentioned that from June 2007 onwards all new constructions in the earthquake prone area must adopt earthquake resistant measures. The critical factors responsible for the high seismic risk in India has prioritised six sets of critical interventions; as the six pillars of earthquake management. They are to:

a) Ensure the incorporation of earthquake-resistant design features for the construction of new structures.
b) Facilitate selective strengthening and seismic retrofitting of existing priority and lifeline structures in earthquake-prone areas.
c) Improve the compliance regime through appropriate regulation and enforcement.
d) Improve the awareness and preparedness of all stakeholders.
e) Introduce appropriate capacity development interventions for effective earthquake management (including education training, R&D, and documentation).
f) Strengthen the emergency response capability in earthquake-prone areas.

6 Conclusions

The population of India has doubled since the last great Himalayan earthquake in 1950 (M8.6). A repeat of this largest intra-continental earthquake in recorded history, would be really devastating with untold misery and loss of human life. The capital cities of Bangladesh, Bhutan, India, Nepal, and Pakistan and several other cities with more than a million inhabitants are vulnerable to damage from future earthquakes originating in the Himalaya. In view of above the earthquake risk management policy of the country has become proactive to motivate earthquake-prone community by devising social, technical, administrative, political, techno-legal, techno-financial forces for a concerted, long-term effort to change, improve, and accelerate the enactment and implementation of cost-effective public policies for mitigation, preparedness, emergency response, and recovery and reconstruction.

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List of BIS codes

1. IS 1893- 2002 – Criteria for Earthquakes Resistant Design of Structures:

Part 1: General provisions and buildings

Part 2: Liquid retaining tanks – elevated and ground supported

Part 3: Bridges and retaining walls

Part 4: Industrial structures

Part 5: Dams and embankments

2. IS 4326- 1993: Earthquake Resistant Design and Construction of Buildings

3. IS 13827 – 1993: Improving Earthquake Resistance of Earthen Buildings

4. IS 13828 – 1993: Improving Earthquake Resistance of Low Strength Masonry Buildings

5. IS 13920 – 1993: Ductile Detailing of Reinforced Concrete Structures Subjected to Seismic Forces

6. IS 13935 – 1993: Repair and Seismic Strengthening of Buildings

Fire safety

Fire safety refers to precautions that are taken to prevent or reduce the likelihood of a fire that may result in death, injury, or property damage, alert those in a structure to the presence of a fire in the event one occurs, better enable those threatened by a fire to survive, or to reduce the damage caused by a fire. Fire safety measures include those that are planned during the construction of a building or implemented in structures that are already standing, and those that are taught to occupants of the building.

Threats to fire safety are referred to as *fire hazards*. A fire hazard may include a situation that increases the likelihood a fire may start or may impede escape in the event a fire occurs.

Fire safety is often a component of building safety. Those who inspect buildings for violations of the Fire Code and go into schools to educate children on Fire Safety topics are fire department members known as *fire prevention officers*. The Chief Fire Prevention Officer or Chief of Fire Prevention will normally train newcomers to the Fire Prevention Division and may also conduct inspections or make presentations.

Effects of Fire

- ✓ Fire may damage life and property
- ✓ The major outcomes of fire are heat and smoke.
- ✓ Heat generates due to burning of combustible material.
- ✓ The intensity of heat depends upon fire-load, calorific-value and rate of burning.
- ✓ In contrast to low height buildings, the heat produced does not escape easily into the atmosphere in high rise buildings, thereby increasing the temperature of the structure.
- ✓ In many Fire incidents, major cause of deaths is inhalation of smoke and other toxic gases.

Types of Fire

Fires are classified according to the type of fuel that is burning.

The four different fire classifications are

Class A

(Wood, Paper, Cloth, Trash, Plastic) Solid Combustible material that are not metals. This type of fire generally leaves an ash.

Class B

(Flammable liquids like petrol, diesel, kerosene, oils, grease, acetone) Any non-metal in a liquid state on fire. This type of fire involves materials that boil or bubble.

Class C

(Electrical: Energized electrical equipment) This type of fire generally deals with an electrical current.

Class D

(Metals: Sodium, Aluminum, Potassium, Magnesium, Zirconium)

Fire Safety measures in schools

Do's

- ✓ Minimum 2 exit doors of 1.5 meters width for each class room.
- ✓ Minimum 2 separate staircases of 1.5 meters width for each floor.
- ✓ Fire dampers in the A.C ducts for central A.C. Buildings.
- ✓ 2 no's 5kg dry powder extinguishers for laboratory and 2 no's for gas bank, 2 no's of 9 liters water type extinguishers for every 600 sq meters area with minimum 4 no's in each floor, one 4.5 kg co_2 extinguisher for electrical mains.
- ✓ Hose Reel, Wet Riser, Down Comer, Yard Hydrant, Automatic Sprinklers, Fire Alarm, Water Storage Tank, Fire Pumps as per requirement and advice of fire department
- ✓ Emergency lighting with battery backup for 1.5 hours in corridors and staircases.
- ✓ Evacuation drill to be conducted in each term.
- ✓ Training in first aid fire fighting and emergency procedures to all staff.
- ✓ Cooking should be done in segregated safe place away from class rooms.
- ✓ Portable fire extinguisher and dry sand buckets should be provided at a travel distance of every 22.5 meters.
- ✓ Underground/Overhead tank water storage tanks exclusively for firefighting should be provided.
- ✓ School emergency plan should be made in consultation with local fire station.
- ✓ Good housekeeping should be ensured.
- ✓ Cooking should be done in segregated safe place away from class rooms.

Don'ts

- ✓ No temporary structure.
- ✓ Travel distance for doors and staircases not to exceed 22.5 meters.
- ✓ No staircases around lift lobby.
- ✓ Thatch and other combustible material should not be used for construction.

Fire Safety in Public Places

Do's

- ➢ Places where fifty or more persons assemble for recreation, social, religious other similar purposes may be termed as public places. Examples Cinema's, Restaurants, Convention halls, Stadiums, Clubs, Dance Halls, Places of Worships, Bus/Train terminals.
- ➢ Buildings should be designed for a high occupant load.
- ➢ The minimum height of assembly hall should be 3.6 meters and minimum width of corridors/ staircase 2 meters.

- Public places with more than 500sq meters per floor should have minimum 2 staircases of enclosed type and one of them should be on external wall.
- Material used for upholstery, interior decoration, seats and carpets should be fire retardant.
- Dry type transformers are referred in public places.
- Temporary electrical wiring should be avoided.
- Pedestal fans if installed should be connected to 3 pin plug only.
- Fire Safety systems like Hose Reels,Wet Risers,Automatic and Manual Fire Alarm Systems,Sprinklers,Public Address System etc should be installed as per N.B.C.
- For large assembly halls with more than 1000 seating capacity and those in High Rise Buildings , Automatic Sprinklers and Yard Hydrant should be provided.
- Water storage tank for Fire fighting 50000 liters capacity(Non-High Rise) and 1 lakh litres (for High-Rise) should be provided.
- One water type extinguisher of 9 liters with minimum 2 per floor should be provided. Travel distance should not exceed 25 meters
- Sufficient number of exits for safe evacuation within 2.5 minutes to be provided.
- Travel distance for exits not to exceed 30 meters.
- Exit doors should open outwards.
- Emergency lighting with battery backup upto 2 hours and auto glow signage should be provided in the escape route.
- Exits should be kept unlocked during period of assembly.
- Fire Safety tips of Do's and Don'ts should be displayed prominently.
- If seats are more than 300,fasten them to floor.
- Fire exit staircases should be maintained free of obstructions.
- Employees should be trained in emergency procedures.
- Fire drills should be conducted once in every 3 months.
- Emergency numbers should be prominently displayed.

Don'ts

- Smoking should be strictly prohibited.
- Aisles & escapes should not be blocked with extra chairs.

General Tips

- Raise alarm and inform the Fire Brigade on Telephone No.101
- Attack the fire with available equipment if you can, without taking undue risk.

- ❖ Leave the premises by nearest exit
- ❖ Do not use lift to escape from the fire
- ❖ Do not shout or run, this causes panic
- ❖ Give way to Fire Engines to enable them to reach the incident quickly.
- ❖ Guide Firemen to water resources i.e. tube wells, ponds and static tanks etc. in case of fire
- ❖ Non Informing fire service about the fire incident is a cognizable offence
- ❖ Do not misuses fire service by false calls as delays the service to really needy.

Types of Fire Extinguisher

The three most common types of Fire Extinguishers are

Water (Air Pressurized Water)

This extinguisher is designed for Class A (wood, paper, cloth) fires only.

Carbon Dioxide (Co2)

This extinguisher is designed for Class B and C. (flammable liquid and electrical) fires only.

Dry Chemical (ABC, BC, DC)

"**DC"** short for "dry chem"

"ABC" indicating that they are designed to extinguish class A,B, and C fires.

"BC" indicating that they are designed to extinguish class B and C fires.

Fire Resistant Doors

- o A fire resistant door is thicker than other type of doors.
- o They contain heavy grade chipboard or a heavy core of fire resisting compressed straw.
- o They can resist the fire upto 30 - 60 minutes.
- o They are usually flush robust doors that should always be fitted into a hardwood one-piece
- o Rebated frame and fitted with an automatic door closer.
- o If a glass panel is preferred, Georgian wired glass must be used.
- o Building regulations require fire resistant doors when a door leads into an adjoining garage.
- o and when a door opens into the loft room

Measures to assess fire safety

Fire safety is a fundamental consideration in building design and management, but unfortunately, one that is often overlooked—firewalls are today more likely to be associated with IT security than with physical safety.

Assess fire safety measures in your built environment with the help of this checklist:

1. Provide adequate means of escape

The first rule of fire management requires sufficient escape routes out of the building, in accordance with its scale and occupancy. The number, size and location of exits are

specified in the National Building Code (NBC) 2005, a detailed set of guidelines for constructing, maintaining and operating buildings of all types. Office occupiers must additionally ensure that staircases, stairwells and corridors are well-maintained, ventilated and free of obstacles in order to be effective in an emergency.

2. Outline clear pathways to exit doors

Getting to exits is as important as providing enough exits. NBC guidelines specify the maximum distance a person must travel in order to access a fire exit, and the importance of photo-luminescent signage to enable evacuation at night. Refuge areas such as terraces are critical for high-rises where people can safely congregate, when asked to leave the building in phases.

3. Install smoke detection systems

The first few minutes of a fire are crucial in containing it. Automatic fire alarm systems such as smoke and heat detectors are mandatory elements in international building codes, and particularly useful in spotting fires during times when occupancy in the building is low.

4. Maintain smoke suppression systems

Fire extinguishers are only useful if they work, so check them regularly. High-rise buildings, which are harder to access and evacuate, should consider installing automatic sprinkler systems.

5. Conduct regular fire drills

Preventing panic in an emergency is as important as staying away from flames and fumes. Regular fire drills familiarize people with emergency evacuation methods at little cost. Nominate a fire safety officer in every building to ensure that this becomes standard operating procedure.

6. Use flame-retardant materials in interiors

Materials used in the interiors can save or endanger lives. The combination of wood, paper and textiles makes workstations highly combustible. Fabrics can be made flame-retardant, however, so that they self-extinguish when lit. An increasing number of companies, especially multinationals, request such fabrics despite their price premium, according to data from Indian office furniture manufacturer BP Ergo. Stringent fire regulations abroad make it necessary for US furniture makers such as Herman Miller to provide only fire-tested fabrics.

7. Make your office accessible to firefighters

Grilled windows are a widespread urban phenomenon, and observes that "residents who have grills on their windows presume that only thieves are kept out, and not firefighters". Occupants of offices in residential buildings with few exits should be wary of locking themselves into confined spaces.

8. Keep the building plans handy

The tragedy at the Taj was heightened by the lack of buildings plans to guide rescue agencies. It is imperative to make multiple copies of your building plan available, especially during an emergency.

9. Ask the local fire brigade to assess safety

Fire departments, for a nominal fee, will independently assess your building's level of fire safety. Storage of hazardous or inflammable materials, old and unstable structures, inadequate escape routes or electricity overloads are potential death traps that are best assessed by professionals.

10. Comply with National Building Code

"Green buildings" are in vogue but safe structures are sadly not. Both the Mumbai Fire Brigade and BMC commissioner concede that 80% of buildings likely violate accepted codes of building safety, with ignorance and personal whims leading to illegal modifications after gaining requisite occupancy permission.

DISASTER MANAGEMENT PLAN

ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣೆ ಯೋಜನೆ ತಯಾರಿಕೆ ಮಾರ್ಗಸೂಚಿಗಳು

ಪೂರ್ವ ವಿಕೋಪ ಯೋಜನೆ ತಯಾರಿಕೆ, ಒಂದು ಸಂಪೂರ್ಣ ಸಿದ್ಧತೆ ಮತ್ತು ವಿಕೋಪವನ್ನು ಪರಿಣಾಮಕಾರಿಯಾಗಿ ನರ್ವಹಿಸಲು ಮಾರ್ಗದರ್ಶಿಯಾಗಿದೆ. ವಿಕೋಪ ನಿರ್ವಹಣೆ ಯೋಜನೆಯು ವಿಕೋಪಗಳಿಂದ ಸಂಭವಿಸುವ ಅಪಾಯ, ನಷ್ಟ, ಗಂಡಾಂತರ ಮೊದಲಾದವುಗಳಿಂದ ಪಾರು ಮಾಡಿ ಸಾಮಾನ್ಯ ಸ್ಥಿತಿಗೆ ತರಲು ಸಹಾಯವಾಗುತ್ತದೆ. ಸಂಪನ್ಮೂಲಗಳನ್ನು ಕ್ರೂಢಿಕರಿಸಿ ವಿಕೋಪ ನಿರ್ವಹಣೆ ಸಮಯದಲ್ಲಿ ಸಂಪನ್ಮೂಲಗಳನ್ನು ಕ್ರಮಬದ್ಧವಾಗಿ ಉಪಯೋಗಿಸಿಕೊಳ್ಳುವುದರಿಂದ ಸಮರ್ಥವಾಗಿ ನಿರ್ವಹಿಸಲು ಸಾಧ್ಯವಾಗುತ್ತದೆ. ವಿಕೋಪಗಳನ್ನು ನಿಗ್ರಹಿಸುವುದಕ್ಕೆ ಮಾಡಿಕೊಳ್ಳುವ ಸಿದ್ಧತೆಗಳು ಮತ್ತೊಂದು ದೃಷ್ಟಿಯಿಂದ ಅಭಿವೃದ್ಧಿಯ ಹೆಜ್ಜೆಯೂ ಆಗಿದೆ.

