

Big
Questions
of our TIME

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Sundeep Waslekar
Ilmas Futehally





C-306 Montana, Lokhandwala Complex,
Andheri West, Mumbai 400053, India
E-mail: info@strategicforesight.com

Authors

Sundeep Waslekar
Ilmas Futehally

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ISBN 978-81-88262-16-8

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Creative: Preeti Rathi Motwani

Processed by:

Printed at: Lifon Industries, Mumbai

This book in its totality poses a big question that connects all the individual questions in it. How is our world going to be governed in the twenty first century, when momentous technological, ecological, economic, political, social, cultural and philosophical changes are taking place?

It might be argued that change is the only constant. The world has coped with changes in the past. It will do so in the future. Several wise men and women, from Malthus to the Club of Rome, have warned us of declining resources. Several futurologists from Toffler to Kruzweil have alerted us to technological, social and cultural shifts. Several political theorists, from Hegel to Huntington, have declared that the old order was over. And yet the world has carried on, with an imperfect United Nations in the last century, a Concert of Power in the century before, and without any mechanism of global governance earlier. Why should we be particularly concerned about the changes that will take place in this century?

This book reminds us that what we have assumed for millennia will not necessarily hold together much longer. The basic laws of physics that explain our understanding of the universe, the terms of relationship between man and nature, well established rules of biological evolution, the principles determining the working of institutions of society, and many other assumptions about life and humanity are being questioned. The present system of global governance is completely inadequate to address these big questions. G-20, UN Security Council, World Bank, IMF, the UN Framework Convention on Climate Change, and other institutions react to crisis in a fragmented way. There is nothing in the world that can anticipate and respond to revolutionary opportunities and catastrophic risks in a holistic manner. In the absence of such a mechanism, we cannot reach consensus on a vast range of issues from trade to climate change and from democracy to cyber security. We urgently need a new architecture of global governance.

The book presents selected essays from our writings on the website of Strategic Foresight Group. In our reflections, as well as in our work around the world, we have realised that challenges to human survival and prosperity are much more interconnected than we tend to acknowledge. So far our knowledge of universe has proved ours to be the only inhabited planet. It has been



given to us by previous generations and it is our responsibility to preserve it for our future generations. We have an obligation to manage it in a way that we are conscious of our debt to the unborn and grateful to the forces of universe for the unique endowment of intelligent life that we have. Such an obligation compels us to match our intelligence with wisdom, our spirit of endeavour with compassion, and our ambition with sustainability. We hope that an open debate on the big questions of our time will provide big and bold answers.

Mumbai, May 2011

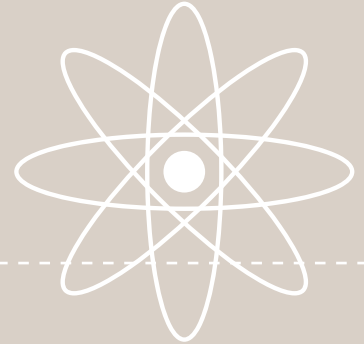
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Question 1

How Little Do We Know?



Once, *The Economist* published a thoughtful leader comparing 21st century biology to 20th century physics. Until about a century ago, we were not aware of the atom and once we were, we thought that was it. Soon we discovered the neutron and the quark. The well-known British weekly argued that ‘the neutron moment’ of biology is yet to arrive but it might happen soon in the early part of this century.

In the last decade, science journals have published articles about scientists investigating RNA-based life at the bottom of oceans and manufacturing artificial genomes in the laboratory. At the same time, CERN has launched a huge particle collider to simulate conditions that made the beginning of the universe possible. In another realm, the world media has reported the discovery of earth-like planets in solar systems light-years away from us. An institute based in California, SETI, is engaged in intensive and extensive efforts to find intelligent life in outer space.

If and when scientists make breakthroughs in any of these areas, it will be a different world. Until we knew about the existence of the atom, we knew almost nothing about physics. Similarly, if we find that there is an explanation beyond DNA for life-forms, we will realise that as of now,

we know very little about biology. If, indeed, it is proved in the future that there are some intelligent beings in the cosmos, our knowledge of the cosmos will have to grow substantially.

Imagine the world only 150 years ago, circa 1860. At that time, the internal combustion engine had not yet been invented; there were no cars, aeroplanes, computers (not to mention internet), and nuclear energy. In a matter of a century and half, the world has changed very significantly. As the speed of change has accelerated, it would be difficult to imagine the world 150 years from now. We may discover new concepts of life that are impossible to envisage today, just as aeroplanes, nuclear energy and computers were not conceived in 1860.

While the most exciting developments are taking

place in physics, biology and astronomy, many other areas remain unexplored. Para-psychology is one of them. Almost everyone I know has experienced telepathy; yet we do not have a scientific explanation of this phenomenon. Our knowledge of history is suspect. Most scholars believe that modern human civilization is about 8-10,000 years old, born in the Palestine region. However, some experts have traced a 12,000-year old habitat in Sanliurfa area in Turkey and others mention much older civilization in the eastern lakes area of Africa. A museum in Brussels houses the Ishango bone, which was the first counting tablet, made in Africa about 25,000 years ago. Was there a civilization prior to ours that disappeared in the sands or storms of history? Can we confidently say that it was absolutely not there? How little do we know?

Indeed, if we introspect upon our understanding of the mysteries of life, we would conclude that we know almost nothing. Therefore, I much admire the tenacity and zeal of Americans and Europeans to invest huge funds in the quest for knowledge. It is true that much of the funding is driven by market and military ambitions. However, there is no doubt that a considerable portion of investments are made in fundamental sciences. It is a matter of shame that other rich countries, mostly in Asia and the Middle East, do not show similar drive to put their money in basic research and exploration – though the

Chinese are catching up fast. And it was in these countries that some of the initial breakthroughs in knowledge were made about 1000-1500 years ago. The issue is not whether we turn a full circle with Asian and Arab countries again assuming leadership in the development of knowledge with their newly acquired resources. The issue is how the Asians, Arabs, Americans, Europeans and other people in the world can come together in vigorous joint endeavours to advance the frontier of knowledge in the common interest of humanity.

If the future of the world depends on joint or individual endeavours in natural sciences and technology, what about subjects like politics, economics and religion? If we have a positively dynamic or at least stable political environment, we can continue our quest for the next 100, 500, 5000 years. It might even be possible to find alternative energy resources that might mitigate the risk of climate change and environmental disasters. However, if we get our politics wrong, we might not have the luxury of the next several centuries to continue our quest for knowledge. And if we get our economics wrong, we will get our politics wrong.

Whether we know very, very little about our universe is not a question. It is a fact. Whether our politics will allow us to continue our journey of life and mind is a question. Indeed, it is the biggest question of our time.



Question 2

Can We Challenge Our Ideas?



Ideas predate civilization. They even predate humanity. The ideas of fire, weapons and symbols were probably thought of by *Homo erectus* before the birth of *Homo sapiens*. However, some of us tend to believe that we don't need to evolve our ideas. The concept of 'end of history' basically means the end of evolution of ideas. It is rather stupid to declare some idea to be so good and so ultimate that we don't need any better idea. Francis Fukuyama proclaimed free enterprise and democracy to be the ultimate ideas with which the progress of humanity would culminate. I wonder if he and his followers are following how the market is begging the state to save itself these days.

When we give up arrogance and challenge our long-held beliefs, human civilization makes progress. One of the most enduring ideas is the idea of God. It predates religion. It pervades all societies all over the world. It is responsible for a lot of bliss, business and bloodshed even today. Yet it has changed over the last few hundred years. The ideas of reformation, revolution and experiment have demolished the monopoly of God on human thought, though not God itself. In fifteenth or sixteenth century Europe, I would have been called before the Inquisition for writing this paragraph. The fact that I don't have to worry about such things in the twenty first

century, marks the progress of free will.

Another idea that has gone through transformation is the idea of weapons. Our *Homo erectus* ancestors discovered the concept of weapons exterior to our beings, when they used stones to secure food. Since then, weapons have become more and more lethal. The present stockpile of weapons can not only destroy humanity but also prevent its rebirth for a few centuries. However, the concept of weapons has also evolved to include the use of diplomacy and development in order to win over an enemy. Josef Nye has given us

the idea of 'soft power' which advocates the use of instruments of persuasion rather than destruction as weapons of modern states. China is an ambitious practitioner of this concept. The Chinese government is funding the creation of several hundred Confucius Institutes all over the world.

The idea of 'nation', though a rather new one is already going through change. Since the idea of nation is closely associated with the idea of sovereignty, we can say that the countries of the world can be divided into pre-sovereign entities, sovereign nations and post-sovereign unions. I must admit that this is not my original thought. I recall reading somewhere that someone – whose name I can't recall – has come out with a book that divides nations into pre-modern, modern, and post-modern. I believe that sovereignty rather than modernity is a more appropriate parameter to categorise the growth of nationhood.

There are several books and essays on the history of ideas. Felipe Armesto has written one in a very reader-friendly style with a lot of pictures and illustrations. The very first idea he lists, dating half a million years ago, is the idea of cannibalism. Some of the latest ideas he lists are the ideas of environmentalism, universal welfare and cultural pluralism. Humanity has advanced in its movement from cannibalism to cultural co-existence. However, it has not completely given

up the original instinct that lured our ancestors at various stages to the ideas of cannibalism, slavery, colonialism and Apartheid. Therefore, we live an era when the idea of God can bring us bliss, as well as bloodshed, and we as much face the risk of extinction at the hands of our fellow human beings as the prospect of welfare of the least privileged among us.

In the daily humdrum of managing our love and enmity portfolio, deluding ourselves by collecting hundreds of 'friends' on Facebook, following the lives of movies stars and saving to buy the latest car, we treat the given as given. And therein hides the risk of our accepting ideas as they are, and allowing those with vested interests to manipulate them. It is this complacent attitude that can take us closer to the precipice. If instead, we want to benefit from the promise of progress, it is necessary for us to examine our long-held ideas and reshape them. Our future will be determined by our willingness to question ourselves.



