Indeed the growth of cities in the developing world presents two additional challenges. The first is that the pace and extent of change is unprecedented. The second is that those who live in and those who manage cities in the developing world are unprepared for what is to come. Given the rate of population growth in cities, they will not have the luxury to learn by experience.

The infrastructure in developing world cities — water, sanitation, energy and transportation systems, health-care facilities, housing and education — is inadequate even for the existing population. Therefore, why should we have any confidence that these cities will be able to manage the change that lies ahead? Meanwhile, central governments in the developing world, which have historically associated poverty with rural areas, have rarely enacted programmes to help cities.

"Public officials and researchers have often underestimated, or even denied, the importance of cities."

NO RESPECT

Public officials and researchers have often underestimated, or even denied, the importance of cities. The prevailing attitude has been that urbanization is a second-tier problem that can await their attention until more pressing problems are addressed — reductions in poverty, access to safe drinking water and adequate sanitation, and improved public health. Many public officials have held onto the false hope that the problems of urbanization will dissipate as developing countries gain greater prosperity.

This partly explains why policy interventions rarely address the root causes of urban problems, and why, in some cases, the policies are misguided. Even the Millennium Development Goals (MDGs) have displayed these weaknesses. For instance, the MDG target for reducing the number of slum dwellers in the developing world is completely inadequate when considering population growth forecasts.

The MDGs call for 100 million fewer slum dwellers in cities by 2015. During the same period, the number of slum dwellers is expected to increase by 1 billion. Clearly this is a reform measure largely divorced from reality. Even by its own definition of success, it is doomed to fail. Unless we carefully guide urbanization, sustainable development and human security will remain elusive.

Contrary to prevailing perceptions about cities, most urban growth will not take place in megacities with more than 10 million people. Instead, it will take place in smaller cities with populations of 500,000 to 1 million. Areas of growth are likely to be at the edge of existing cities.

ENDLESS WEBS

The urban landscape of the future will appear as follows. People will live in a continuum of urban spaces with varying densities. Cities will no longer be sharply defined as autonomous entities comprised of millions of people. Instead, cities will consist of endless webs of interconnected functions and activities. We should, in fact, be thinking in terms of urban and rural, not urban or rural.

This new 'melded' landscape, characterized by the emergence of large populated regions interacting with their hinterlands and beyond, in ever-more complex and kaleidoscopic patterns, represents our urban future. There is no escape from it.

The compelling issue is not how to reverse this trend but how to adapt to this inevitability in ways that will lead to healthy, productive and rewarding lives for the largest number of people.

There are many difficult issues to consider. What impact will this urban growth have on the environment? How can we mitigate this impact and make urban spaces more sustainable? What are the forces driving urban growth and change? How can these forces be controlled or directed? What can we do to curb the risks and vulnerabilities that societies, particularly poor societies, face in the push to urbanize?

MANAGING GROWTH

The world's cities — and especially cities in the developing world — face not only critical economic, social and environmental challenges that need immediate attention, but also long-term problems of how to manage urban growth in responsible and effective ways.

In both the short and the long term, science, technology and innovation will be critical for ensuring access to safe drinking water and adequate sanitation, for improving air quality and developing efficient transportation systems, for redirecting development away from disaster-prone areas and for devising effective management strategies to meet a number of potential risks. Indeed, successful cities are poised to serve as laboratories for science-based development.

Finding sustainable ways of living in the urban landscape of the future is a critical task for institutions such as the United Nations University (UNU), which has a tradition of studying megacities, and TWAS, the academy of sciences for the developing world, with its network of scientific experts across the world. Given the number of people affected, there might be no more important agenda to pursue in the years ahead. ■

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VIEWPOINT | Atta-ur-Rahman

Chemistry needs a new formula for success

Many large pharmaceutical companies are finding that their product pipelines are no longer as healthy as 20, or even 10, years ago. It now takes more than 10 years for a potential drug to be translated from an idea into a commercial product on a chemist's counter. So, if the present pipeline is looking thin, in the next decade it might be even thinner. Can anything be done? As my colleague Iqbal Choudhary writes elsewhere in this supplement, my own field of study, the chemistry of natural products, could step in and provide some help. Yet, we need to do two things, and quickly. The first is to accelerate our understanding of the medicinal properties of natural products. Nature has been the main source for our medicine cabinets for millennia, and there is still much that we can learn. Second, we need a 'paradigm shift' in the field of medicinal chemistry itself — the reductive model needs to give way to a more holistic one. Until now, the convention among researchers in the private and public sectors has been to isolate individual medicinal compounds from natural products, and then to coat them in a pill or dissolve them in a syrup. Yet when, for example, you eat an apple or a fig, you are not ingesting a single compound, but hundreds if not thousands. It is this idea that we need to take on board if we truly want to mimic nature. Thanks to advances in technology, the tools are at our disposal to discover a whole new generation of medicines. Thanks to growing scientific expertise in the developing world, such efforts are likely to be truly global in scope. We are living through some of the most exciting times in the development of natural product chemistry. Our ability to use modern scientific tools in understanding nature's gifts has never been brighter.

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