ಜಿಲ್ಲಾಡಳಿತವು ಎಲ್ಲಾ ಸರ್ಕಾರಿ ಯೋಜನೆಗಳ ಅನುಷ್ಟಾನದ ಮೂಲ ಬಿಂದುವಾಗಿದೆ. ಜಿಲ್ಲಾವಾರು ಯೋಜನೆಯು ನಿರ್ಣಾಯಕ ಪಾತ್ರ ವಹಿಸುವುದರಿಂದ ಪರಿಣಾಮಕಾರಿಯಾಗಿ ಎಲ್ಲಾ ರೀತಿಯ ವಿಕೋಪಗಳನ್ನು ನಿರ್ವಹಿಸಬಹುದಾಗಿದೆ. ರಾಷ್ಟ್ರೀಯ ವಿಕೋಪ ನರ್ವಹಣಾ ಪ್ರಾಧಿಕಾರ ಹಾಗೂ ಭಾರತ ಸರ್ಕಾರ ರಾಷ್ಟ್ರೀಯ ವಿಕೋಪ ನರ್ವಹಣೆ ಕಾರ್ಯವ್ಯಾಪ್ತಿ ಮತ್ತು ಜಿಲ್ಲಾ ವಿಕೋಪ ನರ್ವಹಣೆ ಯೋಜನೆಗೆ ಪ್ರಾಧಾನ್ಯತೆ ನೀಡಿವೆ.

ಅದರಂತೆ ಪ್ರತಿ ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಯೋಜನೆಯು ತನ್ನದೇ ಆದ, ಆಯಾ ಜಿಲ್ಲಾ ಮೂಲ ಅಂಶಗಳನ್ನು ಒಳಗೊಂಡು ನರ್ವಹಣೆಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ಏಕ ರೀತಿ ವಿಕೋಪ ನರ್ವಹಣಾ ಯೋಜನೆಯನ್ನು ಸಿದ್ಧಗೊಳಿಸಬೇಕು.

ರಾಷ್ಟ್ರೀಯ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಯೋಜನೆಯ ಸಾಮಾನ್ಯ ಲಕ್ಷಣಗಳು :–

ಸ್ಪಷ್ಟ ಮತ್ತು ನಿಖರವಾಗಿರಬೇಕು

ಎಲ್ಲರಿಗೂ ಸುಲಭವಾಗಿ ತಿಳಿಯುವ ಹಾಗೆ ಇರಬೇಕು. (ಕಡಿಮೆ ಪಾರಿಭಾಷಿಕ ಪದ ಬಳಕೆಯಲ್ಲಿರ ಬೇಕು)

ಸಿದ್ಧಪಡಿಸಿದ ಯೋಜನೆಯ ದಿನಾಂಕವನ್ನು ಮುಂದಿನ ಬದಲಾವಣೆಯ ಅವಶ್ಯಕತೆಗಾಗಿ ಕಡ್ಡಾಯವಾಗಿ ನಮೂದಿಸ ಬೇಕು.

ನಿರ್ವಹಣೆಗೆ ಸಡಿಲಿಕೆಯ ಅನುಕೂಲತೆ ಇರಬೇಕು: ಋತುಕಾಲಿಕ ಅಪಾಯಗಳು ಮತ್ತು ಜಿಲ್ಲಾಡಳಿತದ ಪಾತ್ರವನ್ನು ಸ್ಪಷ್ಟವಾಗಿ ನಮೂದಿಸಿರಲೇ ಬೇಕು.

ಲಭ್ಯವಿರುವ ಎಲ್ಲಾ ನಿರ್ವಹಣೆ ಮಾಹಿತಿ ತಂತ್ರಜ್ಞಾನವನ್ನು ಹೆಚ್ಚಿನ ದಕ್ಷತೆಗಾಗಿ ಉಪಯೋಗಿಸಬೇಕು.

ಸಂಪನ್ಮೂಲ ಉಪಯುಕ್ತತೆಯನ್ನು ಹೆಚ್ಚಸಿಕೊಳ್ಳುವಂತಿರಬೇಕು.

ಬದಲಾದ ಪರಿಸ್ಥಿತಿಗಳಲ್ಲಿ ನಿರ್ವಹಣೆಯನ್ನು ಮುಂದುವರಿಸಿಕೊಂಡು ಹೋಗುವ ವಿಧಾನಗಳ್ನು ತಿಳಿಸಿರಬೇಕು.

ಜಿಲ್ಲೆಯಲ್ಲಿರುವ ಇತರೆ ಸರ್ಕಾರಿ ಇಲಾಖೆಗಳು, ಅಪಾಯಕಾರಿ ಕಾರ್ಖಾನೆಗಳು ಮತ್ತು ಸರ್ಕಾರೇತರ ಸಂಸ್ಥೆಗಳು ತಯಾರಿಸುವ ಯೋಜನೆಗಳನ್ನು ಒಳಗೂಡಿಸಿ ಅವುಗಳಿಗೆ ಸಮರ್ಪಕವಾಗಿ ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಯೋಜನೆ ರೂಪುಗೊಳ್ಳಬೇಕು.

ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಯೋಜನೆಯು ಕೆಳಮಟ್ಟದಲ್ಲಿ ತಾಲ್ಲೂಕು / ಗ್ರಾಮ / ಇಲಾಖೆಯ ಯೋಜನೆಗಳು ಹಾಗೂ ರಾಜ್ಯ ಮತ್ತು ರಾಷ್ಟ್ರದ ಮಟ್ಟದಲ್ಲಿ ಅವುಗಳ ಕಾರ್ಯನೀತಿ ಮತ್ತು ವಿಧಾನಗಳನ್ನು ಒಳಗೊಂಡಿರಬೇಕು.

ಎಲ್ಲಾ ಮಟ್ಟಗಳಲ್ಲಿ ಸಂಘಟಿತರಾಗಲು ಸಹಾಯವಾಗುವಂತಿರಬೇಕು.

ತರಬೇತಿ ಮತ್ತು ಅಣಕ ಪ್ರಯೋಗಕ್ಕೆ ಹೆಚ್ಚು ಒತ್ತು ಕೊಡಬೇಕು ಇದು ಯೋಜನೆಗಳ ಅನುಷ್ಠಾನವನ್ನು ನಿಖರವಾಗಿಸುವುದು.

ನಿರಂತರ ಬೆಳವಣಿಗೆಗಾಗಿ ಪೂರ್ವ ವಿಕೋಪ ವಿಮರ್ಶೆಗೆ ಒತ್ತು ನೀಡುವುದು. ವಿಕೋಪ ನಂತರದ ಮೌಲ್ಯಮಾಪನದ ಆಧಾರದ ಮೇಲೆ ಇನ್ನೂ ಉತ್ತಮವಾಗಿ ಹೇಗೆ ವಿಕೋಪ ನಿರ್ವಹಣೆ ಮಾಡಬೇಕು, ಮತ್ತು ನರಂತರ ಪರಿಷ್ಕರಣೆಗೆ ಸಹಾಯವಾಗಬೇಕು.

ಯೋಜನೆಗಳು ತಾಂತ್ರಿಕವಾಗಿ ಮತ್ತು ಸಮರ್ಥವಾಗಿ ಇದ್ದು, ಯಾವುದೇ ತಪ್ಪುಗಳು ಇರಬಾರದು.

ಅಪಾಯ, ನಷ್ಟ, ದುರ್ಬಲತೆ ಹಾಗೂ ಸಾಮರ್ಥ್ಯಗಳ ವಿಶ್ಲೇಷಣೆ: (Hazard, Risk ,Vulnerability and Capacity Analysis)

HRVC ವಿಶ್ಲೇಷಣೆ ಮಾಡುವಾಗ ಅತ್ಯಂತ ಹೆಚ್ಚು ನಷ್ಟ ಉಂಟುಮಾಡುವ ಮತ್ತು ನಾಶಪಡಿಸಬಹುದಾದ ಅಪಾಯಗಳನ್ನು ಗುರುತಿಸುವುದು. ಹೀಗೆ ಗುರುತಿಸಿದ ಅಪಾಯಗಳ ಪ್ರಮಾಣತೆ, ಗಾತ್ರ, ಎರುಗುವ ಕಾಲ ಮತ್ತು ಅವುಗಳ ಪರಿಣಾಮಗಳನ್ನು ವಿಶ್ಲೇಷಿಸುವುದಾಗಿದೆ. ಅತ್ಯಂತ ಹೆಚ್ಚು ಮತ್ತು ಇತರೆ ಎಲ್ಲಾ ತರಹದ ಅಪಾಯಗಳ್ನು ಪಟ್ಟಿ ಮಾಡಿ. ನಷ್ಟ ಉಂಟು ಮಾಡುವ ವಿಕೋಪಗಳನ್ನುತಾಳೆ ಮಾಡುವುದು.

ಮುಖ್ಯವಾಗಿ ಇದರಲ್ಲಿ, ಅಪಾಯಗಳು, ಅಪಾಯಕ್ಕೊಳಪಡುವ ಸ್ಥಳ / ಕ್ಷೇತ್ರ / ನರ್ದಿಷ್ಟವಾದ ಸ್ಥಳಗಳು / ಸಮೂಹ / ಆಸ್ತಿ / ಇತರೆ ಸಂಗತಿಗಳನ್ನು ಗುರುತಿಸಬಹುದಾಗಿದೆ. ಜೊತೆಗೆ ಏಕೆ ಈ ಅಪಾಯಗಳ ಉಂಟಾಗುತ್ತವೆ, ಯಾವ ಯಾವ ಸಂಗತಿಗಳು ಕಾರಣವಾಗಿದೆ. ಎಷ್ಟರಮಟ್ಟಿಗೆ ಕಾರಣವಾಗಿದೆ, ಎನ್ನುವ ವಿಶ್ಲೇಷಣೆ ಬಹಳ ಮುಖ್ಯ. ಇವೆಲ್ಲವುಗಳನ್ನು ಗುರುತಿಸಿದ ನಂತರ, ಜಿಲ್ಲೆ / ತಾಲ್ಲೂಕು / ಗ್ರಾಮ / ಆಡಳಿತ / ಸಮೂಹ ಮತ್ತು ಈಗಿರುವ ಸೌಕರ್ಯಗಳು ಎಷ್ಟಮಟ್ಟಿಗೆ ಎದುರಿಸಲು ಸಮರ್ಥವಾಗಿದೆ ಎನ್ನುವುದನ್ನು ವಿಶ್ಲೇಷಣೆ ಮಾಡಬೇಕು.

ಹೀಗೆ, ಸಾಮರ್ಥ್ಯ ಮತ್ತು ಸೌಕರ್ಯಗಳನ್ನು ಗುರುತಿಸಿದ ನಂತರ, ಇನ್ನೂ ಹೆಚ್ಚಿನ ಪ್ರಮಾಣದಲ್ಲಿ ಬೇಕಾಗುವ ನರ್ದಿಷ್ಟ ಸಂಪನ್ಮೂಲಗಳನ್ನು (ಸಿಬ್ಬಂದಿ / ಸಲಕರಣೆ) ಇತ್ಯಾದಿ ಗುರುತಿಸಿ ಸಿದ್ಧಪಡಿಸಬೇಕಾಗಿರುತ್ತದೆ. ಪ್ರತಿಯೊಂದು ವಿಕೋಪ ನಿರ್ವಹಣೆಗೆ ಬೇಕಾಗುವ ತುರ್ತು ಸಂಪನ್ಮೂಲಗಳನ್ನು (ಸಿಬ್ಬಂದಿ / ಸಲಕರಣೆ / ಇತರೆ) ಗುರುತಿಸಬೇಕಾಗುತ್ತದೆ.

HRVC ವಿಶ್ಲೇಷಣೆ ಮತ್ತು ಸಂಪನ್ಮೂಲ ವಿವರ ಪಟ್ಟಿ ಇವುಗಳು ವಿಕೋಪಗಳು ಸಂಭವಿಸಿದಾಗ ಬಹು ಮುಖ್ಯವಾಗಿ ಇರುವ ಸಂಪನ್ಮೂಲಗಳು (ಸಲಕರಣೆಗಳು ಮತ್ತು ಸಿಬ್ಬಂದಿ ಸಾಮರ್ಥ್ಯ) ಸಾಕಷ್ಟು ಇದೆಯಾ ಎಂದು ತಿಳಿದು ಕೊಳ್ಳುವುದು ಅವಶ್ಯ. ಸಾಕಷ್ಟು ಇಲ್ಲದೆ ಇದ್ದರೆ ತುರ್ತು ಪರಿಸ್ಥಿತಿಗಳಲ್ಲಿ ಹೇಗೆ ಸಿದ್ಧತೆಗೊಳ್ಳಬಹುದು ಎಂದು ಗುರುತಿಸಿಕೊಳ್ಳಬಹುದಾಗಿದೆ.

ಯೋಜನೆಗಳನ್ನು ಸಿದ್ಧಪಡಿಸುವ ಸಮಯದಲ್ಲಿ ಸಂಪನ್ಮೂಲಗಳ ಬಗ್ಗೆ ಬಂದ ಚರ್ಚೆಗಳನ್ನು ಸ್ಪಷ್ಟವಾಗಿ ನಮೂದಿಸಿ. ಸಂಪನ್ಮೂಲ ಮಾಹಿತಿ ಪಟ್ಟಿಯು ಪ್ರತಿ ವಿಕೋಪಗಳಿಗೂ ನಿರ್ದಿಷ್ಟವಾಗಿರಬೇಕು

ಸಂಪನ್ಮೂಲ ವಿವರ ಪಟ್ಟಿ ಸಿದ್ಧತೆಯು ಮುಖ್ಯವಾಗಿ ಪ್ರಾಮಾಣಿಕ/ನಂಬಲರ್ಹ ಸಂಪನ್ಮೂಲಗಳಿಗೆ ಮಾತ್ರ ಕೇಂದ್ರಿಕೃತವಾಗಿರುತ್ತದೆ. ಮೂಲಭೂತ ಸಂಪನ್ಮೂಲಗಳ ಅಂದಾಜು ಮಾಡುವಾಗ ಅಸಾಮರ್ಥ್ಯ/ ಕಾರ್ಯರೂಪಕ್ಕೆ ಬಾರದವುಗಳನ್ನು ತೆಗೆದು ಹಾಕಿ.