Question 3

The Future of Stupidity



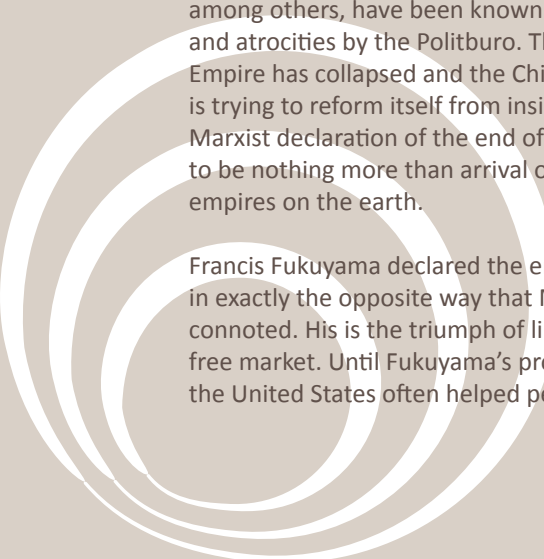
Exactly 500 years ago, Niccolò Machiavelli served the court of Cesare Borgia, Duke of Valentinois and Romagna, son of Pope Alexander VI, and the military general of the papacy. Machiavelli was so impressed by Borgia's crude pursuit of power that a decade and half later, he wrote a treatise, *The Prince*, as an offering to the Medici princes. Machiavelli was particularly impressed by Borgia's assassination of rivals on New Year's Eve of 1503 in Sinigaglia. He advocated that princes should pursue the crude use of force to acquire and retain power at any cost.

Machiavelli's theory of the pursuit of power was based on a false hypothesis. Cesare Borgia, his hero, was nothing but his father's poodle. He was a spoilt arrogant child who could only become the military general for no other reason than nepotism. His incompetence was proved after his father's demise. As soon as his father died, he was arrested by Pope Julius II. And that was the end of Machiavelli's powerful hero.

Many world leaders in the last 500 years have followed Machiavelli's advice based on the life of an incompetent prince. They believe that they should retain power at any cost. They also believe in dynastic regimes. All they want is to grab power and serve the interests of a particular group or a family using a combination

of prudence and force. This is the Machiavellian doctrine. It has often resulted in massacres and killings of innocent people. Sometimes the practitioners of this theory may not go as far as enforcing death on their victims, but they practise discriminatory politics causing misery for many.

The French Revolution challenged *The Prince* in a real sense. But it was usurped by its own enthusiastic supporters. Finally, it gave in to a new prince, Prince Napoleon. Nevertheless, when Napoleon's revolutionary army won a victory over the Prussian Empire in 1806, Hegel declared the end of history. This was another stupid theory that has been revived from time to time. Within a decade of Hegel's



proclamation, Napoleon was defeated and the House of Bourbon was restored. If Hegel's followers claim that Hegel was celebrating the victory of the revolutionary principle, Napoleon was no embodiment of such lofty ideals. He was a great military commander. That's it. His nephew took the help of the Church, undoing the French Revolution, to come to power and later on demolished the Republic to create the second empire under the Napoleon dynasty. Thus, the end of history was nothing more than the heralding of a new empire.

Centuries later, Marx also advocated that the history would end when a classless society was established on the earth. In reality, Marxism has only given birth to different types of empires. These empires are not dynastic; the ruling coterie enjoys absolute power. Communist societies in the former Soviet Union and China, among others, have been known for dictatorship and atrocities by the Politburo. The Soviet Empire has collapsed and the Chinese one is trying to reform itself from inside. But the Marxist declaration of the end of history proved to be nothing more than arrival of new forms of empires on the earth.

Francis Fukuyama declared the end of history in exactly the opposite way that Marx had connoted. His is the triumph of liberalism and free market. Until Fukuyama's proclamation, the United States often helped people to secure

freedom. The United States since then has been trying to build an empire. Once again, the announcement of the end of history has proved to be the trumpeting of another empire. Of course, the French empire and the Soviet empire have disappeared in the debris of history. We have to wait and see what happens to the new American Empire.

In the last decade and half another theory has dominated global discourse. This is the theory of clash of civilizations. I had the pleasure of staying with Prof Samuel Huntington at Hotel Cresta Sun at Davos on a couple of occasions and he repeatedly told me that he did not advocate any clash of civilisations. However, there is no doubt that a number of scholars and leaders have quoted his essay in *Foreign Affairs* not only to describe, but also to influence world events in a way that would divide humanity on religious lines. The translation of this theory into reality resulted in the death of over 3000 soldiers in Iraq under the Bush presidency, even more than the number of innocent people killed by Al Qaeda at the World Trade Centre. The application of this theory has meant American support for tin pot dictators and malignant neglect of the cancerous racket of a nuclear weapons smuggler. It has meant the killing of hundreds of children in Iraq and Afghanistan, and bombing the shelters of thousands of absolutely innocent people. Most important, it has meant an assault on freedom and trust.

This theory has proved to be yet another example of stupidity, not only because its author disclaims it at least in private conversations, but also because it is based on a faulty understanding of the English language. I have repeated many fora what I once heard from a senior statesman – those who are civilised by definition do not clash. The clash is always between the uncivilised.

Prof Huntington's theory was corroborated by Osama bin Laden in the name of fighting Jews and Crusaders. This is another stupid theory based on ignorance of history. Crusaders and Jews were always on the opposite sides. The Crusaders killed the Jews first, then Christians of the Orthodox Church and then the Muslims. At times the Crusaders did not even go as far as Jerusalem. They satisfied themselves by looting Constantinople, torturing the Christian priests of the Orthodox Church and raping Christian women to satisfy their lust. At times they travelled to the southern France to execute dissidents. To accord religious sanctity to this brutal historical nonsense, merely because shrewd Pope Urban started it all by citing religious justification, is to sacrifice truth to serve political ends. It is crazy for anyone to believe in this theory and leave behind their dear ones to undertake suicide bombing. The theory of religious justice, in its deep analysis, is a cover for power politics.

It is amazing to see how we allow ourselves to be taken for a ride by these stupid theories. The more educated we are, the more likely it is that we will use one of these theories in cocktail conversations or seminars. If we carry on accepting such insults to the human intellect with pride, we will together contribute to creating an atmosphere that will create a split in human society. In a way, our survival in the future depends on our willingness to abandon stupidity. Perhaps, instead of chasing the stupidity of grand theories advocated by the so-called wise men, we need to place faith in the simple wisdom of core human values.



Question 4

Which Idea Will Dominate the 21st Century?



The most influential force in the world is the idea. Gods, priests, kings, dictators, democrats, terrorists, anarchists all need an idea to justify themselves. It is on the strength of one idea that we once believed that the world was flat and scientists had to work hard to prove that it was actually round. We again believe in a flat world from a completely different perspective.

It is on the strength of the idea of nationalism that we fought two world wars and killed over a hundred million people. It is on the strength of the idea of nationalism that large segments of the world's population gained freedom from their colonial masters. The idea of evolution drives scientific research today. The idea of post-humanism may drive scientific research tomorrow.

In the last century, the ideas of capitalism and communism competed with each other to dominate the human mind. Also, the idea of freedom and authority competed with each other at the same time. Many people bracket capitalism with freedom and communism with authority, though capitalists supported

authoritarian regimes in Panama, Chile, El Salvador, Pakistan, Congo, the Philippines, among other countries while communists supported freedom movements across Asia and Africa.

Obviously to some people in the West, and the blind-folded elite in Asia and Africa, the West is the world. When the West is attacked, it is clash of civilizations. When the West attacks others, it is just boring colonisation.

While the conflict between freedom and authority and capitalism and communism is still not solved in at least two thirds of the world, one idea seems slowly to unite a growing number of people from north and south,

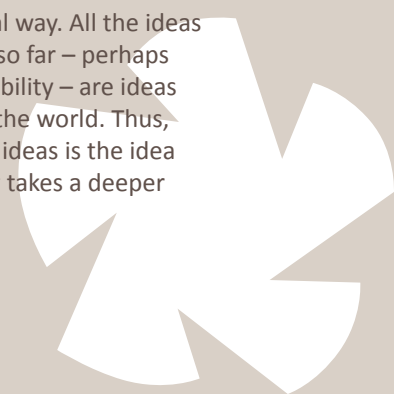
east and west. It is the idea of sustainability. I would personally credit the Club of Rome for raising the question of sustainability through its *Limits to Growth*. Never mind that computer projections about future resource supplies have been proved wrong. The underlying idea that growth is not sustainable with an infinite assault on the earth's resources has seized people's imagination. It encourages villagers in the Himalayas to hug trees to save them from timber companies. It encourages Wangari Mathai to plant a million trees and Al Gore to give a thousand presentations on climate change. It has led to a treaty on emissions (even though it may not have been signed by the world's largest emitters), triple bottom-line auditing, clean-tech investments, green technologies, renewable energies and eco-tourism. It is slowly leading to a change in our lifestyle.

The idea of sustainability is so far understood in the environmental context. The practices that lead to environmental damage also often lead to social conflicts and violence – ask farmers in China and India or Sudan and South Africa. Stein Tonnesson, Norwegian peace scholar, fears that in future we may see environmentally driven trade wars. Others worry about conflicts over water and emissions. We may see the concept of sustainability expanding as linkages between climate change and social change are better understood.

We can expect sustainability to be the dominant idea of the second decade – perhaps also the third decade - of the 21st century. Will it be the idea that dominates most of the 21st century? I doubt it.

The sustainability idea is perhaps the last idea that concerns the human civilization that we know today. In the second half of this century, science and technology may change the very nature of humanity through dramatic developments in outer space exploration and GNR technologies (genetics, nano-technology and robotics). Human beings of tomorrow may not be human at all. They may be artificial designer humans or some combination of humans and machines. They may be able to go deeper into space and perhaps live there. They may even be able to connect to other beings in other galaxies. The issues we will debate then will be very different from the issues we debate today.

I don't know which ideas will dominate in the world where humans co-exist with post-humans. I just hope that such a new world – which I will not be around to see – is different from our world in one very fundamental way. All the ideas that humans have developed so far – perhaps with the exception of sustainability – are ideas that compete for dominating the world. Thus, underlying all such conflicting ideas is the idea of dominance. If sustainability takes a deeper



root from its current scope, it may finally compete with the idea of dominance that has characterised human history. If it does not and if somehow the human race still manages to move to the world of human and post-human co-existence, desire for dominance might convert human being into demons. The big question before us is not so much which idea will dominate the 21st century. It is whether we can challenge the idea of dominance and save humanity.



Question 5

Can We Really Live Beyond Our Means?



