The Road Ahead

Flood-proofing Our Cities - Need of the Hour

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The heavy monsoon rains and consequent flooding in Himachal Pradesh, Haryana, Delhi, Uttar Pradesh and Assam have caused significant loss of life and property. A month ago, the unusual cyclonic storm Biprajay in Arabian Sea caused flooding in the desert landscape of Rajasthan and Gujarat. Rescue, relief and restoration assume high priority now. But we also need to focus on long-term flood prevention.

It appears that global warming is causing heavier and more irregular rainfall in India. In the last two decades, the average rainfall in many parts of the subcontinent has been higher than normal. Indian agriculture seems to have acquired resilience and is much less affected by weather. But the rainfall is uneven, with heavy rains alternating with dry weather even in monsoon season. As a general rule, for a monsoon-fed country, higher rainfall is welcome. But we need to take steps to prevent flooding and minimize damage and disruption with heavy rainfall.

The maximum 24-hour rainfall in all these flooded areas was of the order of 100 - 200mm. While such a rainfall is heavy, it is not extraordinary. Even with such moderately heavy rainfall, severe flooding took place in several cities and farmlands. Blaming the weather or climate change does not help. Nature does what she does; we cannot control nature. Our ability to harness nature and protect ourselves from her vagaries shapes our destiny. We need to take a careful look at our urban settlements, water courses and storm water drainage systems. In this Column, let us focus on urban flooding.

There were 4041 municipalities and urban settlements in India in 2011. Of these, 52 were cities with population exceeding a million. Now there are probably 64 large cities with population over a million. Among large economies, with just 35% urbanization, we are the least urbanized country. In the next three decades, about 500 million more people are going to live in our cities and towns, doubling our urban population. This urbanization is inevitable and necessary. Even now, about 45% of our population depends on agriculture for their livelihood. World over, only 15-20% people depend

on agriculture; in developed countries, only 3-5% population depends on farming. Urban migration and rapid growth of non-farm economy cannot be stopped. In fact such shift from primary sector to industries and services, and from rural to urban localities is the essence of modernization. If already our cities and towns are flooded every monsoon season, the destructions and chaos with doubling of urban population can only be imagined. What do we need to do?

First, we need to remove all obstacles to natural water courses and storm-water drains in all urban areas. Because of chaotic planning, poor enforcement and pressure on land, in most cities the natural drains and water courses are choked, causing heavy flooding even with normal rainfall. Rain water needs to follow the gradient of land and empty into water courses, natural drains and rivers. Blocking these water courses will inevitably lead to flooding and inundation of roads, residential buildings and human settlements. A massive campaign should be launched to remove all obstructions to natural drains. Storm water drains should be desilted and free flow of flood water should be ensured. We have enough data of rainfall in each urban locality, and expected discharge of water in our storm water drains and water courses in case of heavy rains. Storm water drainage is impeded if there is even one obstacle or choke point, even when the rest of the system has adequate drainage capacity. Therefore Storm Water drains should be fully restored to meet anticipated needs, and there cannot be any margin of error. Or else flooding of our cities will be an inevitable annual feature.

Second, lessons learnt from chaotic urbanization so far should be applied to prevent future flooding with increased urban settlements. We are still at a low level of urbanization, and we should prepare for doubling of urban population. The great cities of the world were planned taking into account the geographic contours and gradient of land. First contour surveys of land were done, and contour maps were prepared meticulously. Then the storm-water drains, water pipes and sewerage systems followed the contours.

Indian cities do not have full contour maps; and our infrastructure, urban planning and human settlements have not adequately taken into account the natural contours and gradients. Residential buildings and housing colonies are legally permitted in low lying areas prone to flooding because of chaotic and unscientific urban planning. Storm water does not respect

legal boundaries or construction permits; it only respects gradient and follows the law of gravity. Our urban planning and regulation should respect nature. We should prepare contour maps covering every part of our cities and towns. In these days of GPS and digital technology, detailed contour mapping can be done speedily at a low cost. The contour maps should guide removal of impediments to water courses, building new infrastructure, and most of all future town planning and approvals of construction.

Third, we need to encourage in-situ urbanization, instead of forcing low-skilled rural poor to migrate to distant, inhospitable big cities. While big cities are necessary for their cluster effect in specialized economic activity, most people can have comfortable urban lives and livelihoods if only adequate infrastructure, education and healthcare are available. Therefore development of small towns as hubs of economic activity and magnets for migration from rural areas will improve the quality of life, and make town planning and flood control much easier. Small towns too should follow the same principles of restoring proper and adequate storm water drainage, contour mapping, and gradient-based town planning and construction. But flood prevention will be easier in smaller urban settlements. In large cities with very high densities of population and skyrocketing property values, the cost of flood management is much higher, and the devastation and loss on account of floods are much greater.

We cannot blame nature for many our travails. Human society is unique in its capacity to adapt to change. Global warming is inevitable, and we as a nation should do whatever is feasible to reduce emission of greenhouse gases. But we also should mitigate flooding on account of heavier and irregular rainfall. With proper planning and execution, higher rainfall is a blessing in our water-starved, monsoon-fed country. With proper urban planning and execution, we can convert adversity into opportunity.

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