ಭೂಪಟ ಮತ್ತು ಮಾಹಿತಿ

ಇತ್ತಿಚಿನ/ ಹೊಸ ಭೂಪಟ ಮತ್ತು ಮಾಹಿತಿಯನ್ನು ಪಡೆದುಕೊಳ್ಳಿ. ಅವಶ್ಯಕತೆ ಇದ್ದ ಕಡೆ ಅದರ ಮೂಲದ ಜೊತೆಗೆ ಇಸವಿಯನ್ನು ನಮೂದಿಸಿ. ಇತ್ತೀಚಿಗೆ ಅಂದರೆ 2002 ರಲ್ಲಿ ಸೀಸ್ಮಿಕ್ ಝೋನ್ ಭೂಪಟ ಲಭ್ಯವಿದೆ. (ಸಂಭವನೀಯ ಭೂಕಂಪ ಪ್ರದೇಶಗಳ ಭೂಪಟ)

ಕಾರ್ಯವಿಧಾನದ ಮಾನ (Standard Operating Procedure (SOP)

ಇದು ಪ್ರತಿಯೊಂದು ಇಲಾಖೆಗೂ ನಿರ್ದಿಷ್ಟವಾಗಿರುತ್ತದೆ. ಪ್ರಗತಿ, ಪ್ರತಿಕ್ರಿಯೆ, ಪರಿಹಾರ ಮತ್ತು ಪುರ್ನವಸತಿಯ ಇತ್ಯಾದಿ ಕೆಲಸಗಳು ಕಾರ್ಯವಿಧಾನದಂತೆ ಹಂತ ಹಂತವಾಗಿ ಬದಲಾವಣೆ ಹೊಂದುತ್ತದೆ. ಅದೇ ರೀತಿ ನಿರ್ದಿಷ್ಟ ಅಪಾಯಕ್ಕೆ ನಿರ್ದಿಷ್ಟ ಕಾರ್ಯವಿಧಾನದ ಪಟ್ಟಿಗಳು ಸಾಮಾನ್ಯವಾಗಿದ್ದು ನಂತರ ಅಪಾಯಕ್ಕೆ ತಕ್ಕಂತೆ ನಿರ್ದಿಷ್ಟವಾಗಿರುತ್ತದೆ. ಸೇನಾದಳಗಳು ರಚಿಸಿರುವ ಕಾರ್ಯವಿಧಾನ (SOP) ಗಳನ್ನು ಜಿಲ್ಲಾಡಳಿತ ಹಂಚಿಕೊಳ್ಳುವುದು ಇನ್ನೂ ಹೆಚ್ಚಿನ ಸುಧಾರಣೆಗೆ ಸಹಾಯವಾಗುತ್ತದೆ.

ಸೇರಿಸಿಕೊಳ್ಳಬಹುದಾದ ಕೆಲವು ಅಂಶಗಳು (**Linkages**)

ಅಭಿವೃದ್ಧಿ ಯೋಜನೆಗಳನ್ನು ಇದಕ್ಕೆ ಸೇರಿಸುವುದು ಬಹು ಮುಖ್ಯವಾಗಿದೆ. ವಿಕೋಪ ನಿರ್ವಹಣೆಯು ಅಭಿವೃದ್ಧಿಯ ವಿಷಯವಾಗಿದ್ದು. ಆ ಜಿಲ್ಲೆಯ ವಿಕೋಪಗಳಿಂದ ಸಂಭವಿಸುವ ನಷ್ಟವನ್ನು ಕಡಿಮೆ ಮಾಡುವ ದೃಷ್ಟಿಯಿಂದ ದುರ್ಬಲತೆ ಮತ್ತು ಸಂಪನ್ಮೂಲದ ಮೇರೆಗೆ ಕ್ರೂಢಿಕರಿಸಿ. ಸತ್ಯ ಸಂಗತಿ ಎಂದರೆ ಎಲ್ಲಾ ಅಭಿವೃದ್ಧಿ ಯೋಜನೆಗಳು ಭವಿಷ್ಯದಲ್ಲಿ ಒಂದು ಸಂಪನ್ಮೂಲವಾಗಿರುವ ಹಾಗೆ ಇರಬೇಕು.

ಅಭಿವೃದ್ಧಿ ಯೋಜನೆಗಳನ್ನು ಇದಕ್ಕೆ ಸೇರಿಸುವುದು ಬಹಳ ಮುಖ್ಯ, ಏಕೆಂದರೆ ವಿಕೋಪ ನರ್ವಹಣೆಯು ಕೂಡ ಒಂದು ಅಭಿವೃದ್ಧಿ ವಿಷಯವಾಗಿದೆ. ವಿಕೋಪ ನಿರ್ವಹನಾ ಯೋಜನೆಯು ಜಿಲ್ಲಾ ಅಭಿವೃದ್ಧಿ ಯೋಜನೆಯ ಒಂದು ಅಂಗವಾಗಿರಬೇಕು.

ಎಲ್ಲಾ ಸರ್ಕಾರಿ ಇಲಾಖೆಗಳ ವಿಕೋಪ ಯೋಜನೆಗಳು ಮತ್ತು ಅವುಗಳ ಪಾತ್ರ ಅಂದರೆ, ಸೇವಾದಳಗಳು, ಸಮೂಹ, ಸ್ವಯಂ ಸೇವಕರು ಹಾಗೂ ಸಂಬಂಧಪಟ್ಟ ಎಲ್ಲಾ ಸಂಸ್ಥೆಗಳ ಪಾಲುದಾರಿಕೆ ಮತ್ತು ಅವುಗಳ ಸಹಾಯದ ಪ್ರಮಾಣ ಮತ್ತು ವಿಧಾನಗಳನ್ನು ತಿಳಿಸಿರಬೇಕು.

ಬದಲಾವಣೆ/ಪರಿಷ್ಕರಣೆಗೆ / ಉತ್ತಮೀಕರಣಕ್ಕೆ ಒತ್ತು ನೀಡಿ, ನಿರಂತರ ಅಭ್ಯಾಸ/ತಾಲೀಮು ಮಾಡುವುದು, ಎಚ್ಚರಿಕೆ ಕೊಡುವುದು ಮತ್ತು ಮೌಲ್ಯಮಾಪನ ಮಾಡಿಕೊಳ್ಳುವುದು. ಯೋಜನೆಯು ನಷ್ಟಯೋಜನವಾಗದಂತೆ ಎಚ್ಚರವಹಿಸಿ ಕೊಳ್ಳುವುದು, ಇದರಿಂದ ಎಲ್ಲಿ ಯೋಜನೆಯ ಬದಲಾವಣೆಯ ಅವಶ್ಯಕತೆ ಇದೆ, ಹೇಗೆ ಯೋಜನೆಯನ್ನು ಉತ್ತಮಪಡಿಸಿಕೊಳ್ಳುವುದು ಅಥವಾ ಯಾವ ಸಂದರ್ಭದಲ್ಲಿ ಈ ಯೋಜನೆಯನ್ನು ಪುನರ್‌ಪರಿಶೀಲಿಸಬೇಕೆಂದು ನಮೂದಿಸತಕ್ಕದ್ದು. ಇದಕ್ಕಾಗಿ ಸ್ಪಷ್ಟವಾದ ಮಾರ್ಗದರ್ಶಿಯನ್ನು ರೂಪಿಸಿ ನರಂತರವಾಗಿ ಉತ್ತಮಪಡಿಸಿಕೊಳ್ಳತಕ್ಕದ್ದು ಮತ್ತು ಪುನರ್ ಪರಿಶೀಲಿಸಿಕೊಳ್ಳತಕ್ಕದ್ದು.

ನಾಗರೀಕ ಸೇವಾ ಸ್ವಯಂಸೇವಕರು (ನಿವೃತ ವೃತ್ತಿಪರರು) ತುರ್ತು ನಿರ್ವಹಣಾಕೇಂದ್ರದಲ್ಲಿ ಸರ್ಕಾರಿ ಅಧಿಕಾರಿಗಳ ಜೊತೆಗೆ ಕೆಲಸ ನಿರ್ವಹಿಸಲು ಅನುವುಮಾಡಿಕೊಡಬೇಕು.

ಜಿಲ್ಲಾ ವಿಕೋಪ ನರ್ವಹಣಾ ಯೋಜನೆಯು ಹಣಕಾಸು, ಕಾನೂನಿನ ಮತ್ತು ಆಡಳಿತಾತ್ಮಕ ಸಹಕಾರವನ್ನು, ರಾಜ್ಯ ಸರ್ಕಾರದಿಂದ ಹೊಂದಲೇ ಬೇಕಾಗುತ್ತದೆ ಮತ್ತು ಸಂಸ್ಥೆಗಳು ಆಡಳಿತದ ಚೌಕಟ್ಟಿಗೆ ಒಳಪಟ್ಟಿರಬೇಕು. ಇವುಗಳಿಗೆ ಸಂಬಂಧಪಟ್ಟಂತೆ ಅನುವುಮಾಡಿ ಕೊಡಲು ಯೋಜನೆಯಲ್ಲಿ ಸ್ಪಷ್ಟ ಟಿಪ್ಪಣಿ ನೀಡಿ.

ಜಿಲ್ಲಾಧಿಕಾರಿಗಳು ಕೆಲವು ನಿರ್ಧಾರಗಳನ್ನು ವಸ್ತು ಸ್ಥಿತಿಯ ಅಪಾಯದ ಆಧಾರದ ಮೇಲೆ ತಕ್ಷಣವಾಗಿ

ಪ್ರತಿಕ್ರಿಯಿಸಬೇಕಾಗುತ್ತದೆ. ಆದ್ದರಿಂದ ಹಣಕಾಸು ಆಡಳಿತ್ಮಾಕ ವಿಷಯಗಳಲ್ಲಿ ಸ್ಪಷ್ಟ ನಿಲುವು ಮತ್ತು ಪಾರದರ್ಶಕತೆ ಇರಲೇಬೇಕು. ಬಿಕ್ಕಟ್ಟುಗಳು ಎದುರಾದ ಸಂದರ್ಭದಲ್ಲಿ ಜಿಲ್ಲಾ ಆಡಳಿತಕ್ಕೆ ಬೆಂಬಲವಾಗಿರಲು ಆಯಾ ಜಿಲ್ಲೆಯ ನಿಗಮ ಮಂಡಳಿಗಳನ್ನು ಮತ್ತು ಖಾಸಗಿ ಸಂಸ್ಥೆಗಳ ಸಹಾಯ ಪಡೆದುಕೊಳ್ಳುವುದನ್ನು ಕಡ್ಡಾಯ ಮಾಡುವುದು. ಜನಪ್ರತಿನಿಧಿಗಳನ್ನು ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಯೋಜನೆಯಲ್ಲಿ ವಿವಿಧ ಹಂತಗಳಲ್ಲಿ ಭಾಗವಹಿಸಿಕೊಳ್ಳಲು ಅನುವು ಮಾಡುವುದು ಹಾಗೂ ಜನಪ್ರತಿನಿಧಿಯ ನಿಧಿ (MPLAD Fund) ಬಳಸಿಕೊಳ್ಳುವುದು. ಸಾರ್ವಜನಿಕ ಕುಂದುಕೊರತೆ ಮಾಧ್ಯಮದ ನರ್ವಹಣೆ (ಸುಳ್ಳು ಮತ್ತು ಅಪಪ್ರಚಾರಗಳಿಗೆ ಕಡಿವಾಣ ಹಾಕಲು) ನೀತಿ, ಸಂಹಿತೆಯನ್ನು ತಯಾರಿಸುವುದು.

ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಯೋಜನೆಯು ಮೂರು ಮುಖ್ಯ ಅಂಶಗಳನ್ನು ಒಳಗೊಂಡಿರಬೇಕು.

ವಿಕೋಪ ಪೂರ್ವ ಸಿದ್ಧತೆ ಮತ್ತು ಸಂರಕ್ಷಣಾ ಕ್ರಮಗಳು
ವಿಕೋಪದ ಸಮಯದಲ್ಲಿ ತೆಗೆದುಕೊಳ್ಳುವ ಕ್ರಮಗಳು
ವಿಕೋಪದ ನಂತರದ ಕ್ರಮಗಳು (ಪುನರ್ವಸತಿ ಇತ್ಯಾದಿ)
ಪ್ರತಿ ಅಂಶಕ್ಕೂ ನಿರ್ದಿಷ್ಟವಾದ ಯೋಜನೆಯನ್ನು ತಯಾರಿಸುವುದು.

ಹಲವು ವಿಧದ ಪರಿಶೀಲನಾ ಪಟ್ಟಿ ಮತ್ತು ಕೆಲಸ ಕೈಗೊಳ್ಳಲು ಸಹಾಯವಾಗುವಂತಹ ಅಂದರೆ ನಷ್ಟವನ್ನು ಅಳತೆಮಾಡುವ/ವಿಧಾನ, ವರದಿ ಸಲ್ಲಿಸುವುದು, ನರಂತರವಾಗಿ ತಪಾಸಣೆ ಮಾಡಿಕೂಳ್ಳುವುದು, ಮುಂತಾದವುಗಳನ್ನು ಅನುಬಂಧಗಳಲ್ಲಿ ಸೇರಿಸುವುದು. ಹಿಂದೆ ಮಾಡಿದ ವಿಕೋಪ ಸಮೀಕ್ಷಾ ಮಾದರಿಯನ್ನು ಲಗತ್ತಿಸಿದರೆ ಒಳ್ಳೆಯದು.

ಸ್ಪಂದನಾ ಯೋಜನೆಯಲ್ಲಿ (Response Plan) ಪರಿಹಾರ ನಿರ್ವಹಣೆಗೆ ಹೆಚ್ಚು ಒತ್ತು ಕೊಡುವುದು. ಜಿಲ್ಲಾ ವಿಕೋಪ ನರ್ವಹಣಾ ಯೋಜನೆಯು, ವಿಕೋಪ ಸ್ಥಳದಲ್ಲಿ ಕಾರ್ಯಚರಣೆಯನ್ನು ಕೈಗೂಳ್ಳಲು ಅನುಸರಿಸ ಬೇಕಾದ ಮಾರ್ಗದರ್ಶಿ/ಕೈಪಿಡಿ. ಇದು ವಿಕೋಪ ಸಂದರ್ಭಗಳಲ್ಲಿ ಅಧಿಕಾರಿಗಳು ಪಾಲಿಸ ಬೇಕಾದ ಮುಖ್ಯ ಜವಬ್ದಾರಿಗಳು ಮತ್ತು ಒಂದು ಕೆಲಸದ ನಕ್ಷೆ, ವಿಕೋಪಕ್ಕಿಂತ ಮುಂಚೆ, ಆ ಸಂದರ್ಭದಲ್ಲಿ ಮತ್ತು ನಂತರದಲ್ಲಿನ ಕಾರ್ಯಚಟುವಟಿಕೆಯ ಬಹುಉಪಯೋಗದ ಚೌಕಟ್ಟಾಗಿದೆ.

ಜಿಲ್ಲಾ ವಿಕೋಪ ನರ್ವಹಣಾ ಯೋಜನೆ ತಯಾರಿಸಲು ಅನುಸರಿಸುವ ಕೆಲವು ವಿಧಾನಗಳು:

ಪ್ರಾಥಮಿಕ ಮಟ್ಟದ ಮಾಹಿತಿ ಸಂಗ್ರಹಣೆ:

ಕ್ಷೇತ್ರ ಭೇಟಿ: ಜಿಲ್ಲೆಯ ವಿವಿಧ ಸ್ಥಳಗಳಿಗೆ ಭೇಟಿ ನೀಡಿ ಅಲ್ಲಿನ ಸಂಗತಿಗಳನ್ನು ತಿಳಿದುಕೊಳ್ಳುವುದು. ಮುಖ್ಯವಾಗಿ, ಅಪಾಯಕ್ಕೀಡಾಗುವ ಪ್ರದೇಶ, ಸುರಕ್ಷಿತ ಪ್ರದೇಶ, ಸಂಪನ್ಮೂಲಗಳು ಇತ್ಯಾದಿಗಳನ್ನು ಗುರುತಿಸುವುದು.