On a visit to China in 2008, the global financial crisis was the centre of most conversations. We debated the cause of it- and answers ranged from greed on Wall Street and the sub-prime crisis to lifestyles not in sync with real earnings, of people living on credit, in debt and beyond their means. The announcement of the Chinese government of a stimulus package of Yuan 4 trillion to create domestic demand for Chinese goods also figured a lot in our conversations. Western governments also discussed bail out measures and began to implement them. Finally, the financial system was rescued. Or has the crisis been merely postponed?

However, another kind of global debt that has not much been discussed in these last few months is the ecological debt. The very concept of which is not understood very well. We are living beyond our means not just in financial terms, but also in ecological ones. Ecological debt occurs when humanity uses up more of the ecosystem than its capacity to regenerate.

An interesting concept related to this is that of Earth Overshoot Day, developed by the New Economics Foundation. Earth Overshoot Day fell on August 21st in 2010. This day marks the unfortunate milestone when humanity uses up

all the resources that the earth can regenerate in one year. Thus from August 21st to December 31st, we were already using up resources that should have been kept aside for next year. We would require 1.5 earth-like planets to support our current lifestyle.

The earth first went into overshoot mode in 1986, when Earth Overshoot Day fell on the 31st of December. By 1996, humanity was using 15 per cent more resources than what planet Earth could supply, with Earth Overshoot Day falling in November. In 2050, it is expected that Earth Overshoot Day will fall on July 1st. This means

that it would take two years for the planet to regenerate what we use up in one year. Can we begin to comprehend where we are heading? The direction looks steeply downwards. If we look at how different nations compare, the situation looks even bleaker. If everyone in the world lived like residents of the United States, we would need 5.4 earth-like planets to support us. If everyone lived like the Canadians or British, we would need 4.2 or 3.1 earths respectively. If everyone lived like the Indians, we would need 0.4 earths. Is this a new concept of measurement that will gain popularity in the years to come? Will we soon be talking about the number of earths that we need to sustain us, rather than the number of acres?

The connection between ecological overspending and climate change is very strong. One of the main reasons for our ecological debt is that humanity is emitting carbon at a faster pace than the atmosphere can absorb. Is this completely different from credit companies and banks offering credit and credit cards to us, even when both sides know that it is going to turn into a bad debt?

As the financial crisis snowballed into a number of smaller crises, each having a larger impact than the actual event, ecological debt has similar repercussions. Globally, deforestation is taking place at a rate of about 13 million hectares per year without showing any signs of slowing down.

Almost 6 million hectares of primary forest land have been lost or modified each year since 1990.

The Food and Agriculture Organization of the United Nations estimated in 2001 that about 75 per cent of our seas have been fished beyond their capacity to regenerate. Some fish stocks such as the Atlantic Cod stocks off the coast of Newfoundland have collapsed entirely due to over fishing. Maybe we should start discussing a bailout package for the fish rather than for the fishing industry?

The “Dow Jones” of animal population, or Living Planet Index has also kept pace with the stock market crash world wide. Over the last 30 years, this index has decreased by over 30 per cent. This implies that the current rate of extinction of plant and animal species is around 1,000 times faster than it was in pre human times. And unlike stock prices, it is only expected to get worse. By 2050, the rate of extinction of living species is expected to increase by 10,000 times. And this is just part of the story.

Salinity of land has increased dramatically, currently affecting over 260 million hectares of irrigated lands. Soil erosion affects more than 1.1 billion hectares worldwide. Currently, US agricultural practices are destroying soil at a rate 20 times faster than it can be replenished. The percentage of land that has been affected by drought has more than doubled from the 1970s

to the 2000s.

Climate change is here to stay. There is not much argument about that. Carbon is perhaps the primary culprit in creating ecological debt, as mentioned earlier. It is estimated that our carbon footprint (a measure of how much productive area it takes to produce what an individual, city, country or world consumes and absorb its waste, using prevailing technology) has increased by 750 per cent since 1961. At present, over 50 per cent of our ecological footprint comes from carbon emissions. This is fast building up to unprecedented levels in the atmosphere. If we are able to create a rescue package for our planet and arrest climate change without depleting our natural resources, we can rebalance the earth's budget. If this budget is left unbalanced, we may not have much of a world left to rescue on other fronts.



Question 6

Ecosystem Economics



It is not easy to miss the signs of destruction of nature wherever one goes. Tall skyscrapers and large cranes are more and more commonplace in every city in the world. Mountains of granite and rocks are being flattened, trees cut and rivers diverted to provide raw materials for the construction industry. It is estimated that about 90 per cent of all non-fuel mineral use and a large proportion of timber use goes into the construction industry. It is easy to fuel economic growth, especially in the short term with no regard to the damage that it is causing on longer term environmental and social sustainability. What we need to find are imaginative and constructive solutions that ensure growth and economic development, but also restore to the earth some of her natural bounties.

There have been some experiments for the restoration of forests and mangroves that have yielded multi-million dollar returns. These are the projects that need to be highlighted, as a report by the UN Environment Programme titled *Dead Planet, Living Planet: Biodiversity and Ecosystem Restoration for Sustainable Development* has done. Of course, what we need to do first is preserve the ecosystems that we already have, but given the fact that over 60 per cent of them are already badly degraded, we need to give restoration activities a priority.

Poverty, unemployment and land degradation is a vicious circle that has been in evidence in the last few decades. It can be converted into a virtuous circle by restoring, repairing and rehabilitating ecosystems which can create millions of jobs and lift families out of the poverty trap.

An example of this reversal is the restoration of degraded grasslands in and around the rivers that flow in South Africa's Drakensberg Mountains. This region is home to 299 recorded bird species which makes for about 40 per cent

of all non-marine avian species in southern Africa. A study estimates that the project will bring river flows back during the crucial winter months to a tune of up to 4 million cubic metres (MCM), apart from the added advantage of storing carbon. The project is estimated to cost Euro 3.6 million over seven years with an annual cost of Euro 800,000 for its management. The returns are expected to be Euro 6 million a year while generating over 300 permanent jobs and 2.5 million person-days of work during the restoration phase.

If we begin to factor in ecological costs and benefits to all projects, be they large infrastructure projects like roads and dams or smaller projects such as a farmhouse, the economics of it can begin to look a lot different. If the savings from ecological infrastructure of the planet were monetised, they would be somewhere between \$21 trillion to \$72 trillion a year. Just for comparison, the Gross World Income is around \$60 trillion. Therefore, if this cost is factored while determining accounts, the balance sheets of many projects would look fundamentally different than they do today.

The UNEP report, mentioned earlier, lists out a number of areas in which ecological services provide direct benefits, measurable in dollar terms. These include \$23 trillion for storm protection in the United States, an average of \$33-\$153 per household in Indian villages

located near mangroves that serve as storm barriers, at least \$153 billion for pollination costs to agricultural plants by bees and insects, and large savings in pesticides due to natural pest control.

Of course, most of the services provided by ecosystems are not measurable. How does one put a value to the view from the valleys, the worth of water or the peace of the peaks? We need to make sure that we protect what we have and restore what is still repairable to ensure that the world we live in continues to have things that do not have price tags attached to them.



Question 7

Will the Winds of War Blow from the Arctic?



The impact of climate change is here to stay. One dramatic example is that for the first time in at least 125,000 years (or the beginning of the last Ice Age), ships can travel around the North Pole. The opening up of the North-west and North-east passages in the Arctic region is witness to this.

Global warming and climate change have been touted as issues that needs global collaborative solutions. So far, the response to the ice melt from countries can hardly be labelled as collaborative. Canada's Prime Minister has warned that all ships entering the North West passage must report to the Canadian government, a move that is bound to be resisted by other countries, especially the United States. Shipping companies are already planning the first sail around the North Pole for an oceanic voyage from Germany to Japan that would reduce the distance by around 4000 miles, but potentially pollute one of the last remaining pristine environments on earth.

But the real stakes lie far beneath the ocean floor. These include about 22 per cent of the

world's untapped petroleum deposits, including 90 billion barrels of oil, 1,670 trillion cubic feet of natural gas and 44 billion barrels of natural gas liquids. The petroleum deposits are mainly offshore and are spread across 25 geological provinces in the Arctic, with over 50 per cent of the untapped oil and 70 per cent of the untapped natural gas deposits in just six geological provinces. The race to capture these fields is definitely on.

Another aspect to keep in mind is that there are currently no techniques available that would allow oil spills to be cleaned up in icy waters. Therefore it would be important to designate no-go zones for both shipping and oil exploration to prevent damage to the unique Arctic environment. New battle lines are expected to

be drawn and unlikely partnerships are likely to form in the near future over a piece of land that no country was particularly interested in, when it was covered over by ice for centuries on end.

In 2002, Russia planted its flag on the Arctic Seabed. In July 2008, it sent war ships to patrol Arctic waters. In August 2007, Canada announced the building of a military base and deep water port to patrol and maintain its sovereignty over the North West passage. China has also planted a research ship within 200 miles of the North Pole. Danish and American researchers have conducted month long expeditions to collect geological data and map the sea floor in the last few years.

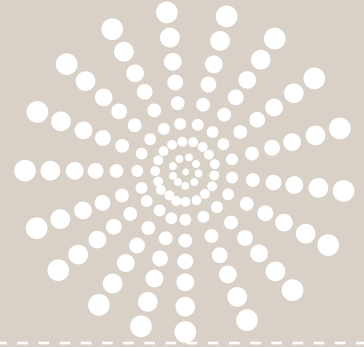
Russia has laid claims over the Arctic leading to a clash of claims with the US, Canada, Denmark and Norway. Canada, Denmark and Russia claim the Lomonosov Ridge, as a natural extension of their continental shelves. While Canada and Denmark both agree that the ridge is not an extension of the Russian continental shelf, where their own borders begin and end are under dispute. Norway has a border dispute with Russia in the Barents Sea. The US position is unclear as they have yet to sign the UN Convention on the Law of the Sea that governs the use of oceans and its resources. Melting ice and warmer waters could also lead to the potential development of new fisheries. However, so far no international fisheries

conservation and management regime are in place that covers all of the Arctic sea.

With countries looking for a division of the spoils over the resources that the Arctic holds is it likely that the global collaboration and action that is required to prevent further melting of the Arctic ice will actually come about? Or will the cold and frozen continent lead to a new cold war?

Question 8

Will Energy and Environmental Industries Build World Peace?



SC Jamir, the then Governor of Maharashtra and Goa in India, made a startling remark while speaking at the inauguration of the SFG International Conference on Responsibility to the Future in 2008. He suggested that just as coal and steel had created lasting cooperation between France and Germany in the last century, energy and environmental industries would be the building blocks of peace between hostile nations in the 21st century.

On the surface, Governor Jamir's comment may appear wishful thinking. The history of the 20th century, and indeed the first decade of this century, was characterised by conflicts driven by oil. The British and the French rulers divided the Middle East at Paris in 1919 between themselves, mainly out of lust for oil. The two Gulf wars, West-Islam conflict, attacks on the Twin Towers, and continued violence in the Middle East are directly or indirectly attributed to the politics of oil. Experts have written books about how the 21st century will be dominated by resource conflicts. However, what we see on surface often hides the depth of the truth beneath.

The world is preparing for a new economy beyond fossil fuels. In Europe, two bold experiments are under way. One aims to produce energy through nuclear fusion. The other aims to replicate the creation of universe through collision of particles of gold and lead at super-speed, and in the process discover a new source of infinite energy. There are a large number of experiments being made to tap energy from the sun, wind and oceans. Most of these experiments are collaborative. The experimental reactor for nuclear fusion in Europe is a cooperative project of seven countries including the United States, China and India. The particle collision accelerator project brings together scientists and investments from

many continents. Search for solar, wind and ocean energy involves joint ventures between private sector companies from different parts of the world. The search for new sources of energy is thus bringing nations, including rivals, together in a constructive way. Countries such as India, Korea, the Philippines, Mexico, South Africa and others have been bestowed with solar, wind, geothermal and ocean resources. But they need technology and investments from the North American and European companies and institutions to harness them. It is only through mutual cooperation that the transition to the next sources of energy can take place.


The scenario is somewhat different when we consider the development of clean and green technologies. Almost 90 per cent of investments in clean technologies are concentrated in North America and Western Europe with a gradually growing share of North-East Asia. Entrepreneurs in these economies are developing energy-efficient lights, paints, construction material, town designs, and transit systems. They are investing in nano-technology that can also create alternative materials that require less of fossil fuel inputs. They may sell products and services resulting from such technologies at a high price to emerging economies, repeating the pattern of the last three industrial revolutions.

However, such a pattern would not be viable. If the emerging and developing economies

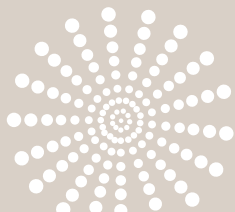
cannot afford to pay for products developed in the developed countries, they will continue to live in the old economies that cause pollution and global warming. The West may react with environmental trade barriers but such a strategy will only make the developing countries more dependent on old practices. The way to break the logjam would be to find means of collaboration between the developed and developing economies in technological and product development – taking advantage of the competitive price of human resources in the developing world. Also, in an era of open source research, a new pragmatic approach to patents and intellectual property rights will need to be developed. Thus, unless we prepare for a considered collaborative future from now, collaboration in environmental technologies will in any case be thrust upon the world in years to come – albeit after an initial period of old fashion trade and technology transfer.

Movement from oil to nuclear and renewable sources of energy and clean technologies is not going to make oil disappear from the world economy. Oil and gas will very much form components of the new energy mix but they will not be the dominant components. Therefore, they will lose their strategic value. The West need no longer control the Middle East for oil. It may still want it for geopolitical reasons and the religious zealots may want it to see Armageddon come true. However, without oil, the incentive





to spend billions on wars will be reduced. And with the shrinking oil revenues, the Arab states in 20 years from now will have less money to import weapons – except those that have successfully diversified out of oil economy. However, such states will have a vested interest in a collaborative global economy. We may find it difficult to imagine a post-fossil fuel world in 20-30 years from now. But 20-30 years is a long time. Who had envisaged the Internet and SMS economy in 1980?



Question 9

The Geopolitics of Food



In early 2011 global food prices reached highest levels in several decades, climbing steeply from earlier peak levels of 2008. Whatever happens in the short run, food prices are bound to go up, up, and above all expectations in the next few decades. The food riots of 2008 may become a common feature of our daily life. In a way, the revolutions in Tunisia, Egypt, Yemen and Libya in early 2011 were sparked by food inflation, though the focus of the media has been on authoritarian politics. The world's population is expected to increase from 7 billion in 2011 to 9 billion in 2050. This means two billion more mouths to feed, in addition to two billion under nourished people now.

To what extent one can blame global warming for food crisis towards the end of the first decade of the 21st century is unclear. However what is clear is that even though food riots may not have recurred with the same vengeance, the future of food security is very closely tied in with global warming. Things are only going to get worse unless a global collaborative solution is found.

With changes in the temperature, agriculture in the tropics is expected to be most affected. Changes in the growing period of crops are already being experienced in countries like

India, Ethiopia and Latin America. Cultivation of crops that are sensitive to high temperatures is expected to shift towards the temperate zones or to higher altitudes. This has been the experience with the apple crop in the northern India and coffee in Uganda. It is not just a matter of shifting to other areas. Experiments have shown that global warming could lead to a 10 per cent drop in the production of maize in developing countries over the next 50 years.

When crisis occurred, major rice exporters such as India, China, Brazil, Indonesia, Cambodia and Egypt cut back on exports. Major wheat

exporters such as Argentina, Ukraine, Russia, and Serbia either imposed high tariffs or banned exports driving up international prices.

Another interesting development was the setting up of the Organization of Rice Exporting Countries (OREC) consisting of a small group of South-East Asian countries including Cambodia, Laos, Myanmar, Thailand and Vietnam. It is unclear whether OREC is modelled on OPEC to form a rice price fixing cartel. The organization has been denounced by many countries, as well as the Asian Development Bank.

The food crisis led to new kinds of trade agreements being signed, as food-importing countries sought to buy or lease large blocks of land to farm in other countries. Libya, which imports close to 90 percent of its grain, leased 250,000 acres of land in Ukraine to grow wheat for its people in exchange for access to one of its oil fields. Egypt is seeking land acquisition in Ukraine in exchange for access to its natural gas. China is currently looking out for long-term leases of land in other countries, including Australia, Russia, and Brazil.

Qatar has plans to lease 40,000 hectares of agricultural land along Kenya's coast to grow fruit and vegetables, in return for building a £2.4 billion port close to the Indian Ocean tourist island of Lamu.

In February 2009, Madagascar was all set to sign a 99 year agreement to lease 1.3 million hectares of land to South Korea's Daewoo Logistics Corporation to plant maize and palm oil for export. This has however been put on hold after major protests by the Madagascar people about fears of becoming a colony of South Korea.

Yet another aspect of global warming on food is depletion of fish stocks in the ocean due to rising sea temperatures and greater acidification due to increased rate of carbon dioxide absorption. This is expected to kill corals, affecting the habitat of smaller fish, on which larger fish are dependant.

Thus global warming is expected to have a critical impact on our food security. From the land to the seas, the food we depend on is going to be affected, changing not only our future menu, but also the politics of the world.



Question 10

The Great Rift Valley



I have visited a number of places along the Great Rift Valley in the course of my travels - the geographical system of faults and valleys that stretches from Lebanon in the North to Mozambique in the South across almost 5000 km, crossing over 20 national borders.

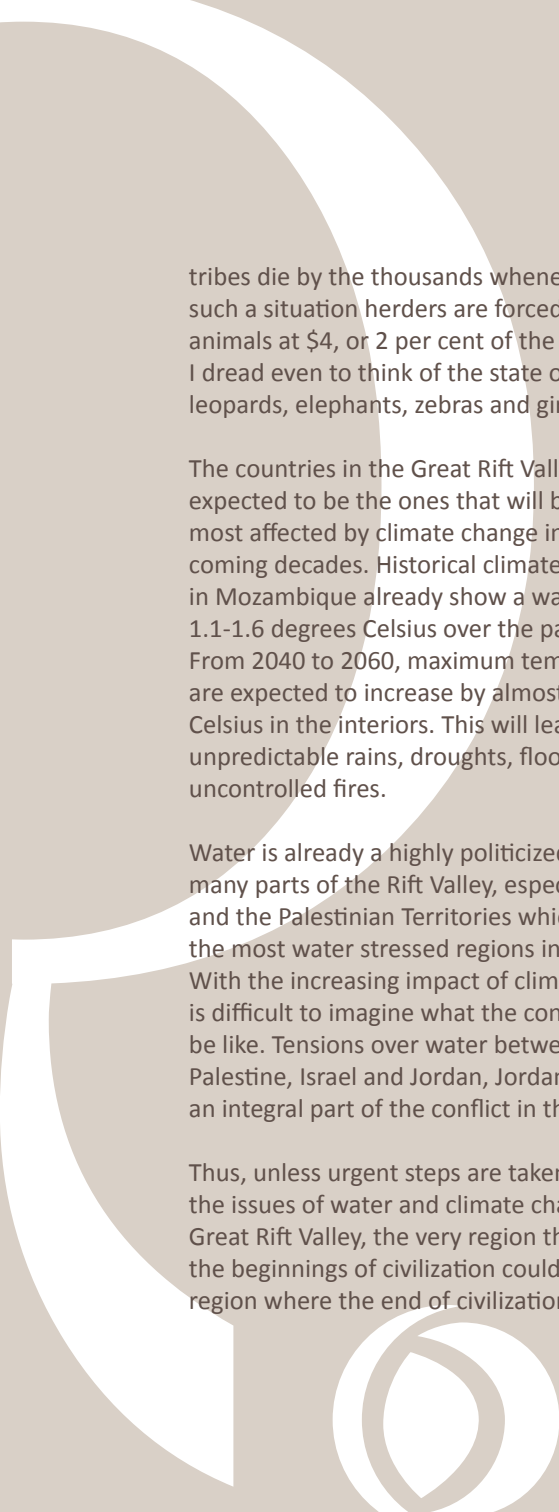
The Great Rift Valley has been the cradle of civilization- with the Leakey family of anthropologists having found the fossils of several of our hominid ancestors in its East African part. Some of the hominid bones found here date back to over 3 million years. This region also provides evidence of man's transition from hunting to farming, and the beginnings of language and writing. It contains the origins of three major religions- Judaism, Christianity and Islam.