ನಕ್ಷೆ: ಇಲ್ಲಿ ಸಾಮಾಜಿಕ ನಕ್ಷೆ, ಅಪಾಯಗಳ ನಕ್ಷೆ ಸಂಪನ್ಮೂಲಗಳ ನಕ್ಷೆ ಇತ್ಯಾದಿಗಳನ್ನು ತಯಾರಿಸುವುದು.

ಸಾಮಾಜಿಕ ನಕ್ಷೆಯಲ್ಲಿ: ಜಿಲ್ಲೆಯಲ್ಲಿರುವ ಧಾರ್ಮಿಕ ಮತ್ತು ಸಾಮಾಜಿಕ ಸಂಘ–ಸಂಸ್ಥೆಗಳನ್ನು ಪಟ್ಟಿ ಮಾಡುವುದು. ಏಕೆಂದರೆ ಈ ಸಂಸ್ಥೆಗಳನ್ನು ವಿಕೋಪ ಸಂದರ್ಭಗಳಲ್ಲಿ ಬಳಸಿಕೊಳ್ಳಲು ಅನುವಾಗುತ್ತದೆ (ಉದಾ: ಬ್ಯಾಂಕುಗಳು, ದೇವಸ್ಥಾನಗಳು ಸ್ವಯಂ ಸೇವಾ ಸಂಸ್ಥೆಗಳು, ಶಾಲೆಗಳು, ಕಾರ್ಖಾನೆಗಳು ಇತ್ಯಾದಿ) ಈ ಸಂಸ್ಥೆಗಳನ್ನು ವಿಕೋಪದ ಸಮಯದಲ್ಲಿ ಪರಿಹಾರ, ಸಂರಕ್ಷಣೆಗಾಗಿ ಪುನರ್ವಸತಿಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಬಹುದು. ಜಿಲ್ಲೆಯಲ್ಲಿ ತುಂಬಾ ಅಪಾಯಕ್ಕೀಡಾಗುವ ದುರ್ಬಲ ಜನರ ಗುಂಪುಗಳನ್ನು ಗುರುತಿಸಿ ಜಿಲ್ಲಾಡಳಿತದ ಗಮನದಲ್ಲಿಡಬೇಕು.

ಸಂಪನ್ಮೂಲ ಮತ್ತು ಸಾಮರ್ಥ್ಯ ನಕ್ಷೆ. ರಾಜ್ಯ/ಜಿಲ್ಲೆ/ ಸ್ಥಳಗಳು/ ನೆರೆಹೊರೆಯಲ್ಲಿರುವ ಬೇಕಾಗುವ ಸಂಪನ್ಮೂಲಗಳನ್ನು ಪಟ್ಟಿ ಮಾಡುವುದು.

ನೆರೆ ರಾಜ್ಯದಲ್ಲಿರುವ ಸಂಪನ್ಮೂಲಗಳನ್ನು ಸಾಮರ್ಥ್ಯಗಳನ್ನು ಪಟ್ಟಿ ಮಾಡುವುದು.

ಅಪಾಯಗಳ ನಕ್ಷೆ: ಜಿಲ್ಲೆಯಲ್ಲಿರುವ ಎಲ್ಲ ರೀತಿಯ ಅಪಾಕಯಗಳು ಪ್ರವಾಹ, ಬೆಂಕಿ, ಬರ, ಭೂಕಂಪ ರೋಗಗಳು, ರಾಸಾಯನಕ ಅಪಾಯಗಳು, ಕಾರ್ಖಾನೆಗಳು ಇತ್ಯಾದಿಗಳನ್ನು ಪಟ್ಟಿ ಮಾಡಿ ಅವುಗಳನ್ನು ನಕ್ಷೆಯಲ್ಲಿ ಗುರುತಿಸಬೇಕು.

ಅಪಾಯ– ನಕ್ಷೆ– ದುರ್ಬಲತೆಯ ವಿಶ್ಲೇಷಣೆ ಶ್ರೇಯಾಂಕ ಪಟ್ಟಿ: ಅಪಾಯಗಳನ್ನು ಅವುಗಳ ಆಗುವಿಕೆ ಮತ್ತು ಅವುಗಳ ದುಷ್ಪರಿಣಾಮದ ಆಧಾರದ ಮೇಲೆ ಶ್ರೇಯಾಂಕ ಮಾಡಿ ಪಟ್ಟಿ ಮಾಡುವುದು.

ದ್ವಿತೀಯ ಮಟ್ಟದ ಮಾಹಿತಿ ಸಂಗ್ರಹಣೆ

ಈಗಾಗಲೇ ಅಪಾಯಗಳ ಬಗ್ಗೆ ಲಭ್ಯವಿರುವ ಮಾಹಿತಿ. ಗಣತಿ ಮಾಹಿತಿ, ವರದಿಗಳು, ಸಂಶೋಧನಾ ವರದಿಗಳು, ಇತ್ಯಾದಿಗಳ ಮೂಲಕ ಮಾಹಿತಿಯನ್ನು ಸಂಗ್ರಹಿಸುವುದು.

ಲೈಬ್ರರಿ, ಇಲಾಖೆಯ ಕಛೇರಿಗಳು, ವಿಶ್ವವಿದ್ಯಾಲಯಗಳು, ಕೇಂದ್ರ/ ರಾಜ್ಯ ಸರ್ಕಾರದ ಅಂತರ್ಜಾಲಗಳು/ ವರದಿಗಳು, ಕರ್ನಾಟಕದ ಅಪಾಯಗಳ ಭೂಪಟಗಳು, ಇತ್ಯಾದಿ.

ಏಕಾಗ್ರ ಗುಂಪು ಚರ್ಚೆ: ಅಪಾಯಗಳು, ವಿಕೋಪಗಳು, ದುರ್ಬಲತೆ, ಈಗಿರುವ ಸಾಮರ್ಥ್ಯದ ಬಗ್ಗೆ ಪ್ರತಿ ವಿಷಯದ ಕುರಿತು 10 ರಿಂದ 15 ವ್ಯಕ್ತಿಗಳ ಜೊತೆ ಗುಂಪು ಚರ್ಚೆ ಮಾಡುವುದು.

ಋತುಮಾನ ಪಟ್ಟಿ: ಒಂದು ವರ್ಷದಲ್ಲಿ ಆದ ಎಲ್ಲ ಅಪಾಯಗಳನ್ನು ಪಟ್ಟಿ ಮಾಡುವುದು. ಇದರಿಂದ ವರ್ಷದಲ್ಲಿ ಅತಿ ಹೆಚ್ಚು ಅಪಾಯ ಸಂಭವಿಸುವ ಕಾಲವನ್ನು ನಿರ್ಧರಿಸುವುದು.

ಅಪಾಯಗಳನ್ನು ವೈ– ರೇಖೆಯಲ್ಲಿ ತಿಂಗಳುಗಳನ್ನು ಎಕ್ಸ್– ರೇಖೆಯಲ್ಲು ಗುರುತಿಸಿ ಚಾರ್ಟ್ ತಯಾರಿಸುವುದು.

ಪರಿವಿಡಿ ನಿರೂಪಣೆ:–

ತಕ್ಷಣದ ಪರಾಮರ್ಶೆಯ ಉಪಯೋಗಕ್ಕಾಗಿ ಒಂದು ಪುಟದಲ್ಲಿ ಯೋಜನೆ ಮತ್ತು ಕಾರ್ಯಗಳ ವಿವರವನ್ನು ತಯಾರಿಸಿ.

ಧೀರ್ಘ ವಿವರಣೆ ಆದಷ್ಟು ಬರಂದತೆ ನೋಡಿಕೊಳ್ಳಿ. ಯೋಜನೆಯಲ್ಲಿ ನಿರೀಕ್ಷೆಯ ಕಾರ್ಯಚಟುವಟಿಕೆಯನ್ನು ಬುಲೆಟ್‌ನ್ನಿಂದ ಪಟ್ಟಿಮಾಡಿ.

ಮುಖ್ಯ ವಿವರಗಳಾದ ಪ್ರವಾಹದ ವಿಧಗಳು, ಅಪಾಯಗಳು ಹೇಗೆ ಸಂಭವಿಸುತ್ತದೆ ಎಂಬ ಮುಂತಾದ ವಿಚಾರಗಳನ್ನು ಯೋಜನೆಯ ಕರಡಿನ ಜೊತೆಗೆ **"ಸಹಾಯ ಕೈಪಿಡಿ"** ಯಲ್ಲಿ ವಿವರಿಸಿ. ಇದರಿಂದ ಮುಖ್ಯ ಯೋಜನೆಯನ್ನು ಕಾರ್ಯಗತಗೊಳಿಸುವಲ್ಲಿ ಸಾಧ್ಯವಾಗುತ್ತದೆ.

ನಕ್ಷೆ, ಚಿತ್ರಗಳು, ಗ್ರಾಫ್‌ಗಳನ್ನು ತೋರಿಸಿದರೆ ಮುಂತಾದವುಗಳನ್ನು ಕಡಿಮೆ ಸಮಯದಲ್ಲಿ ಅರಿತುಕೊಳ್ಳಲು ಸಹಾಯವಾಗುತ್ತದೆ. ಅಪಾಯಗಳು ಅದರಿಂದಾದ ನಷ್ಟ, ಒಂದು ಪ್ರದೇಶದಲ್ಲಿ ಸಂಭವಿಸಿದಂತಹ ಶೇಕಡ, ಒಟ್ಟು ಅಪಾಯ, ಮುಂತಾದವುಗಳನ್ನು ಪೈ ನಕ್ಷೆ (Pie chart, Bar diagram and Line diagram) ಹಾಗೂ ಕಂಬಸಾಲು, ಮುಂತಾದ ನಕ್ಷೆಗಳಿಂದ ವಿವರಿಸಿ

ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಯೋಜನೆಯ ಅಧ್ಯಾಯಗಳು

ಈ ಭಾಗವು DDMP ಯ ಮೊದಲನೆ ಅಧ್ಯಾಯವಾಗಿದೆ. ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಯೋಜನೆಯ ಎಲ್ಲಾ ಅಂಶಗಳನ್ನೊಳಗೊಂಡ ಸಂಕ್ಷಿಪ್ತ ಚಿತ್ರಣವನ್ನು ನೀಡುತ್ತದೆ. ಈ ಭಾಗದಲ್ಲಿ ಕೆಳಗೆ ನಮೂದಿಸಿದ ಅಂಶಗಳು ಇರಬೇಕಾಗುತ್ತದೆ.

ಪೀಠಿಕೆ (Introduction)

ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಯೋಜನೆಯ ಅವಶ್ಯಕತೆ ಬಗ್ಗೆ ವಿವರ.
ಬದಲಾಗುತ್ತಿರುವ ಸಂದರ್ಭದಲ್ಲಿ ಜಿಲ್ಲಾ ವಿಕೋಪ ನರ್ವಹಣೆಯ ದೃಷ್ಟಿಕೋನ.
ಯೋಜನೆಯ ಗುರಿಗಳು.
ಯೋಜನೆ ತಯಾರಿಕೆಯಲ್ಲಿ ಭಾಗವಹಿಸುವವರು ಯಾರು ಮತ್ತು ಅವರ ಹೊಣೆಗಾರಿಕೆ.
ಹಿಂದಿನ ಯೋಜನೆ ಯಾವಾಗ ರಚನೆಯಾಗಿತ್ತು ಮತ್ತು ಮುಂದೆ ಯಾವಾಗ ಪರಿಷ್ಕರಣೆ.
ಹಾಗೂ ಬೇರಾವುದಾದರೂ ವಿಷಯಗಳಿದ್ದರೆ ಅದನ್ನು ವಿಕೋಪ ನಿರ್ವಹಣೆಗೆ ಪೂರಕವಾಗಿ ಸೂಚಿಸುವುದು.

ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಸೂಚಕ

ಈ ಕೆಳಕಂಡ ಸೂಚಕಗಳನ್ನು ಕಾರ್ಯಾಗಾರ ಹಾಗೂ ವಿಚಾರ ಸಂಕೀರ್ಣಗಳಲ್ಲಿ ಚರ್ಚಿಸಿ ಒಟ್ಟು ನಿರ್ಣಯಗಳನ್ನು ಸೂಚಿಸಲಾಗಿದೆ. ಹಾಗೂ ಈ ಸೂಚಕವನ್ನು ಆಯಾ ಜಿಲ್ಲೆಯ ವಿಕೋಪ ಅನುಸಾರ ಈ ಸೂಚಕವನ್ನು ಜಿಲ್ಲಾ ಮಟ್ಟದಲ್ಲಿ ಬದಲಾಯಿಸಿಕೊಳ್ಳಬಹುದು.

ಜಿಲ್ಲೆಯ ಹೆಸರು :
ವರ್ಷ:
ಜಿಲ್ಲೆಯ ವಿಕೋಪ ದುರ್ಬಲತೆ (Velnerability) :
ವಿವಿಧ ಅಪಾಯಗಳನ್ನು (Hazards) ತೋರಿಸುವ ನಕ್ಷೆ (Map) ಮತ್ತು ವಿವಿಧ ವಿಕೋಪಗಳು
ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಸಮೀತಿ/ ಪ್ರಾಧಿಕಾರ ಸಂಯೋಜನೆ (Organizational Structure).
ಬೇರೆ ಬೇರೆ ವಿಕೋಪಗಳಿಗೆ ಬೇಕಾದ ಘಟನಾ ನಿರ್ವಹಣಾ ವ್ಯವಸ್ಥೆ (Incident Command System)
ಅತೀಮುಖ್ಯವಾದ ದೂರವಾಣಿ ಸಂಖ್ಯೆಗಳು ಮತ್ತು ವಿಕೋಪ ನಿರ್ವಹಣೆಯಲ್ಲಿ ಅವುಗಳ ಸಹಾಯ.
ವಿಕೋಪ ನಿರ್ವಹಣೆಗೆ ಬೇಕಾಗುವ ಮುಖ್ಯವಾದ ಜಿಲ್ಲಾ ಸಂಪನ್ಮೂಲಗಳು.

ಜಿಲ್ಲಾ ವಿವರಗಳು (District Profile) :

ಈ ಭಾಗವು ಒಂದು ಸಂಕ್ಷಿಪ್ತ ಸಾರಾಂಶವಾಗಿದ್ದು ಆಯಾ ಜಿಲ್ಲೆಯ ಗುಣಗಳು i.e. ಭೌಗೋಳಿಕವಾಗಿ, ಮಳೆ, ತಾಪಮಾನ, ಭೌಗೋಳಿಕ ವಿಸ್ತೀರ್ಣ, ಭೂಮಿಯ ಬಳಕೆ, ಬೆಳೆಗಳ ವಿಧಗಳು, ನದಿ, ಜನರ ಉದ್ಯೋಗ, ಕುಡಿಯುವ ನೀರಿನ ಮೂಲಗಳು ಇತ್ಯಾದಿ.) ಜನಸಂಖ್ಯೆ (ಸಾಕ್ಷರತೆಯ ವಿವರ, ಬಡತನ, ಉದ್ಯೋಗ, ಆರ್ಥಿಕತೆಯ ವಿವರಗಳು, ಹವಾಮಾನ ವಿವರಗಳು, ಆಸ್ಪತ್ರೆ, ನಗರ ಪ್ರದೇಶಗಳ ಅರಣ್ಯ ಪ್ರದೇಶ, ಸಂಘ ಸಂಸ್ಥೆಗಳು, ವಿದ್ಯುತ್ ಸ್ಥಾವರಗಳು, ಕಾರ್ಖಾನೆಗಳು. ರಸ್ತೆಗಳು, ನದಿಗಳು ಮತ್ತು ಎಲ್ಲಾ ವಿವರಗಳನ್ನು ಎರಡು ಪುಟಗಳಿಗೆ ಮೀರದಂತೆ ವಿವರಿಸಿರಬೇಕು.

ಅಪಾಯ, ನಷ್ಟ, ದುರ್ಬಲತೆ ಹಾಗೂ ಸಾಮರ್ಥ್ಯಗಳ ವಿಶ್ಲೇಷಣೆ: (Hazard, Risk, Vulnerability, Capacity Analysis (HRVC)

HRVC ವಿಶ್ಲೇಷಣೆ ಅತ್ಯಂತ ಮುಖ್ಯವಾದ ಭಾಗವಾಗಿದೆ. ಏಕೆಂದರೆ, ಇಡೀ ಯೋಜನೆ ಈ ವಿಶ್ಲೇಷಣೆಯ ಮೇಲೆಯೇ ಅವಲಂಬನೆಯಾಗಿದೆ. HRVC ವಿಶ್ಲೇಷಣೆ ಮಾಡುವಾಗ, ಅಪಾಯಗಳು/ವಿಕೋಪಗಳ ಆಗುವಿಕೆ, ಅವುಗಳ ಗಾತ್ರ, ಅಳತೆ ಮತ್ತು ಅವುಗಳಿಂದಾಗಬಹುದಾದ ದುಷ್ಪರಿಣಾಮದ ವಿಶ್ಲೇಷಣೆ ಏನಾದರೂ ಸ್ವಲ್ಪ ತಪ್ಪಾದರೆ, ಸಂಪೂರ್ಣ ಯೋಜನೆ ಕೂಡಾ ತಪ್ಪಾಗಿಯೇ ತಯಾರಾಗುತ್ತದೆ.

ಅಪಾಯ (Hazard) ಅಂದರೆ, ಆ ಕ್ಷೇತ್ರದಲ್ಲಿ ಜನರಿಗೆ / ಪ್ರಾಣಿಗಳಿಗೆ / ಆಸ್ತಿ / ಪರಿಸರಕ್ಕೆ ಹಾನ ಉಂಟುಮಾಡುವ ಯಾವುದೇ ರೀತಿಯ ಸಂಗತಿಗಳು / ವಸ್ತುಗಳು / ನದಿಗಳು / ಕಾರ್ಖಾನೆಗಳು / ಭೂಕಂಪ / ಬೆಂಕಿ / ಕಟ್ಟಡ / ಅತಿವೃಷ್ಟಿ / ಅನಾವೃಷ್ಟಿ ಇತ್ಯಾದಿ. ಜಿಲ್ಲೆಯಲ್ಲಿ ಆವರಿಸಿರುವ ಇಂತಹ ಎಲ್ಲಾ ಅಪಾಯ (Hazard) ಗಳನ್ನು ಗುರುತಿಸಿ ಕೂಲಂಕುಷ ವಿಶ್ಲೇಷಣೆ ಮಾಡುವುದು ಬಹಳ ಮುಖ್ಯವಾಗಿದೆ.

HRVC ವಿಶ್ಲೇಷಣೆ ಫಲವಾಗಿ ಕೆಳಗಿನ ಅಂಶಗಳು ನಿಖರವಾಗಿ ಮತ್ತು ನರ್ದಿಷ್ಟವಾಗಿ ಹೊರಬರುತ್ತದೆ. ಹಿಂದೆ ಆದ ಎಲ್ಲಾ ವಿಕೋಪಗಳ ವಿಶ್ಲೇಷಣೆಯನ್ನು ಕೆಳಗಿನ ಮಾದರಿಯಲ್ಲಿ ವಿವರಿಸಬೇಕು. ಉದಾಹರಣೆಯನ್ನು ಕೆಳಗೆ ತಿಳಿಸಿದೆ.

ವಿಕೋಪ / ಅಪಾಯ	**ಸಂಭವಿಸಿದ ಕಾಲ**	**ಅದರ ದುಷ್ಪರಿಣಾಮ**	**ಅಪಾಯಕ್ಕೀಡಾದ ಕ್ಷೇತ್ರ/ ಜಿಲ್ಲೆ / ನಗರ / ಇತ್ಯಾದಿ**
ಪ್ರವಾಹಇತ್ಯಾದಿ	ಜೂನ್‌ನಿಂದ ಆಗಸ್ಟ್	ಉದಾ:–ಜನರ ಸಾವು –ನೋವು, ಆಸ್ತಿ ಹಾನ ಮನೆಕೆಲಸ, ರೈತರ ಆತ್ಮಹತ್ಯೆಬೆಳೆ ನಾಶ, ಇತ್ಯಾದಿ	ಇಡೀ ಜಿಲ್ಲೆ / ನಗರ

ಸಂಭವನೀಯ ವಿಕೋಪಗಗಳು

ವಿಕೋಪದ ಹೆಸರು	Jan	Feb	mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec
ಅನಾವೃಷ್ಟಿ												
ಪ್ರವಾಹ												
ಬೆಂಕಿ												
ಭೂ ಕುಸಿತ												
।												
।												
।												
ಇತ್ಯಾದಿ												

ಹಿಂದೆ ಆದ ವಿಕೋಪಗಳ ವಿವರ

ಕ್ರ. ಸಂ.	**ವಿಕೋಪ ಅಪಾಯ ಹೆಸರು**	**ಸಂಭವಿಸಿದ ವರ್ಷ**	**ಹಾನಿಗೊಳಪಟ್ಟ ಕ್ಷೇತ್ರ**	**ಜನಹಾನಿ**	**ಬೆಳೆಹಾನಿ**	**ಮೂಲಭೂತ ಸೌಕರ್ಯಗಳ ಹಾನಿ**	**ಪ್ರಾಣಿಹಾನಿ**	**ಇತ್ಯಾದಿ**

ಸಾಮರ್ಥ್ಯ ವಿಶ್ಲೇಷಣೆ:

ಜಿಲ್ಲೆಯ ವಿಕೋಪ ನರ್ವಹಣಾ ಸಾಮರ್ಥ್ಯ ವಿಶ್ಲೇಷಣೆಯನ್ನು ಕೆಳಗಿನ ಅಂಶಗಳ ಕುರಿತು ಮಾಡಬೇಕು.

ಈಗಿರುವ ಸಿಬ್ಬಂದಿ ಮತ್ತು ಅವರ ಸಾಮರ್ಥ್ಯ

ಗ್ರಾಮ ಪಂಚಾಯ್ತಿಯ ನೆರವು / ನಿಧಿ

ಜಿಲ್ಲಾ / ತಾಲ್ಲೂಕು ಪಂಚಾಯ್ತಿಯ ನೆರವು

ರಾಜ್ಯ / ಕೇಂದ್ರ ಸರ್ಕಾರದ (NDMA) ಇತ್ಯಾದಿ.

ಸೇನೆ / ಅರೆ ಸೇನೆ / ವಿಕೋಪ ನಿರ್ವಹಣಾ ಪಡೆ / ಇತ್ಯಾದಿಗಳ ನೆರವು.

ಸ್ಥಳೀಯ–ಸಂಘಸಂಸ್ಥೆಗಳ ಸಹಕಾರ.

ಸ್ವಯಂ ಸೇವಾ ಸಂಸ್ಥೆಗಳ ನೆರವು, ಅಗ್ನಿಶಾಮಕ ಪಡೆ / ವಾಹನಗಳ ಸಿದ್ಧತೆ ಇತ್ಯಾದಿ

ಇವುಗಳಿಂದಾಗುವ ದುಷ್ಪರಿಣಾಮದ ಅಳತೆ ಮಾಡುವುದು ಅವಶ್ಯ ಇಂತಹ ಅಪಾಯಗಳಿಂದ ಆಗುವ ನಷ್ಟಗಳನ್ನು ಅಳತೆ ಮಾಡಬೇಕು. ಇಡೀ ಜಿಲ್ಲೆಯ ಒಟ್ಟು ಕ್ಷೇತ್ರವನ್ನು ಅಲ್ಲಿರುವ ಅಪಾಯಗಳ ಆಧಾರದ ಮೇಲೆ, ಅನಾಹುತಕ್ಕೊಳಪಡುವ ಕ್ಷೇತ್ರವನ್ನು ಗುರುತಿಸಿ ಸಾಮಾಜಿಕ ದುರ್ಬಲತೆ, ಆರ್ಥಿಕ ದುರ್ಬಲತೆ ಇತ್ಯಾದಿಗಳನ್ನಾಗಿ ವಿಂಗಡಿಸಿ ವಿಶ್ಲೇಷಣೆ ಮಾಡಬೇಕು.

ಸಂಪನ್ಮೂಲಗಳ ವಿಶ್ಲೇಷಣೆ :

ಈ ಕೆಳಗಿನ ಅಂಶಗಳ ಮೇಲೆ ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣೆಗೆ ಬೇಕಾಗುವ ಸಂಪನ್ಮೂಲ ವಿಶ್ಲೇಷಣೆ ಮಾಡಬೇಕು.

- ಹಣ, ಆಹಾರ ಸಂಗ್ರಹಣೆ ಮತ್ತು ವಿತರಣೆ ವ್ಯವಸ್ಥೆ.
- ಆರೋಗ್ಯ ಸೇವೆಗಳು / ವೈದ್ಯಕೀಯ ವ್ಯವಸ್ಥೆ.
- ವಸತಿ, ಅಗ್ನಿಶಾಮಕ ಪಡೆ / ವಾಹನಗಳ ದೂರ ಸಂಪರ್ಕ ವ್ಯವಸ್ಥೆ
- ನೀರು
- ಮೂಲಭೂತ ಸೇವೆಗಳು, ಸುರಕ್ಷಿತ ವಸತಿ ಸೌಲಭ್ಯ.
- ಸಲಕರಣೆಗಳು (ಬುಲ್‌ಡೋಜರ್, ವಾಹನಗಳು)
- ಇತ್ಯಾದಿ.

ಸಂಸ್ಥೆಗಳ ರಚನೆ (Institutional Mechanism)

ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಸಂಸ್ಥೆಗಳು / ಸಮಿತಿಗಳು / ಇತ್ಯಾದಿಗಳ ಸಂಯೋಜನೆ ಮತ್ತು ಅವುಗಳ ಕರ್ತವ್ಯಗಳನ್ನು ತಿಳಿಸಬೇಕು. ಈ ಕೆಳಗಿನ ಜಿಲ್ಲಾ ವಿಕೋಪ ನರ್ವಹಣೆ ಸಂಬಂಧಪಟ್ಟ ಎಲ್ಲಾ ಅಂಗಗಳ ಕರ್ತವ್ಯಗಳನ್ನು ವಿವರಿಸಬೇಕು.

ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಪ್ರಾಧಿಕಾರ

ವಿಕೋಪ ನಿರ್ವಹಣಾ ಸಲಹಾ ಸಮೀತಿಗಳು

ವಿಕೋಪ ನಿರ್ವಹಣಾ ಉಪ ಸಮೀತಿಗಳು

ತುರ್ತು ಅಪಾಯ ನಿರ್ವಹಣಾ ತಂಡ / Incident Command System

ತುರ್ತು ನಿರ್ವಹಣಾ ಕೇಂದ್ರ (Emergency Operation Centre) ಮತ್ತು ಇದರ ನಿರ್ವಹಣಾ ವಿಧಾನ

ಸ್ಥಳೀಯ ನಿರ್ವಹಣಾ ಕೇಂದ್ರ (Site Operation Centre)

ನಿರ್ವಹಣಾ ಸಂಸ್ಥೆಗಳ ಅಂತರ್ ಸಂಪರ್ಕ ಮತ್ತು ಸಮನ್ವಯ (ನಿರ್ವಹಣೆಯಲ್ಲಿ ಒಳಗೊಂಡ ಎಲ್ಲಾ ಸಂಸ್ಥೆಗಳು ಮತ್ತು ಮಿಲಿಟರಿ ಕೋಸ್ಟ ಗಾರ್ಡ್ ರಾಷ್ಟ್ರೀಯ ವಿಕೋಪ ಸ್ಪಂದನಾ ಪಡೆ (NDRF), ಸ್ವಯಂ ಸೇವಾ ಸಂಸ್ಥೆಗಳ ಮಧ್ಯ ಸಮನ್ವಯ ಮತ್ತು ಅವುಗಳ ಪಾತ್ರ.

ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಯೋಜನೆಯ ಜೊತೆ ಇತರೆ ಉಪ ಯೋಜನೆಗಳ ಸಮನ್ವಯ (ಉದಾ:– ಗ್ರಾಮ / ತಾಲ್ಲೂಕು ಯೋಜನೆಗಳು, ಇಲಾಖೆಗಳ ಯೋಜನೆಗಳು, ಫ್ಯಾಕ್ಟರಿಗಳ ಯೋಜನೆಗಳು. ಶಾಲಾ . ಕಾಳೇಜುಗಳು/ ಆಸ್ಪತೆಗಳು / ಪೊಲೀಸ್ / ಅಗ್ನಿಶಾಮಕದಳ / ಸಂಘಸಂಸ್ಥೆಗಳು ಇತ್ಯಾದಿ)

Mitigation Plan (ವಿಕೋಪ ಅಪಾಯ ಸಂರಕ್ಷಣಾ ಯೋಜನೆ) :

ಈ ಯೋಜನೆಯು ಅಪಾಯಗಳಿಂದ ಹೇಗೆ ಸಂರಕ್ಷಣೆ ಮಾಡಿಕೊಳ್ಳಬೇಕು. ಎಂಬುದರ ಬಗ್ಗೆ ತಿಳಿಸುತ್ತದೆ.

ಜಿಲ್ಲೆಯ ವಿವಿಧ ವಿಕೋಪಗಳಿಂದಾಗುವ ದುಷ್ಪರಿಣಾಮವನ್ನು ಹೇಗೆ ಕಡಿಮೆ / ಕಡಿತಗೊಳಿಸಬಹುದು ಎನ್ನುವ ಮಾರ್ಗೋಪಾಯಗಳನ್ನು ವಿವರಿಸುವುದು.