The Great Rift Valley has been listed amongst the World Heritage Sites, because of its anthropologic significance, enormous diversity of landforms, lake systems, hot springs and other unique water bodies, such as the Dead Sea in Jordan and Lake Nakuru in Kenya. It contains mountains and active volcanoes with a high degree of seismic activity. The Rift Valley is

particularly high in biodiversity, and serves as a migratory route as well as wintering grounds for birds between Europe, Asia and Africa.

Standing on the shores of the Dead Sea in Jordan in a mild winter, I tried to think of the common feature that binds the countries of the Great Rift Valley together. The whole region has been suffering from drought for the last few years- and the image that kept returning to me was the grey dusty landscape I had seen in Kenya in August 2009. Perhaps it is the lack of water, and vulnerability to droughts rather than the presence of the lakes that is the common feature of the countries in the Rift Valley today.

The situation in Kenya does not provide much hope. Malnutrition is rampant with over 20 per cent of the children being severely underweight. Cattle, considered to be the wealth of many



tribes die by the thousands whenever rains. In such a situation herders are forced to sell their animals at \$4, or 2 per cent of the normal price. I dread even to think of the state of the lions, leopards, elephants, zebras and giraffes.

The countries in the Great Rift Valley are expected to be the ones that will be the most affected by climate change in the coming decades. Historical climate records in Mozambique already show a warming of 1.1-1.6 degrees Celsius over the past 40 years. From 2040 to 2060, maximum temperatures are expected to increase by almost 3 degrees Celsius in the interiors. This will lead to more unpredictable rains, droughts, floods and uncontrolled fires.

Water is already a highly politicized issue in many parts of the Rift Valley, especially in Jordan and the Palestinian Territories which are among the most water stressed regions in the world. With the increasing impact of climate change, it is difficult to imagine what the conditions would be like. Tensions over water between Israel and Palestine, Israel and Jordan, Jordan and Syria are an integral part of the conflict in the region.

Thus, unless urgent steps are taken to address the issues of water and climate change in the Great Rift Valley, the very region that fostered the beginnings of civilization could turn into the region where the end of civilization begins. And

we are talking not just about human beings, but also other species that share our world.

Question 11

Water and Westphalia in the 21st Century



One of the biggest questions of the 21st century is what will happen to the Treaty of Westphalia when it celebrates its 400th anniversary in 2048. The historic treaty that ended the 30-year war in Europe in the 17th century established two principles – the concept of state sovereignty and the use of trans-boundary watercourses as instruments of cooperation, rather than causes of conflict.

The same Europe that gave birth to the concept of sovereignty has led the journey to the post-sovereign world. Instead of the Roman Catholic Church dictating to the princes, it is now the Brussels Bureaucracy overriding nation-states. Despite criticism and competitive financial nationalism in response to the economic crisis of 2009, the model works. There is now free movement of capital, labour and people. More important, there is a noticeable European spirit. Will the post-sovereign sphere spread to Turkey, Ukraine and finally Russia by 2048? Will Switzerland embrace it?

Besides the European model of shared sovereignty, another model of traded

sovereignty is emerging in parts of the world. Interestingly, it is happening due to the shortage of water. In years to come, as sensitivity to climate change increases and dependence on oil declines, hydro-electricity will be an added factor.

Large countries like Saudi Arabia and China are purchasing tracks of land – normally larger than a million acres each time – in Africa and the former Soviet Union. They grow crops for importing home. It is not about shortage of land. Both Saudi Arabia and China are among the world's ten largest countries in geographic area. It is about shortage of water to grow food crops. Unlike the colonial estates of cash crops,

the new investors in foreign agricultural land are essentially growing food crops.

These are still early days for sovereign investors in food land. Soon the question of security of their land will come up. Will the Chinese military guard its crops in Sudan or will China rely on Sudanese security? Pakistan is offering a double deal – agricultural land and special security forces to protect it. Will the investors buy in, considering the growing influence of Taliban in Pakistan or will they insist on arranging their own security? One of the reasons for the failure to tap the massive potential of the Nepalese rivers through India-Nepal cooperation is the question of sovereignty. The Indian government will be happy to invest huge amounts in hydro-electricity projects in Nepal if it can export its army to guard them. Nepal insists on its own army in its sovereign territory. (The other main reason is a dispute over price but being a commercial dispute, this should be easier to resolve.) As miles and miles of land in one country are leased by another country to produce food or energy, our conventional idea of sovereignty will be challenged in the next few decades.

Another principle of the Peace of Westphalia was about using trans-boundary watercourses for cooperation and common prosperity of all parties. Cardinal Mazarin, the great French statesman, decided to treat the River Rhine as

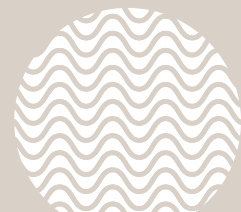
a corridor for fair trade rather than a boundary, unlike his predecessors. Moreover, he conducted a thorough study of the entire river system in the Hapsburg Empire. He made plans for cooperative development of Vistula River in Poland, Oder River, Elbe River in Bohemia (today's Czech Republic), Weser and Ems Rivers in Germany and of course, the Rhine.

We need a Mazarin plan for all parts of Asia today. If we can link Turkish national rivers to Jordan, Israel and Palestine, a permanent peace between Israel and all Arab people (including but not limited to the Palestine) will be possible. Also, it will end age-old competition between the Turks and Arabs. This will demand statesmanship on the part of the Turkish leaders but Prime Minister Erdogan is an outstanding statesman, supported by a high calibre team, who can deliver such vision. Will he be the Mazarin of the 21st century?

China and India can also negotiate a new blueprint for turning rivers into corridors of prosperity not only for the Brahmaputra (Yarlong Tsangpo) which is shared by them and Bangladesh, but also for other rivers that either of them share with Nepal, Bangladesh, Burma, Vietnam, Thailand, Mongolia, Kazakhstan and Russia. Both countries have visionary leaders. Will they play Mazarin? Will India and Pakistan convert the receding Indus into a corridor of prosperity for their people, and especially for the

people of Kashmir, finally publicly acknowledging that Pakistan's interest in Kashmir is actually in the river basins and therefore Mazarin-style integrated river development for fair trade is the only way out, rather than carrying on with the myth of a religion-based boundary? If Turkey and Israel, China and India lead the way, a new light might illuminate life in almost 260 trans-boundary river basins in the world.

It took thirty years of war and millions of dead people for the Westphalia, underpinned by the watercourses cooperation arrangement, to emerge. I hope that the statesmen of Asia will demonstrate wisdom before wars ignite a much worse tragedy in this century.



Question 12

Nature: The Final Frontier of Politics



In the last few years, I read two transformative books. Robert Frenay's *Pulse* is a comprehensive, extremely well researched reportage spanning the whole world on how new technologies and systems are more and more being inspired by nature. Julie Catterson Lindahl's *On My Swedish Island* is exactly the opposite. It is a personal, intimate and almost poetic account of how nature can influence us at the individual level. Frenay, whom I have never met, began his life as an artist. Julie Catterson, who is a good friend, was a hot shot corporate consultant. Beginning at two different ends, they have arrived at the same conclusion: that nature will be the final frontier of politics, though neither of them puts it in these words.

The Club of Rome in the 1970s, Green Parties in Europe since the 1980s, the Rio Conference in the early 1990s, and the Climate Change campaign since the late 1990s have highlighted the importance of balance between man, machine and nature. There is progress. There is recognition of the urgency to reduce carbon emissions. A clean technological platform based on energy efficiency, renewable energy and environmental sensitivity is expanding. US investors in the automobile sector are likely to support electric cars. The first plane powered by solar panels has proved to be viable though

it flies at the same speed as the plane made by Wright Brothers did.

However, the rate of progress is dismal as compared to the rate of growth of risk to humanity due to the degradation of nature. Much of the debate is trapped in diplomatic shadow-boxing. Should countries be obliged to reduce carbon emissions in absolute terms or in relative terms with reference to their population? Should the West use the newly unleashing industrial revolution of clean technologies to continue dominance over

emerging and developing economies? Or should we have a fresh approach to intellectual property rights for effective and inexpensive transfer of new technologies?

In their obsession to win diplomatic battles, emerging economies are losing the game of the next industrial revolution. Much of the innovation in clean technologies, renewable energies and a nature-oriented lifestyle is taking place in North America and Europe, particularly in California and Scandinavia. At the very personal level, an average person in North America and Europe spends a lot of time trekking, sailing, skiing, cycling, collecting plants and wood from forests, growing organic food, and being one with nature. As a result, new political parties in these countries campaign on the platform of preservation of environment and nature-friendly technological innovation.

On the other hand, in emerging economies, rivers are turning pink with chemicals, where they are not drying up altogether. Seas are changing their colour from blue to grey. Forests are making way for jungles of concrete. At the personal level, an average citizen belongs to one of the two types. There is the lucky one who spends time buying stocks, apartments, cars and cosmetics. And there is the underprivileged one who spends time on protests and demonstrations, criminal gangs or terror groups. Both types are disconnected from nature. As a

result, politicians who want them as followers either campaign on the platform of material growth to please the lucky type or religious or tribal identity to please the underprivileged type. In the process, nature takes its revenge with glaciers melting, sea levels rising, rivers disappearing, crops dying, and all these factors leading to a wider divide between the two kinds of average citizen. The people in emerging economies are losing both ways. They miss the prospects of new avenues of progress as described by Robert Frenay and they also miss the prospects of health and happiness that nature offers as illustrated by Julie Catterson.

However, environmental erosion in developing countries is no relief for California and Canada, Norway and New York. Several companies from advanced economies bear direct responsibility for some of the damage to environment in developing countries – be it the mines of Africa or forests of Asia. Carbon movements, wind patterns, sea currents, and atmospheric temperature do not recognise national boundaries. Neither do criminals, terrorists and refugees. The most serious threats will not spare anyone. Scientists expect the world's fish stocks to deplete in 50 years. They also expect several glaciers, and therefore rivers, and therefore fishermen and farmers, to become extinct in 50 years. There is uncertainty about oil. Nobody predicts that the world's oil resources will be over since the Club of Rome got it wrong once.

But there is no doubt that there will be serious deficit of oil by 2050 at the current rate of consumption, unless someone invents another viable source of energy. Can anyone be happy in a world without fish, depleted fresh water and oil, and much reduced arable land? Can the politics of competing identities solve these problems? Or is it time for us to explore a new global philosophy of sustainable relationship between man and nature? These questions need to be addressed as much at the macro-level as at the micro-level. Since politics connects the micro to the macro, political priorities of the next decade in all parts of the world will be important. If politicians of the South and politicians of the North get it right, we can have a new world. If they get it wrong, the outcome will be unpredictable. In the past, politicians fought against politicians, and one side won. In future, if politicians neglect or confront nature, all sides will lose.



Question 13

Limits to Globalization



There have been many waves of globalisation. If we focus merely on the current phase, it is obvious that export-oriented policies of the East Asian and Latin American countries in the 1960s and oil exports and import of labour by the West Asian countries since the 1970s have helped millions of people to move out of poverty. Egyptian or Indian workers could have never imagined buying property and hosting lavish wedding ceremonies before they found construction jobs in the Gulf. In the last two decades, Chinese workers, managers, businessmen and Indian engineers and entrepreneurs have discovered new life in shopping malls and overseas holidays.

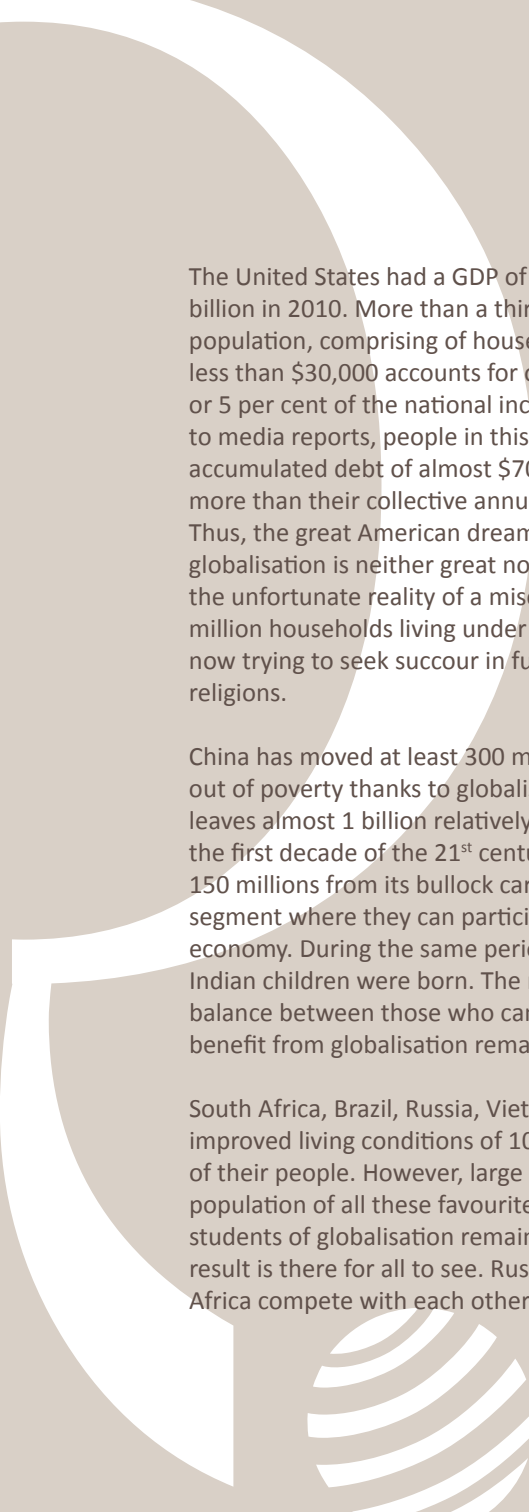
As construction workers in the Middle East and Asia, factory workers in China, software workers in India spend their extra income, new income and employment opportunities develop for traders, taxi drivers and temple priests. Their spending in turn enhances demand for housing, furniture, cars, television sets, and all kinds of other goods that generate jobs and more income.

Despite the obvious benefits why is there so much opposition to globalisation? Is it because globalisation is bad or is it simply inadequate and will always be inadequate?

If trade is an indicator of globalisation, global

economy is meant for few nations and a small number of elite within these nations. Only 10 countries account for 60 per cent of global merchandise trade. Another 40 countries account for 30 per cent of it. The remaining 150 odd nations of the world share 10 per cent of world trade. Thus, so called globalisation is not global at all. It is a game with 10 first class players, some marginal players and the majority relegated to the role of spectators.

This game is further concentrated in the hands of a few percentage of people within countries – not only in the poor nations but also in the rich ones.



The United States had a GDP of around \$13,000 billion in 2010. More than a third of the population, comprising of households earning less than \$30,000 accounts for only \$650 billion or 5 per cent of the national income. According to media reports, people in this bracket have accumulated debt of almost \$700 billion, or more than their collective annual income. Thus, the great American dream driven by globalisation is neither great nor a dream. It is the unfortunate reality of a miserable life for 40 million households living under heaps of debt, now trying to seek succour in fundamentalist religions.

China has moved at least 300 million people out of poverty thanks to globalisation. But it still leaves almost 1 billion relatively deprived. In the first decade of the 21st century, India moved 150 millions from its bullock cart economy to a segment where they can participate in the global economy. During the same period 150 million Indian children were born. The net national balance between those who can and cannot benefit from globalisation remains unchanged.

South Africa, Brazil, Russia, Vietnam have improved living conditions of 10-20 per cent of their people. However, large chunks of the population of all these favourite countries of the students of globalisation remain in poverty. The result is there for all to see. Russia and South Africa compete with each other to emerge as

major centres of crime. Brazil already has a lot of it in its favelas. If this is the story of the successful nations in the globalisation game, we don't need to say much about those who are completely out of it.

It is impossible for substantial number of people to participate in the global economy simply because population is increasing at a much faster pace than opportunities. In 1825, the world reached its first 1 billion mark of population. It took almost 150 years for population to treble by 1960. It has since more than doubled to reach almost 7 billion. In the same period almost 800 million people will have improved their life. Thus globalisation can help a maximum of 20 per cent of people to change their life.

The big question of our time is therefore not whether globalisation is good or bad. It obviously helps 20 per cent of us. It carries with it some anomalies that can be corrected. The big question is about the remaining 80 per cent. Since it is unrealistic to expect globalisation to help them come up in life, what kind of economic policies can we conceive for uplifting them? Unfortunately, this is a question that draws very inadequate attention in the global policy discourse.

Question 14

Are We Cruel, Stupid or Just Shameless?



The bright graduates of business schools have proved me wrong. In 2006, I had warned of a worldwide economic collapse by 2010. The MBAs ensured that it took place much earlier in October 2008.

The US Congress responded with a bailout package of \$700 billion. This money has not been offered to defaulting home owners. It has been put in the hands of the same investment bankers who brought the world on the edge in the first place. This is on top of the \$800 billion that the American government has spent on the Iraq War and related adventures. We now know that the US has a capacity to blow up \$1500 billion. And this is just the beginning. More bailouts will be required as more defaults take place in today's debt economy.

Of course, the problem is not confined to the United States. Other economies are sinking in equally deep water. These days, rumours spread very fast. One of them speculates combined losses from financial collapse and failed wars in Iraq and Afghanistan to cross \$5000 billion.

Another school of thought considers this too exaggerated. According to this school, the losses would be in the range of only \$2500-3000 billion.

While we have public funds for fighting wars and bailing out badly run financial enterprises, we don't have resources for bigger problems.

In just the last one year, more than 10 million children have died of malnutrition and preventable diseases. In fact, in the first decade of the 21st century, 100 million children had avoidable deaths. That is more than the toll of the Second World War. If Lehman Brothers collapses throwing a few thousand overpaid executives out of jobs, there is a hue and cry all over the world. But 100 million children have died in a tragedy larger than the Second World

War and the world does not find it worthwhile to report it as headline news. Every single day 5,000 children die only because of lack of access to sanitation. As Brian Appleton, an expert with the United Nations says: “this is tantamount to two dozen jumbo jets crashing.” Imagine the frenzy in the world’s if 24 jumbo jets crashed on one day. But it does not matter if two dozen jumbo loads of children die for no fault of their own every day. Are we cruel, stupid or just shameless?

It is possible to save the life of 100 million children – who would otherwise die in the next ten years from malnutrition, lack of sanitation and shortage of inoculation drugs - if we spend \$70 billion to pull them out of abysmal poverty. However, the world does not have \$70 billion for this purpose.

About 1 billion people lack access to safe and clean water. It is possible to solve their problem if we can invest \$100 billion in new water supply systems. Of course, we don’t have funds for improving water security of the underprivileged.

About 1.6 billion people do not have access to electricity. If each person is given a solar lantern, the total bill for the entire world will be \$70 billion. We don’t have money for solar energy for the poorest of the poor.

About 100 million people are homeless. We

need only a few billions to build homes for them. Of course, we don’t have funds to take care of people’s housing and dignity needs.

The problems are not only of the elite of the developed world. The elite in emerging economies are not fundamentally different. In India about one million people (according to NGO estimates and one third of this number according to government estimates) are manual scavengers. They spend their daily life cleaning, removing and carrying human faeces from dry latrines. Asia’s rising economic power is flush with dollars and pounds to buy overseas companies, but lacks pennies to provide toilets with water to every citizen.

India’s manual scavengers earn a princely sum of three or four dollars per month. They are richer than many people in Rwanda and Somalia. Africa’s one billion people can start a new life if their debt of \$300 billion is written off and accounts of their rulers in Western banks are unearthed. The world has neither funds to rid Africa of its debt nor guts to reveal the banking secrets of corrupt rulers. We need all the funds that we can get to save the bank managers who manage these corrupt accounts.

This is not to say that the global financial system should not be rescued. We certainly need to save it. However, at the same time we should remind ourselves of bigger problems that we

tend to ignore. We desperately need a new architecture of global governance with new priorities, methods and rules that are capable of dealing with the complexity of 21st century, instead of a system that looks after a few at the cost of many.



Question 15

Changing Choices



Choices change. That is definitely a given. However the direction of change is often not easy to predict. While a number of predictions have been made about the future trends in technology, computing speeds and genetic engineering, there are fewer on the more human aspects of consciousness, ethics and aspirations. Before looking at the future, it is worthwhile to look at the past and see what kinds of predictions were made for the present day.