ವಿಕೋಪದಿಂದಾಗುವ ನಷ್ಟವನ್ನು ಹೇಗೆ ಕಡಿಮೆಮಾಡುವುದು ಎನ್ನುವ ಕುರಿತು ಹೆಚ್ಚಿನ ಒತ್ತು ಕೊಡುವುದು ಅವಶ್ಯ..

HRVC ವಿಶ್ಲೇಷಣೆಯಿಂದ ಗುರುತಿಸಲ್ಪಟ್ಟ ವಿವಿಧ ರೀತಿಯ ವಿಕೋಪ / ಅಪಾಯಗಳಿಗೆ ನಿರ್ದಿಷ್ಟ ಸಂರಕ್ಷಣೆ (Mitigation) ಯೋಜನೆಗಳನ್ನು ತಯಾರಿಸುವುದು.

ಸಂರಕ್ಷನಾ ಯೋಜನೆಗಳಲ್ಲಿ ಸ್ಟ್ರಕ್ಚರಲ್ ಮತ್ತು ನಾನ್‌ಸ್ಟ್ರಕ್ಚರಲ್ ಕ್ರಮಗಳನ್ನು ತಿಳಿಸುವುದು.

ಬರೀ ತಾಂತ್ರಿಕ ವಿಷಯಗಳಿಗೆ ಮಹತ್ವ ನೀಡದೇ ವಿಕೋಪ ನಿರ್ವಹಣೆಗೆ ಹೆಚ್ಚು ಒತ್ತು ಕೊಡಬೇಕಾಗುತ್ತದೆ.

ಸಂರಕ್ಷಣಾ ಯೋಜನೆ (Mitigation Plan) ಯನ್ನು ಅನುಷ್ಟಾನಗೊಳಿಸುವ ಎಲ್ಲಾ ಇಲಾಖೆಗಳನ್ನು ಸಂಘ–ಸಂಸ್ಥೆಗಳನ್ನು ನಗರ ಮತ್ತು ಗ್ರಾಮೀಣ ಸ್ಥಳೀಯ ಸಂಸ್ಥೆಗಳನ್ನು ಗುರುತಿಸಬೇಕು.

ಸಮೂಹ ಸಂರಕ್ಷಣಾ ಕ್ರಮಗಳನ್ನು ಗುರುತಿಸುವುದು (ಸಮೂಹದ ಪಾತ್ರವನ್ನು ತಿಳಿಸಬೇಕು).

ವಿಕೋಪ ನಿರ್ವಹಣೆಗೆ ಬೇಕಾದ ತರಬೇತಿ ಕಾರ್ಯಕ್ರಮಗಳು ಮತ್ತು ಸಾಮರ್ಥ್ಯ ಬಲವರ್ಧನೆಗೆ ಬೇಕಾಗುವ ಸೌಕರ್ಯಗಳ ರೂಪುರೇಷೆಯನ್ನು ರಚಿಸುವುದು.

ಪೂರ್ವ ವಿಕೋಪ ಸಿದ್ಧತೆಯ ಯೋಜನೆಯಲ್ಲಿ ಕೆಳಗಿನ ಅಂಶಗಳನ್ನು ಗುರುತಿಸಬೇಕು.

ನಿರ್ವಹಣೆಗೆ ಬೇಕಾಗುವ ಪೂರ್ವ ಸಿದ್ಧತೆ, ಸಲಕರಣೆ, ವಸ್ತುಗಳು

ತುರ್ತು ನಿರ್ವಹಣಾ ಘಟಕ (EOC) ದ ಸ್ಥಾಪನೆ, ಅಲ್ಲಿರುವ ಸಿಬ್ಬಂದಿ, ಸಲಕರಣೆ / ಸೌಕರ್ಯ / ಸಂಪರ್ಕ ಇತ್ಯಾದಿ. ಪ್ರವಾಹ ಅಥವಾ ಅನಾವೃಷ್ಟಿ ಅಥವಾ ಯಾವುದೇ ವಿಕೋಪ ಸಂಭವಿಸುವ ಮುನ್ನ ಅದರ ನಿರ್ವಹಣೆಗೆ ಬೇಕಾಗಿರುವ ಸಂಪನ್ಮೂಲಗಳ ಪರಿಷ್ಕರಣೆ ಮಾಡಬೇಕು.

ನಿರ್ವಹಣೆಗೆ ಬೇಕಾಗುವ ಜ್ಞಾನ / ಕೌಶಲ್ಯ / ಸಿಮ್ಯುಲೇಶನ್ / ತರಬೇತಿ ಅವಶ್ಯಕತೆಯನ್ನು ಗುರುತಿಸುವುದು.

ಜನರಿಗೆ ತಿಳುವಳಿಕೆ ಕೊಡುವ ಕ್ರಮಗಳು.

ಸ್ಪಂದನಾ ಯೋಜನೆ (Response Plan) :

ವಿಕೋಪ ಸ್ಪಂದನಾ ಯೋಜನೆಯನ್ನು ತಯಾರಿಸುವಾಗ ಯಾವುದೇ ವಿಕೋಪ ಸಂಭವಿಸಿದ ಸಮಯದಲ್ಲಿ ನಿರ್ವಹಿಸಬೇಕಾದ ಕರ್ತವ್ಯಗಳನ್ನು ಗುರುತಿಸುವುದು ಅತ್ಯವಶ್ಯ. ಪರಿಸ್ಥಿತಿಯನ್ನು ಎದುರಿಸಲು ಬೇಕಾಗುವ ಸಾಮಗ್ರಿ, ಸಲಕರಣೆ ಆಹಾರ, ಸಿಬ್ಬಂದಿ ಮತ್ತಿತರ ಅವಶ್ಯಕತೆಗಳನ್ನು ಪೂರೈಸಬೇಕಾಗುತ್ತದೆ. ವಿಕೋಪದ ತುರ್ತು ಪರಿಸ್ಥಿತಿಯನ್ನು ಎದುರಿಸಲು ಜನಹಾನಿ ಪ್ರಾಣಿಹಾನಿಗಳನ್ನು ತಪ್ಪಿಸಲು ಆಸ್ತಿ–ಪಾಸ್ತಿಗಳನ್ನು ಸಂರಕ್ಷಿಸಲು,

ಕಡಿಮೆ ಸಮಯದಲ್ಲಿ ಕಾರ್ಯನಿರ್ವಹಿಸಬೇಕಾಗುತ್ತದೆ.

ಸ್ಪಂದನಾ ಯೋಜನೆಯಲ್ಲಿ ಪ್ರತಿಯೊಂದು ಸಂಸ್ಥೆ / ಇಲಾಖೆ / ಸ್ವಯಂ ಸೇವಾ ಸಂಸ್ಥೆ / ಸಮೂಹ ಹಾಗೂ ಮತ್ತಿತರರ ಕಾರ್ಯಗಳನ್ನು ಜವಾಬ್ದಾರಿಗಳನ್ನು ತಿಳಿಸಬೇಕಾಗುತ್ತದೆ. ಮುಖ್ಯವಾಗಿ, ಈ ಯೋಜನೆಯಲ್ಲಿ ಶೋಧ ಮತ್ತು ರಕ್ಷಣೆ, ಜನರ ಸುರಕ್ಷಿತ ಸ್ಥಾನ ಪಲ್ಲಟನ, ವೈದ್ಯಕೀಯ ಉಪಚಾರ, ಸಂಪರ್ಕ, ತಾತ್ಕಾಲಿಕ ವಸತಿ ಸೌಲಭ್ಯ, ಕಾನೂನು ಪರಿಪಾಲನೆ, ಆಹಾರ ಸಾಮಗ್ರಿ, ಇತ್ಯಾದಿಗಳ ನಿರ್ವಹಣೆಯನ್ನು ಸೂಚಿಸುವ ಯೋಜನೆಯಾಗಿದೆ. ಜಿಲ್ಲಾ ಸ್ಪಂದನಾ ಯೋಜನೆ ಕೆಳಗಿನ ಕೆಲವು ಅಂಶಗಳನ್ನು ಒಳಗೊಂಡಿರುತ್ತದೆ.

ನಿರ್ವಹಣೆ ಮತ್ತು ಸಮನ್ವಯ
ತುರ್ತು ಎಚ್ಚರಿಕೆ ಮತ್ತು ಸುದ್ದಿ ಪ್ರಚಾರ
ಹಾನಿಯ ಮೌಲ್ಯಮಾಪನ ಮತ್ತು ವರದಿ ಮಾಡುವಿಕೆ
ತುರ್ತು ಘಟನೆಯ ವ್ಯವಸ್ಥೆ (Incident Command System)
ಶೋಧ ಮತ್ತು ರಕ್ಷಣೆ
ವೈದ್ಯಕೀಯ ಸೌಕರ್ಯ
ಸಾಮಗ್ರಿ ವ್ಯವಸ್ಥೆ
ಸಂಪರ್ಕ ವ್ಯವಸ್ಥೆ
ತಾತ್ಕಾಲಿಕ ವಸತಿ ನಿರ್ವಹಣೆ ಆಹಾರ ಒದಗಿಸುವ ಸೌಲಭ್ಯ / ನಿರ್ವಹಣೆ
ಕಾನೂನು, ಪಾಲನೆ ಮತ್ತು ನಿರ್ವಹಣೆ
ಸಾರ್ವಜನಿಕ ಕುಂದುಕೊರತೆ / ಕಾಣದ ಜನರ ಶೋಧನೆ / ಮಾಧ್ಯಮ ನಿರ್ವಹಣೆ
ಪ್ರಾಣಿ ಆರೈಕೆ
ರೋಗಿಗಳ ಆರೈಕೆ
ಸರ್ಕಾರೇತರ ಸಂಘ ಸಂಸ್ಥೆಗಳ / ಸ್ವಯಂ – ಸೇವಾ ಸಂಸ್ಥೆಗಳ ನಿರ್ವಹಣೆ

ತುರ್ತು ಪರಿಹಾರ ಮತ್ತು ಲಾಜಿಸ್ಟಿಕ್ (ಸಾಮಗ್ರಿ) ವ್ಯವಸ್ಥೆಯ ನಿರ್ವಹಣಾ ಯೋಜನೆಯು ಬಹಳ ಮುಖ್ಯವಾಗಿದ್ದು, ಇದರ ನಿರ್ವಹಣೆಗಾಗಿ ಒಂದು ಪ್ರತ್ಯೇಕ "ಪರಿಹಾರ ನಿರ್ವಹಣಾ ಯೋಜನೆ" ಯನ್ನು ತಯಾರಿಸಿ ಸ್ಪಂದನಾ ಯೋಜನೆಗೆ ಅಳವಡಿಸುವುದು ಅವಶ್ಯ. ಇದರಲ್ಲಿ, ಕೆಳಗಿನ ಸಂಗತಿಗಳನ್ನು ತಿಳಿಸಬಹುದಾಗಿದೆ ಯೋಜನೆಗೆ ಅಳವಡಿಸುವುದು ಅವಶ್ಯ. ಇದರಲ್ಲಿ, ಕೆಳಗಿನ ಸಂಗತಿಗಳನ್ನು ತಿಳಿಸಬಹುದಾಗಿದೆ

ಪರಿಹಾರಕ್ಕೆ ಬೇಕಾಗುವ ಅವಶ್ಯಕತೆಗಳು
ಪರಿಹಾರ ಸಾಮಗ್ರಿ ಕ್ರೂಢೀಕರಣದ ಕೇಂದ್ರಗಳು
ಸಾರಿಗೆ ಮಾಡಲು ಮಾರ್ಗಗಳು
ಪೊಲೀಸ್ / ಹೋಮ್‌ಗಾರ್ಡ್ / ಅಗ್ನಿಶಾಮಕದಳಗಳ ಜೊತೆ ಸಮನ್ವಯ ವ್ಯವಸ್ಥೆ.
ಸ್ಥಳೀಯ / ರಾಷ್ಟ್ರೀಯ / ಅಂತರರಾಷ್ಟ್ರೀಯ ಮಟ್ಟದಿಂದ ಬರುವ ಪರಿಹಾರದ ಸಮನ್ವಯ ಮತ್ತು ನರ್ವಹಣೆ
ಪರಿಹಾರ ಸಾಮಗ್ರಿಗಳನ್ನು ಸಾಗಿಸುವ ವಾಹನಗಳು,
ಅಸಂಪ್ರದಾಯಕ ದೂರ ಸಂಪರ್ಕ ಸಾಧನಗಳಾದ ಹ್ಯಾಮ ರೇಡಿಯೋ (HAM Radio) ಗಳ ಬಳಕೆ ವ್ಯವಸ್ಥೆ ಇತ್ಯಾದಿ.

ಕೆಲವು ಪ್ರಮುಖ ದೂರವಾಣಿ ಸಂಖ್ಯೆಗಳು ಮತ್ತು ನಿರ್ವಹಣಾ ತಾಳೆ ಪಟ್ಟಿಗಳನ್ನು (Check Lists) ಒಳಗೊಂಡ "ಪರಿಹಾರ ನಿರ್ವಹಣಾ ಯೋಜನೆ" ಪರಿಹಾರ ಕಾರ್ಯದಲ್ಲಿ ತೊಡಗುವ ಅಧಿಕಾರಿಗಳಿಗೆ

ಬೇಕಾಗುವುದರಿಂದ ಈ ರೀತಿಯ ಒಂದು ಸಂಕ್ಷೇಪ ಯೋಜನೆಯನ್ನು ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಯೋಜನೆಯ ಭಾಗವಾಗಿ ಪ್ರತ್ಯೇಕವಾಗಿ ತಯಾರಿಸಬೇಕಾಗುತ್ತದೆ.

ಪುನರ್ವಸತಿ, ಮರು ನಿರ್ಮಾಣ ಯೋಜನೆ (Recovery and Reconstruction Plan)

ವಿಕೋಪಕ್ಕೊಳಪಟ್ಟ ಜನರು ದುಷ್ಪರಿಣಾಮದಿಂದ ಹೊರಬರಲು ಮತ್ತು ಯಥಾಸ್ಥಿತಿಯನ್ನು ಸ್ಥಾಪಿಸಲು ಹಮ್ಮಿಕೊಳ್ಳುವ ಯೋಜನೆಯಾಗಿದೆ. ಈ ಯೋಜನೆಯಲ್ಲಿ ಕನಿಷ್ಟ ನಿರ್ವಹಣಾ ಮಾನ (Minimum Operating Standard) ಗಳನ್ನು ಅಲ್ಪಾವಧಿ ಹಾಗೂ ಧೀರ್ಘಾವಧಿ ಪುನರ್ವಸತಿ / ಪುನರ್‌ನಿರ್ಮಾಣ ಕಲ್ಪಿಸಲು ಅಳವಡಿಸುವುದು ಅವಶ್ಯ. ಪುನರ್ವಸತಿ ಯೋಜನೆಗಳ ಅನುಷ್ಟಾನದಿಂದ ಕ್ಷೇತ್ರದ ಸಂಪೂರ್ಣ ಅಭಿವೃದ್ದಿಯನ್ನು ತಲುಪಲು ಸಾಧ್ಯವಾಗಬೇಕು. ಮುಖ್ಯವಾಗಿ, ಕೆಳಗಿನ ಅಂಶಗಳನ್ನು ವಿವರವಾಗಿ ತಿಳಿಸಿರಬೇಕು.