In 1900, an article by John Elfreth Watkins, Jr in *The Ladies Home Journal* made a number of predictions for the next 100 years. Many of the predictions that were made on the technology front were described in detail and have turned out to be unerringly correct. These include the television described as ‘man being able to see around the world’ with snapshots of important events. It seems that he had even envisioned the phenomenon of “breaking news”! Other inventions such as MRI, tractors, and take-out meals have also been actualized. Watkins also predicted that in the by 2000 there would be no street cars in large cities, and that there would be public transportation under and above ground that would move at high speeds and connect all parts of the city, giving a graphic description of a modern subway system. Predictions made on some other fronts such as

the total extermination of rats, flies, mosquitoes and other pests are far from a reality. However, with greater understanding of the ecosystem and its fine balance, this is may be just as well. In the future, apart from technology, of course, one of the major drivers of choice is going to be environmental consciousness.

We already have a number of labels and ratings that inform consumers about products. Green labels indicate that a product is produced in a sustainable manner, contains no harmful chemicals, and has not been tested on animals. Energy labels indicate the level of energy consumption and rate appliances that consume the least energy. There is a growing awareness, as well as regulations, to ensure that these standards are adhered to. A French legislation called the Grenelle 2 bill, adopted in May 2010,

requires all consumer products and services sold in France - whether manufactured in the country or imported - to display information about their environmental impacts.

A new standard currently being formulated is the Water Footprint. This is an indicator of water use that includes both direct and indirect water use of a consumer or producer. For example, to produce one cup of coffee about 140 litres of water is required. When this information is printed on the packaging of coffee powder, it is likely to have an impact on coffee consumption.

An interesting experiment to enable more people to use electric cars is being put into place by Shai Agassi of Israel. This is the concept of the battery swap scheme. His start up - The Better Place - has forged a partnership with one of the largest gas stations chains in Israel and hope to set up charging stations across Israel. Shai Agassi predicts that by 2015, over a third of the cars on Israeli roads will be battery powered.

Coupled with environmental consciousness, is another new trend that is the move away from ownership- that some have described as collaborative consumption. Collaborative consumption focuses on sharing, renting, bartering and swapping. We see examples of this in many different spheres of life - from car pooling to bartering of books to shared sites such as Wikipedia, Twitter and Flickr.

In terms of housing, more and more people are opting to rent homes rather than buy them outright, a marked changed from conventional wisdom of about a decade ago. Renting a place gives one a number of options and flexibility to shift at fast notice, rather than tying one down to a particular area or employment.

This trend seems to be entering the automotive market as well, though on a small scale to begin with. The Melaka government in Malaysia plans to rent, rather than buy, national cars for use in 2011. While many people have been renting a car when going on a driving holiday, the BMW Group in Germany has recently introduced the concept of BMW on Demand to enable people to rent a luxurious BMW on an hourly basis directly from the company. This is in response to the world's leading car sharing company Zipcar, that has over 500,000 members and 8,000 vehicles spread in cities and college campuses throughout the United States, Canada and the United Kingdom.

Technology will continue to grow at the accelerating rate that we have seen in the last 100 years. Whether the current trends in environmental consciousness, collaborative consumption and ownership will do so too, or are just a short term phenomenon, needs to be seen.

Question 16

The Future of Property



In an old issue of *Oxford Today*, Oxford don in Engineering Science Department, Prof Malcolm McCulloch, makes a startling prediction. In two or three decades there will not be any private cars. In an interview to the magazine, he says: “The problem at the moment is that most people want to own a vehicle to do everything ... You won’t own a car at all (in future). There will be providers who will lease you the right vehicle for each task. You might cycle or walk to work, but when you want to shop you will hire a small car for a few hours. If you want to go camping, you will hire a vehicle geared towards that particular task.”

The Dutch realised this several years ago. In large cities in the Netherlands, you can pick up a bicycle from a parking slot, use it for free and leave it where it was. This has reduced the need to possess a car. With growing awareness of climate change, it won’t be surprising if many other European cities adopt this model.

In small towns in the Scandinavian countries, it is quite normal to borrow a bicycle of anyone in town, without permission, use it to move around and then return it in good condition. It is also common to have a picnic in the garden of any private house. It is not necessary to take the permission of the landlord. Obviously the user is expected to observe certain discipline

and decency. But using the garden, compound or veranda of any house is not considered a violation of private property.

In recent years, when scientists were lenient about the issue of intellectual property rights, breakthroughs were made possible. The Large Hadron Collider is a collaborative effort between scientists from more than 50-60 countries. Much of the scientific output is the common property of mankind. CERN, which hosts the largest ever particle collider, is in the process of building a new information superhighway for scientists from around the world to create and share research with no private intellectual property rights.

The world has been able to combat two of the most deadly diseases, AIDS and SARS, because of international agreements to short-change intellectual property rights on vaccines and medicines.

Advancement of knowledge at the beginning of modern history was made possible because people didn't think about property and intellectual property. If those who invented farming, domestication of plants and taming of animals had sought intellectual property rights or if they had made these experiments in secret confines of their own compounds, most of us would still have been hunter-gatherers today.

In the early days of agricultural revolution, there was no private property. Until recently, many villages in Scandinavia and tribes in India's north-eastern states did not own agricultural land. They distributed it by lots to those who wanted to cultivate it. Land was something to be used and not owned.

Rousseau once indicated that the concept of property is a big fraud on humanity. Someone drew a line on the ground and declared ownership of a piece of land. Others followed him. Locke even tried to make citizenship rights dependent on the basis of the possession of property. Eventually estates and states were built by acquiring and expanding land. Kings and priests fought wars. While doing so, they

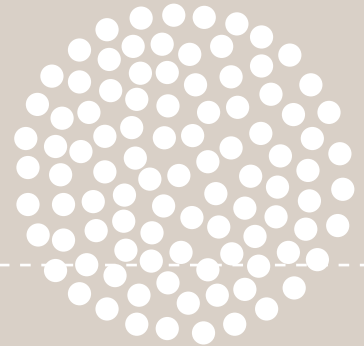
invented more and more deadly weapons. Now we are willing to blow up the world with thermonuclear, chemical and biological weapons so that we can protect our possessions and pride, in the name of patriotism. If we carry on in this fashion, we may not survive for too long.

This is not to suggest that property, and intellectual property rights, should be abolished. I am particularly opposed to the idea of the state or the society owning property instead of the individual. The communist experience has been disastrous, unhappy and impoverishing. We need property, but we need to redefine its role in our life. Instead of measuring success or failure by how much we own, we need to measure the right and wrong way of life by how we acquire, own and share property and intellectual property rights. When we are able to redefine our approach to property in a way that provides incentive to the individual to create and to the society to collaborate, humanity will have made real progress. In such a world, village folks will be able to grow crops but not wish to own farmland and urban folks will use but not own vehicles. Prof Malcolm McCulloch predicts that such a world is inevitable. If we want humanity to survive for the next several centuries, we will have to make such a world possible.



Question 17

Beyond Biology



Three disparate things that I read recently made me sit up and take another look at the threat that biotechnology poses to the future of humankind. The first was an announcement made by scientists of the J Craig Venter Institute on their work on genome transplantation that enabled them to transform one kind of bacteria to another type. This is the first time in history that a completely synthetic organism has been created. The second was a declaration made by Sir Martin Rees, Astronomer Royal and former President of British Association for the Advancement of Science - considered to be one of the most eminent scientists of today. He states “I have staked one thousand dollars on a bet: That by the year 2020, an instance of bio-error or bio-terror will have killed one million people.” The third was that scientists at the Shanghai Second Medical University have created the first human/animal Chimera (animal containing genetic material from parents of two or more distinctly different species) fusing together cells from humans and rats.

The first piece of information shows that biotechnology is racing ahead at breakneck speed and has the ability to change things in a fundamental way. This ability has already been translated into the development of drugs and other products - biotechnology now produces 40 per cent of the drugs that the US Food and Drug Administration approves of every year.

The second indicates that scientists of the

calibre of Sir Martin Rees believe that it is likely that this ability could be used with malicious intent. Bio-weapons are the ideal weapons for terrorist and/or anarchists. The cost of setting up a laboratory for biotech research is significantly smaller than that of developing nuclear or chemical weapons. The manufacture of lethal toxins requires modest equipment, essentially the same as is needed for medical or agricultural programmes: the technology is “dual use”.

Research teams have been able to reconstitute the polio virus, as well as the 1918 pandemic influenza virus (that killed somewhere between 20 to 40 million people) using only published DNA information and raw material from mail order services. This knowledge and technology is already dispersed among hospital staff, academic research institutes and factories. Bioterrorism is thus a real possibility in the next decade with the invention of ways of killing that had previously existed only in the realm of science fiction.


Sir Martin Rees also mentions the possibility of error on the part of otherwise responsible laboratories and agencies. Ed Hammond of the Sunshine Project in Texas that monitors the use of biological agents says that lab accidents happen a lot more frequently than the public knows. In recent years, the spread of Foot and Mouth Disease in the UK (2007), the death of a lab worker at Texas A&M (2006) due to brucellosis after cleaning a high containment container, the exposure of three researchers at Boston University Medical Centre (2004) to tularaemia or rabbit fever have occurred. All these laboratories are well run and subject to many regulations. The same cannot be said for other laboratories in different parts of the world. Perhaps the worst bio-error took place in 1979 in the former Soviet Union when weapons-grade anthrax escaped from a facility in Sverdlovsk, now known as Yekaterinburg, killing 68 people.

The accident was covered up by the authorities and came to light only in 1998.

If there is a major outbreak in the future, there may be severe clamping down by governmental authorities on the kind of research and agents that can be used in experimentation. This however would not have impact on research in rouge laboratories or by anti-social elements.

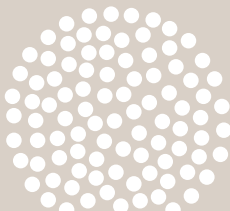
The Human Chimera experiment in China is one that could not have been carried out in any other country in the world. Most do not, at least at present, have the scientific capability. Those that do, such as the US and Western Europe have strict codes of ethics and regulations in place that expressly forbid such experimentation. Even between the US and Europe however, there is a vast difference in the regulatory framework. In the US, products of biotechnology have been extensively tested and marketed. In the EU, few biotechnology products have received regulatory approval, while most have faced a de facto moratorium.