ಮೂಲ ಸೌಕರ್ಯಗಳನ್ನು ಯಥಾಸ್ಥಿತಿಗೆ ತರುವುದು.

ಸಾಮಾಜಿಕ ಸೇವೆಗಳ / ಸೌಕರ್ಯಗಳ ಮರು ನಿರ್ಮಾಣ ಹಾಗೂ ಕೆಲವು ಅತ್ಯವಶ್ಯ ಕಟ್ಟಡಗಳನ್ನು ರಿಪೇರಿ ಮಾಡುವುದು

ಬಿದ್ದ ಕಟ್ಟಡಗಳ ಪುನರ್‌ನಿರ್ಮಾಣ ಅಥವಾ ರಿಪೇರಿ

ವಿಮೆ ಮಾಡಿಸುವುದು.

ಅಲ್ಪಾವಧಿ ಸಾಲಗಳು

ಜೀವನೋಪಾಯ / ಉದ್ಯೋಗಗಳನ್ನು ಮೂಲ ಸ್ಥಿತಿಗೆ ತರುವುದು – ಸಹಾಯ / ಅನುದಾನ

ವೈದ್ಯಕೀಯ ಮರು ಸ್ಥಾಪನೆ

ಭೌತಿಕ ಆರೋಗ್ಯದ ಆರೈಕೆ

ಮನೋ ಸಾಮಾಜಿಕ ಆರೈಕೆಯ ಕ್ರಮಗಳು

ಕಾರ್ಯವಿಧಾನದ ಮಾನಗಳು ಮತ್ತು ತಾಳೆಪಟ್ಟಿಗಳು
(Standard Operation Procedures and Checklists (SOP)

ಪ್ರತಿ ಕಾರ್ಯವಿಧಾನ ಮಾನವು (SOP), ಪ್ರತಿ ಇಲಾಖೆಯ / ಸಂಸ್ಥೆಯ / ಅಧಿಕಾರಿಯ ಪಾತ್ರ ಹಾಗೂ ಜವಾಬ್ದಾರಿಗಳೇನು ಎಂಬುದನ್ನು ಸ್ಪಷ್ಟವಾಗಿ ವಿವರಿಸಬೇಕು. ಹೀಗೆ ತಿಳಿಸುವಾಗ, ವಿಕೋಪದ ಮೊದಲು, ಆದಾಗ ಹಾಗೂ ನಂತರ ಸ್ಪಂದನಾ ಪರಿಹಾರ ಸಂರಕ್ಷಣೆ, ಪುನರ್ವಸತಿ / ಪುನರ್‌ನಿರ್ಮಾಣ ಸಿದ್ಧತೆ ಮೊದಲಾದ ಕ್ರಿಯೆಗಳನ್ನು ಅನುಷ್ಟಾನಗೊಳಿಸಲು ಮಾನಗಳನ್ನು ತಯಾರಿಸಬೇಕು. ಈ ಮಾನಗಳು ವಿಕೋಪ ನಿರ್ವಹಣೇಯಲ್ಲಿ ತೊಡಗಿದ ಪ್ರತಿ ಇಲಾಖೆಗೆ, ಸಂಸ್ಥೆಗೆ, ಅಧಿಕಾರಿಗೆ / ಸಿಬ್ಬಂದಿಗೆ ಕಾರ್ಯವಿಧಾನದ ಆಧಾರದ ಮೇಲೆ ತಯಾರಿಸಲಾಗುತ್ತದೆ. SOP ಗಳನ್ನು ಕೆಳಗಿನ ಸಂಸ್ಥೆಗಳಿಗೆ / ವರ್ಗಗಳಿಗೆ ತಯಾರಿಸಬೇಕಾಗುತ್ತದೆ.

ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಪ್ರಾಧಿಕಾರ

ಮಾಹಿತಿ / ಮಾಧ್ಯಮ ಭಾಗ

ತುರ್ತು ಆರೋಗ್ಯ ನಿರ್ವಹಣಾ ಭಾಗ

ಪರಿಹಾರ (ಆಹಾರ, ಮೇವು ಇತರೆ ಸಾಮಾಜಿಕ ಸೇವೆಗಳು) ಭಾಗ

ಸಾರಿಗೆ ನಿರ್ವಹಣಾ ಭಾಗ

ಪ್ರಾಣಿ ಸಂಪನ್ಮೂಲ ನಿರ್ವಹಣಾ ಭಾಗ

SOP ಗಳನ್ನು ವಿಕೋಪ ನಿರ್ವಹಣೆಯಲ್ಲಿ ತೊಡಗಿದ ಎಲ್ಲಾ ಇಲಾಖೆಗಳಿಗೆ / ಸಂಸ್ಥೆಗಳಿಗೆ ತಯಾರಿಸಬೇಕು.
SOP ಗಳನ್ನು ಇಲಾಖೆಗಳಲ್ಲಿರುವ ಅಧಿಕಾರಿ / ಸಿಬ್ಬಂದಿ ವರ್ಗಕ್ಕೆ ತಯಾರಿಸಬೇಕು.

ಜಿಲ್ಲಾಧಿಕಾರಿಯ ಕಾರ್ಯವಿಧಾನದ ತಾಳೆಪಟ್ಟಿ ತಯಾರಾಗಬೇಕು.
ಎಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಭಾಗಗಳಿಗೆ ಕಾರ್ಯವಿಧಾನ ತಾಳೆಪಟ್ಟಿ
ತುರ್ತು ನಿರ್ವಹಣಾ ಕೇಂದ್ರದ (EoC)
ಕಾರ್ಯವಿಧಾನದ ಮಾನಗಳು (SOP) ಮತ್ತು ತಾಳೆ ಪಟ್ಟಿಗಳು

ನಗರ / ಗ್ರಾಮೀಣ / ಸ್ಥಳೀಯ ಸಂಸ್ಥೆಗಳ (ULBs/ PRI) ಗಳಿಗೆ ಕಾರ್ಯವಿಧಾನದ ಮಾನಗಳು ಮತ್ತು ತಾಳೆಪಟ್ಟಿಗಳು

ಸ್ವಯಂ ಸೇವಾ ಸಂಸ್ಥೆಗಳು ಹಾಗೂ ಸಮೂಹಕ್ಕೆ ಕಾರ್ಯವಿಧಾನದ ಮಾನಗಳು ಹಾಗೂ ತಾಳೆಪಟ್ಟಿಗಳು ತಯಾರಾಗಬೇಕು.

ಜಿಲ್ಲೆಯ ಅಭಿವೃದ್ಧಿ ಯೋಜನೆಗಳ ಜೊತೆ ವಿಕೋಪ ಯೋಜನೆಯ ಸೇರಿಕೆ

ಜಿಲ್ಲಾಡಳಿತಗಳು, ವಿಕೋಪಗಳನ್ನು ನಿರಂತರವಾಗಿ ಎದುರಿಸಬೇಕಾಗುತ್ತದೆ. ಆದ್ದರಿಂದ, ಜಿಲ್ಲಾ ದೀರ್ಘಾವಧಿ ಯೋಜನೆಗಳಲ್ಲಿ ವಿಕೋಪ ಯೋಜನೆಯನ್ನು ಸೇರಿಸುವುದು ಅವಶ್ಯ. ಹೀಗೆ ಮಾಡುವುದರಿಂದ ಜಿಲ್ಲೆಯ ವಿವಿಧ ಇಲಾಖೆಗಳಿಗೆ / ಅಧಿಕಾರಿ / ಸಿಬ್ಬಂದಿ ವರ್ಗಕ್ಕೆ ಆಯಾಯ ಜಿಲ್ಲೆಯ ವಿಕೋಪ ನಿರ್ವಹಣೆಗೆ ಬೇಕಾಗುವ ಸಾಮರ್ಥ್ಯಾಭಿವೃದ್ಧಿ ತರಬೇತಿ ಹಾಗೂ ಇತರೆ ಸಂಪನ್ಮೂಲಗಳನ್ನು ಗುರುತಿಸಲು ಸಾಧ್ಯವಾಗುತ್ತದೆ. ಅಪಾಯ ಸ್ಪಂದನಾ / ಸಂರಕ್ಷಣಾ ಕ್ರಮಗಳನ್ನು ಜಿಲ್ಲಾ ಅಭಿವೃದ್ಧಿ ಯೋಜನೆಯಲ್ಲಿ ಅಳವಡಿಸುವುದು ಅವಶ್ಯವಾಗುತ್ತದೆ. ಈ ಭಾಗದಲ್ಲಿ ಜಿಲ್ಲಾ ಅಭಿವೃದ್ಧಿ ಯೋಜನೆ ಮತ್ತು ವಿಕೋಪ ಯೋಜನೆಗಳನ್ನು ಹೇಗೆ ಸೇರಿಸಲಾಗಿದೆ ಹಾಗೂ ಯಾವ ಕ್ರಮಗಳನ್ನು ತೆಗೆದುಕೊಳ್ಳಲಾಗಿದೆ ಎನ್ನುವ ಕುರಿತು ವಿವರಿಸಬೇಕು.

ಆಯವ್ಯಯ ಅಂದಾಜು ಮತ್ತು ಇತರೆ ಹಣಕಾಸಿನ ಹಂಚಿಕೆ

ಈ ಭಾಗದಲ್ಲಿ ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣೆಗೆ ಬೇಕಾಗುವ ಆಯ–ವ್ಯಯ ಅಂದಾಜು ಹಣಕಾಸಿನ ಹಂಚಿಕೆ ಕುರಿತು ಸ್ಪಷ್ಟವಾಗಿ ತಿಳಿಸಿರಬೇಕು. ಜೊತೆಗೆ ಸಂಬಂಧಪಟ್ಟ ಎಲ್ಲಾ ಸರ್ಕಾರಿ ಆದೇಶಗಳು / ಸುತ್ತೋಲೆಗಳನ್ನು ಅನುಬಂಧದಲ್ಲಿ ಲಗತ್ತಿಸಬೇಕು.

ಉಪದೇಶಕ ಮತ್ತು ಮೌಲ್ಯಮಾಪನ (Monitoring and Evaluation)

ಈ ಅಧ್ಯಾಯದಲ್ಲಿ ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಯೋಜನೆಯನ್ನು ಅನುಷ್ಟಾನಗೊಳಿಸಲು ಬೇಕಾಗುವ ನಿಯಮಗಳನ್ನು ತಿಳಿಸಬೇಕು. ಮುಖ್ಯವಾಗಿ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಯೋಜನೆಯ :

ಸಮರ್ಪಕ ಉಪದೇಶಕ ಮತ್ತು ಮೌಲ್ಯಮಾಪನ ವಿಮರ್ಶೆ
ವಿಕೋಪ ನಂತರದ ಮೌಲ್ಯಮಾಪನ ಕ್ರಿಯೆ / ವಿಭಾಗ
ನಿರಂತರ ಪರೀಕ್ಷರಣಾ ವ್ಯವಸ್ಥೆ

ಪರಿಷ್ಕರಿಸಿದ ಯೋಜನೆಗಳನ್ನು (I D K N) (Indian Disaster Knowledge Network) ನಲ್ಲೂ ಮತ್ತು ಸಂಪನ್ಮೂಲಗಳನ್ನು (I D K N) (Indian Disaster Knowledge Network) ಅಂತರ್ಜಾಲಗಳಲ್ಲಿ ಸೇರಿಸುವ ಕ್ರಿಯೆ

ಅಣಕ ಪ್ರಯೋಗ (Mock Drill) ಮಾಡುವ ವ್ಯವಸ್ಥೆ ಕುರಿತು

ಪರಿಷ್ಕೃತ ಯೋಜನೆಗಳನ್ನು ಅನುಷ್ಟಾನ ಮಾಡಲು ಬೇಕಾದ ಸಿಬ್ಬಂದಿ / ತರಬೇತಿ / ಕೌಶಲ್ಯ ಗಳನ್ನು ವೃದ್ಧಿಸುವ ಬಗ್ಗೆ ವ್ಯವಸ್ಥೆ ಕುರಿತು

ಅನುಬಂಧ (Annexure)

ಈ ಕೆಳಕಂಡ ಸಂಗತಿಗಳನ್ನು ಯೋಜನೆಯ ಜೊತೆಗೆ ಲಗತ್ತಿಸತಕ್ಕದ್ದು. ಅವಶ್ಯಕತೆ ಇದ್ದರೆ ಹೆಚ್ಚಿನ ಮಾಹಿತಿಯನ್ನು ಕೂಡ ಇದರ ಜೊತೆಗೆ ಲಗತ್ತಿಸಬಹುದು.

ಜಿಲ್ಲೆಯ ಒತ್ತಟ್ಟಿನ ರೂಪ, ಹೊರ ರೇಖಾಕೃತಿ (District Profile) :

ಇತ್ತೀಚಿನ ಭೌಗೋಳಿಕ (Geography), ಕೃಷಿ, ಜನಸಂಖ್ಯೆ, ಹವಾಮಾನದ ವಿವರಗಳು, ರಸ್ತೆಗಳು, Railways etc. ಈ ಎಲ್ಲಾ ವಿವರಗಳನ್ನು ಸೂಚಿಸತಕ್ಕದ್ದು. ಈ ತರಹದ ಎಲ್ಲಾ ವಿವರವಿದ್ದರೂ, ಎಚ್ಚರವಹಿಸಿ ಬೇಕಾಗುವಂತ ಅವಶ್ಯಕ ಮಾಹಿತಿಗಳು ಮಾತ್ರ ಸೀಮಿತಗೊಳ್ಳಬೇಕಾಗುತ್ತದೆ. ಹಾಗು ಈ ವಿವರಗಳ ಗಾತ್ರ ಕಡಿಮೆ ಇರುವಂತೆ ಎಚ್ಚರ ವಹಿಸಬೇಕು.

ಸಂಪನ್ಮೂಲಗಳು

ಪ್ರತೀ ಅಪಾಯಕ್ಕೆ / ವಿಕೋಪಕ್ಕೆ ಬೇಕಾಗುವ ಸೌಕರ್ಯಗಳು ಮತ್ತು ಸಿಬ್ಬಂದಿಯ ವಿವರ IDKN ಮತ್ತು IDKN ಗಳ ಉಪಯೋಗ

ತಾಳೆಪಟ್ಟಿ (Checklist) :

ಜಿಲ್ಲಾ ಮಟ್ಟದಲ್ಲಿ, ತುರ್ತು ಸೇವೆಗಳನ್ನು ಒದಗಿಸುವ ಎಲ್ಲಾ ಮುಖ್ಯ ಅಧಿಕಾರಿಗಳು ಅಂದರೆ, ಜಿಲ್ಲಾಧಿಕಾರಿಯಿಂದ ಹಿಡಿದು ಇತರೆ ಎಲ್ಲಾ ಪ್ರಮುಖ ಅಧಿಕಾರಿಗಳ ಕಾರ್ಯವಿಧಾನದ ಮಾನಗಳ ಬಗ್ಗೆ ತಾಳೆಪಟ್ಟಿಗಳನ್ನು ಸಿದ್ಧಪಡಿಸಬೇಕು.

ಮಾಧ್ಯಮ ಮತ್ತು ಮಾಹಿತಿಯ ನಿರ್ವಹಣೆ

ಮಾಧ್ಯಮ ಮತ್ತು ಮಾಹಿತಿಯ ಅಂದರೆ ವಾರ್ತಾ ಪತ್ರಿಕೆಗಳು, ದೂರದರ್ಶನ ಕೇಂದ್ರಗಳು ಬಹಳ ಮುಖ್ಯವಾಗಿ ವಿಕೋಪದ ಸಂದರ್ಭದಲ್ಲಿ ಒಳ್ಳೆಯ ಹಾಗೂ ಸ್ಪಷ್ಟವಾದಂತಹ ಮಾಹಿತಿಗಳನ್ನು ಬಿತ್ತರಿಸಲು ಹಾಗು ತಪ್ಪು ಮಾಹಿತಿಗಳನ್ನು ಬಿತ್ತರಿಸದಂತೆ ಹೆಚ್ಚಿನ ಎಚ್ಚರ ವಹಿಸಲು ಮಾರ್ಗ ಸೂಚಕಗಳನ್ನು ರೂಪಿಸತಕ್ಕದ್ದು.

ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣ ಯೋಜನೆಯ ಅಭಿವೃದ್ಧಿಯ ಪದ್ಧತಿ (Process of development of DDMP) :

ಜಿಲ್ಲಾ ವಿಕೋಪ ನಿರ್ವಹಣಾ ಯೋಜನೆಯನ್ನು ಸಿದ್ಧಪಡಿಸಿದ ಬಗೆಯನ್ನು ಸಂಕ್ಷಿಪ್ತವಾಗಿ ತಿಳಿಸುವುದು. ಈ ಯೋಜನೆಯನ್ನು ಸಿದ್ಧಪಡಿಸಿದ ವರ್ಷ ಮತ್ತು ಮುಂದೆ ಪರಿಷ್ಕರಿಸುವ ವರ್ಷವನ್ನು ತಿಳಿಸಬೇಕು.

GEOGRAPHICAL INFORMATION SYSTEM (GIS) FOR EMERGENCY MANAGEMENT

Introduction

Emergency management encompasses a wide range of activities. Government at all levels (federal, sate, and local) has primary responsibility for emergency management. Traditionally, the military has responsibility for threats from foreign governments. Lawmakers and policy makers are debating the appropriate role of the National Guard and military concerning internal terrorism. This paper will identify emergency management activities and describe how GIS plays a critically important role. First, it is important to define a number of terms. These terms follow.

Terms Defined

Emergency: An emergency is a deviation from planned or expected behavior or a course of events that endangers or adversely affects people, property, or the environment.

Disaster: Disasters are characterized by the scope of an emergency. An emergency becomes a disaster when it exceeds the capability of the local resources to manage it. Disasters often result in great damage, loss, or destruction.

Risk: Risk is the potential or likelihood of an emergency to occur. For example, the risk of damage to a structure from an earthquake is high if it built upon, or adjacent to, an active earthquake faults. The risk of damage to a structure where no earthquake faults exist is low.

Hazard: Hazard refers generally to physical characteristics that may cause an emergency. (For example, earthquake faults, active volcanoes, flood zones, highly flammable brush fields, are all hazards.)

General Types of Emergencies

Human-caused

Human-caused emergencies include those unplanned events or accidents that result from human activity or human developments. Examples include chemical spills, nuclear radiation escapes, utility failures, epidemics, crashes, explosions, urban fires, and so forth.

Natural Disaster

Natural disasters include those unplanned events that occur as a result of natural processes such as earthquakes, tornadoes, tsunamis,

freezes, blizzards, extreme heat or cold, drought, insect infestation, and so forth.

Internal Disturbances Internal disturbances are those events or activities planned by a group or individual to intentionally cause disruption. This includes riots, demonstrations, large-scale prison breakouts, violent strikes, and so forth.

Energy and Material Shortages Emergencies as a result of shortages include price wars, resource scarcity, and so forth.

Attack This includes acts of large-scale terrorism or war using nuclear, conventional, or biological agents.

Emergency Management Phases Emergency management activities can be grouped into five phases that are related by time and function to all types of emergencies/ disasters. These phases are also related to each other, and each involves different types of skills.

Planning Activities necessary to analyze and document the possibility of an emergency or disaster, and the potential consequences or impacts upon life, property, and the environment. This includes assessing the hazards, risks, determination of mitigation, preparedness, and response and recovery needs.

Mitigation Activities that actually eliminate or reduce the probability of a disaster (for example, arms buildup to deter enemy attack or legislation that requires stringent building codes in earthquake-prone areas). It also includes long-term activities designed to reduce the effects of unavoidable disaster (for example, land use management, establishing comprehensive emergency management programs such as vegetation clearance in high fire danger areas, or building restrictions in potential flood zones).

preparedness Activities necessary to the extent that mitigation measures have not, or cannot, prevent disasters. In the preparedness phase, governments, organizations, and individuals develop plans to save lives and minimize disaster damage (for example, compiling state resource inventories, mounting training exercises, installing early warning systems, and predetermined emergency response forces). Preparedness measures also seek to enhance disaster response

operations (for example, stockpiling vital food and medical supplies, performing training exercises, and mobilizing emergency response personnel on standby).

Response Activities following an emergency or disaster. These activities are designed to provide emergency assistance for victims (for example, search and rescue, emergency shelter, medical care, mass feeding). They also seek to stabilize the situation and reduce the probability of secondary damage (for example, shutting off contaminated water supply sources, securing and patrolling looting-prone areas) and speed recovery operations (for example, damage assessment).

Recovery Activities necessary to return all systems to normal or better. They include two sets of activities. Short-term recovery activities return vital life-support systems to minimum operating standards (for example, cleanup, temporary housing, and access to food and water). Long-term recovery activities may continue for a number of years after a disaster. The purpose of long-term recovery activities is to return life to normal or improved levels (for example, redevelopment loans, legal assistance, and community planning).

GIS- The Foundation For Emergency Management All phases of emergency management depend on data from a variety of sources. The appropriate data has to be gathered. Organized, and displayed logically to determine the size and scope of emergency management program(s). During an actual emergency it is critical to have the right data at the right time displayed logically to respond and take appropriate action. Emergencies can impact all or a number of government departments. Emergency personnel often need detailed information concerning pipelines, building layout, electrical distribution, sewer systems, and so forth. By utilizing a GIS, all departments can share information through databases on computer—generated maps in one location. Without this capability, emergency workers must gain access to a number of department managers, their unique maps, and their unique data. Most emergencies do not allow time to gather these resources. This results in emergency responders having to guess, estimate, or make decisions without adequate information. This costs time. money,

and, in sonic cases, lives. GIS provides a mechanism to centralize and visually display critical in formation during an emergency.

Most of the data requirements for emergency management arc of a spatial nature and can be located on a map. The remainder of this section will focus on how data is acquired, display ed. and utilized in all aspects of public safety programs. This paper will illustrate how GIS can accomplish data requirement needs for planning and emergency operations and how GIS can become the backbone of emergency management.

Emergency management activities are focused on three primary objectives. These objectives are protecting life, property, and the environment. In order to accomplish these objectives, the following basic processes are necessary.

Planning

Emergency management programs begin with locating and identifying potential emergency problems. Using a GIS, officials can pinpoint hazards and begin to evaluate the consequences of potential emergencies or disasters. When hazards (earthquake faults, lire hazard areas, flood zones, shoreline exposure, etc.) are viewed with other map data (streets, pipelines, buildings, residential areas, power lines, storage facilities, etc.), emergency management officials can begin to formulate mitigation, preparedness, response, and possible recovery needs. Lives, property, and environmental values at high risk from a potential emergency or disaster become apparent. Public Safety personnel can focus on where mitigation efforts will be necessary, where preparedness efforts must he focused, where response efforts must be strengthened, and the type of recovery efforts that may be necessary. Before an effective emergency management program can be implemented, thorough analysis and planning must be done. GIS facilitates this process by allowing planners to view the appropriate combinations of spatial data through computer—generated maps.

Mitigation

As potential emergency situations are identified, mitigation needs can be determined and prioritized. In the case of an earthquake, what developments arc within the primary impact zone of earthquake faults? Based on the expected magnitude of an earthquake, soils, and other geologic data, what damage may occur? What facilities

require reinforced construction or relocation? What facilities are in high—hazard areas (key bridges, primary roads. free ay overpass, hospitals, hazardous material storage facilities, etc). Mitigation may include implementing legislation that limits building in earthquake or flood zones. Other mitigation may target fire safe roofing materials ins ildland lire hazard areas. Values at risk can be displayed quickly and efficiently through a GIS. Utilizing existing databases linked to geographic features in GIS makes this possible. Where are the fire hazard zones? What combination of features (topography, vegetation, weather) constitutes a lire hazard? A GIS can identify specific slope categories in combination with certain species of flammable vegetation near homes that could be threatened by wildfire. A GIS can identify certain soil types in and adjacent to earthquake impact zones where bridges or overpasses are at risk. A GIS can identify the likely path of a flood based on topographic features or the spread of a coastal oil spill based on currents and wind. More importantly, human life and other values (property, habitat, wildlife. etc.) at risk from these emergencies can be quickly identified and targeted for protective action.

Preparedness

Preparedness includes those activities that prepare for actual emergencies. GIS can provide answers to questions such as Where should lire stations be located if a five-minute response time is expected? How many paramedic units are required, and where should they be located? What evacuation routes should be selected if a toxic cloud or plume is accidentally released from a plant or storage facility based on different wind patterns? I low will people he notified? Can the road networks handle the traffic? What facilities will provide evacuation shelters? What quantity of' supplies, bed space, and so forth, will he required at each shelter based on the number of expected evacuees?

GIS can display "real-time" monitoring for emergency early warning. Remote weather stations can provide current weather indexes based on location and surrounding areas. Wind direction, temperature, and relative humidity can be displayed by the reporting eather station. Wind in formation is vital in a chemical cloud release or anticipating the direction of wildfire spread upon early report. Earth

movements (earthquake), reservoir level at dam sights, radiation monitors, and so forth, can all be monitored and displayed by location in GIS.

Response

GIS can provide one of the primary components for computer-aided dispatch (CAD) systems. Emergency response units based at fixed locations can be selected and routed for emergency response. The closest (quickest) response units can be selected, routed, and dispatched to an emergency once the location is known. Depending upon the emergency, a GIS can provide detailed information before the first units arrive. For example. During a commercial building fire, it is possible to identify the closest hydrants, electrical panels, hazardous materials, and the floor plan of' the building while en route to the emergency. For hazardous spills or chemical cloud release, the direction and speed of movement can be modeled to determine evacuation zones and containment needs. Advanced Vehicle Locating (AVL) can be incorporated to track (in real time) the location of incoming emergency units. AVL can also assist in determining the closest mobile units (law enforcement) to be dispatched to an emergency, as they are located on the map through global positioning system (GPS) transponders.

During multiple emergencies (numerous wild fires, mud slides, earthquake damage) in different locations, a GIS can display the current emergency unit locations and assigned responsibilities to maintain overall situation status. If' the emergency becomes a disaster and emergency response units arrive from outside the local area, they can he added and displayed.

Recovery

Recovery efforts begin hen the emergency is over (immediate threat to life, property. and the environment). Recovery efforts arc often in two phases, short-term and long- term.

Short- Term Recovery

Short—term recovery restores vital services and systems. This may include providing temporary food, water, and shelter to citizens who have lost homes in a hurricane or large wildfire: assuring injured persons have medical care: and or restoring electrical ser ices through emergency generators, and so forth. The effects of the emergency may be continuous and ongoing. But the immediate threats are halted and basic services and vital needs are restored. A GIS can

play an important role in short-term recovery efforts. One of the most difficult jobs in a disaster is damage assessment. A GIS can work in concert with G PS to locate each damaged foci lily, identify the type and amount of damage, and begin to establish priorities for action (triage). Laptop computers can update the primary database from remote locations through a variety of methods. GIS can display (through the primary database) overall current damage assessment as it is conducted. Emergency distribution centers supplies (medical, food, water, clothing. etc.) can be assigned in appropriate amounts to shelters based on the amount and type of damage in each area. GIS can display the number of shelters needed and here they should be located for reasonable access. A GIS can display areas here services have been restored in order to quickly reallocate recovery work to priority tasks. Action plans with maps can be printed outlining work for each specific area. Shelters can update inventory databases, allowing the primary command center to consolidate supply orders for all shelters. The immediate recovery efforts can be visually displayed and quickly updated until short-term recovery is complete. This 'visual status map" can be accessed and viewed from remote locations. This is particularly helpful for large emergencies or disasters where work is ongoing in different locations.

Long- Term Recovery

Long-term recovery restores all services to normal or better. Long-term recovery (replacement of homes, water systems, streets, hospitals, bridges, schools, etc.) can take several years. Long—term plans and progress can be displayed and tracked utilizing a GIS. Prioritization for major restoration investments can be made with the assistance of GIS. As long-term restoration is completed, it can be identified and visually tracked through GIS. Accounting for disaster costs can be complicated. As funds are allocated for repairs, accounting information can he recorded and linked to each location. Long- term recovery costs can be in the millions (or more) for large disasters. Accounting for how and where funds are allocated will be demanding. A GIS can ease the burden of these tasks.

Summary

Emergency management programs are developed and implemented through the analysis of' information. The majority of information is

spatial and can be mapped. Once in formation is mapped and data is linked to the map, emergency management planning can begin. Once life, property, and environmental values are combined with hazards. Emergency management personnel can begin to formulate mitigation, preparedness, response, and recovery program needs.Historically, emergency management programs are planned, implemented, and modified based on volume of business or reaction to emergencies as they occur. GIS allows emergency management needs to be identified prior to an incident. Disaster events, such as wildfire spread, tsunami impacts, floods, earthquakes, hurricanes, epidemic spread, chemical cloud dispersion, oil spills, and so forth, can be modeled and displayed in GIS. Emergency management personnel can use modeling for training, for actual tactical deployment during a disaster, or to analyze the consequences of a possible disaster. The use of this technology takes emergency management planning information “off the shelf” for utilization by response personnel for real-world operations. In short, the thoughtful application of a GIS can take much of the panic and surprise out of emergencies.

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