Many countries do not have any kind of regulatory framework relating to biotechnology or restrictions on the kind of research that can be carried out. Frightening experiments could be conducted, without the knowledge of the rest of the world, or authorities within the countries themselves. These could even attract groups to set up research facilities in the future- the same



principle that attracts groups and individuals to tax havens such as Barbados, St Kitts, Canary Islands etc.

The advancements made in the field of biotechnology have the potential to change the life of humankind for the better by impacting health, eradicating disease and creating miracle drugs. But we need to also ponder seriously on what we need to do to prevent Sir Martin Rees' wager coming true.



Question 18

The Next Stage in Our Evolution



Certain events in the world act as dividers of time. The world before a big event, and after it, is fundamentally changed for ever. So, I have often been asked: “Where were you when Indira Gandhi was assassinated?”, “Where were you when the deluge of 26th July took place in Mumbai?” A very common question that all of us have been asked is: “Where were you on the morning of 9/11?” I am sure that all of us remember the answers to these questions very graphically. Where one was standing when you heard the news, who else was around, one’s immediate reactions and emotions.....

One question of this nature that will be asked in the future will be: “Where were you on the 11th of February 2001?” This was the day when the genetic code for the human genome was announced in the scientific journals. (Actually it was officially announced on 12th February 2001, but the embargo was broken by one newspaper). This discovery unleashed new knowledge, not just about the human being and its functioning; it changed the manner in which biology is practiced.

Combining the potential of life with computer technologies is creating a new type of biology, “in silico biology” coined by Juan Enriquez in his book *As the Future Catches You*. In Silico biology has been able to change not just the way biology

is done, but even thought about. For example, in the 1970s, Monsanto estimated that the cost of sequencing a gene would cost USD 150,000,000. Today using computers and other devices the average cost of sequencing a gene has come down considerably (almost by one thousandth). Once it is possible to sequence the genes of individuals at a cost that is feasible, medicine will undergo a transformation. Personalised medicine will be possible.

Personalized medicine is based on deciphering a person’s genome or genotype and anticipating possible genetic and hereditary diseases before they strike. The benefits lie in its accuracy, efficacy, safety, speed and cost. Because of the anticipatory nature of personalised medicine,

it can prevent most of the suffering associated with diseases like diabetes, heart disease, common cancers, high blood pressure, asthma, mental illness — almost any disease that tends to be passed on via our genes.

To help achieve this aim, an interesting prize has been constituted. The Archon X Prize offers US dollar ten million to the first team that can build a device and use it to sequence 100 human genomes within 10 days or less, with an accuracy of no more than one error in every 100,000 bases sequenced, with sequences accurately covering at least 98 per cent of the genome, and at a recurring cost of no more than \$10,000 per genome. This prize is supported in part by Craig Venter, one of the pioneers of genomic research, who to his credit has the sequencing of the human genome using new mathematical algorithms.

But beyond the realm of personalised medicine, expected to be a reality about 10 to 15 years in the future, lies a whole new science of creating new kinds of humans or post-humans. Nick Bostrom at Oxford University describes post-humans as either completely synthetic artificial intelligences, or as could be enhanced uploads or as the result of making many smaller but cumulatively profound augmentations to a biological human.

Looking at the rate at which computing power

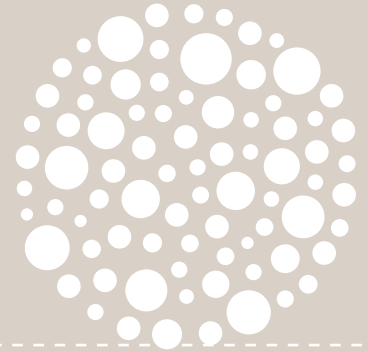
is increasing, the day of the post-human is not too far away. Moore's Law refers to the time and cost of doubling of computing power. For the past couple of years, the doubling time has averaged between 18 months and two years. It is expected that within our life time computers will have the same processing capacity as the human brain. Thus computers will soon be super-intelligent- i.e be able to outperform human beings in practically every field, including scientific and technological creativity. But the big question is whether these super-intelligent beings will be wise as well.

So looking back on the momentous announcement made on 11th February 2001, I wonder if it is the discovery that will change the lives of all for the better, bringing about a new era of health, wealth and happiness. Or is it going to destroy our world by churning out a new kind of demon? Either way, the date will much be discussed in years to come.



Question 19

In the Post Natural Evolution World

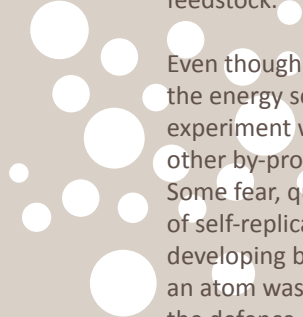


These quotes are coded into the DNA as watermarks in the first synthetic cell developed by the J Craig Venter Institute and announced on May 20, 2010. “To Live, To Err, To Fall, To Triumph, To Recreate Life Out Of Life.” - James Joyce; “See Things Not As They Are, But As They Might Be.”- American Prometheus; “What I Cannot Build, I Cannot Understand.” - Richard Feynman.

Craig Venter has been a living embodiment of the spirit articulated in these quotes. He mapped the human genome code in February 2001, three years ahead of a public project. In 2007, his institute successfully transplanted the genome of one bacterium into another whereby the recipient bacterium acquired the property of the host bacteria. Finally, in May 2010, the institute created a synthetic bacteria cell in a laboratory and transplanted it into another bacterium where it began to replicate itself.

The institute is funded by Synthetic Genomics, Craig Venter’s own business company and the US Department of Energy. Venter’s Synthetics Genomics Incorporated has a close tie-up with

Exxon Mobil and BP, besides some venture capital companies. Thus, there is a financial bond between genomics research at the Craig Venter Institute and the main players in the energy sector. The development of the new self-replicating bacteria seems to be driven by the needs of the energy sector. One set of objectives relate to the invention of bio-fuels. Another set of objectives relate to developing bacteria capable of absorbing CO₂ from the atmosphere so that the negative climate change impact of emissions, by transport and other gas consuming industries, is minimised. The institute is also engaged in developing a microbe capable of producing hydrogen. Its mission statement for this project says:



“The goal of our research is to develop a microbe that will form the basis for a viable, cost-effective, photo-biological process to produce renewable hydrogen fuel. By combining the properties of two microorganisms—cyano-bacteria and photosynthetic bacteria—we hope to develop a novel, hybrid microbe with two highly desirable traits not found together in nature: the ability to produce hydrogen in the presence of oxygen, using water as the feedstock.”

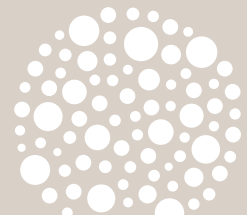
Even though the primary objective is to service the energy sector, the synthetic genome experiment will undoubtedly create viruses and other by-products useful for the health sector. Some fear, quite justifiably, that the invention of self-replicating bacteria can be used for developing biological weapons. A century ago, an atom was dissected for civilian purposes but the defence establishment used this knowledge to create the most deadly weapon known to man. In order to use a thermo-nuclear weapon, someone has to take a decision and hopefully debate it with a group of advisers before implementing it. Self-replicating bacteria, if produced for military purposes, will not need their creator’s or user’s permission to spread. Thus, the invention by Craig Venter may advance humanity to a level never imagined during six million years of natural evolution. It may also cause extinction of humanity with one mistake, however intended or unintended.

In either case, the world is no longer what it used to be. Craig Venter and his team have progressed from reading a genome code to writing one. Today they are the only ones capable of doing so. However, once technology is out of the bottle it spreads at a fast pace. In 2001, Venter read the human genome code by spending millions of dollars. Oxford University will soon provide a facility capable of reading anyone’s genome code for less than \$1000. Similarly, Venter produced a synthetic, self-replicating bacterial cell for \$40 million in 2010. We can’t be sure who will produce it for \$40,000 or even \$4000 in 2020.

The J Craig Venter Institute is to biology in the early twenty first century, what the Cavendish Laboratory was to physics in the early twentieth century. The discovery of the electron by JJ Thomson, the invention of the Cloud Chamber by Charles Wilson, the discovery of artificial nuclear fission by Rutherford are examples of the extraordinary advances in experimental techniques at Cavendish which ushered in what became known as modern physics. They also gave birth to nuclear weapons, capable of destroying the planet earth several times over.

Just as we cannot blame the Cavendish Laboratory for Hiroshima and Nagasaki, but should rather thank it for advancing physics, we cannot blame the J Craig Venter Institute for the use of a future biological weapons, but rather

thank it for advancing biology and genomics. However, there is a lesson to be drawn from the misuse of Cavendish successes by power-hungry politicians. Science has progressed in the last 200-300 years, but the nature of politics has remained as selfish, manipulative and greedy as ever. The great challenge before us is how to manage our politics in the post natural evolution world.



Question 20

Revolutionary Opportunities, Catastrophic Risks



A few years ago, a friend forwarded me an email which provided a macro and micro view of the universe. I am sure many people around the world have seen this power point presentation. It begins with a small plant a meter away from you. As you travel as far as 10^{16} meters away, you see the universe from the distance of one light year. Here the sun looks like a small dot, lost among myriad stars in the sky. The earth is completely invisible. It is a beautiful sight full of dots in our galaxy. You then come back to the plant and enter into one of its leaves. As you travel a distance of 10^{-16} meters into the leaf, you are inside the nucleus of an atom within a cell of the leaf. It is a beautiful sight which is full of dots in the vast universe of the atom.

In the last ten years, for the first time in the 10,000-year history of human civilization, humanity has demonstrated its ability to exploit both inter-stellar space and the complex structure inside the atom. Voyager spacecrafts, which were launched in 1977, long before the PC and mobile phone arrived, with an objective to observe Jupiter and Saturn, are now 15-17 billion kilometres away from the earth. They continue to be controlled remotely from the earth and regularly send data and pictures. More interestingly, once they completed their original

mission of exploring our solar system, they were tasked by remote control from earth to travel farther away. Inspired by their success, a new mission has been launched to visit Pluto. We are at the beginning of the beginning. In the 21st century, the solar system will not be the limit of human endeavour. What results these inter-stellar missions will produce remains to be seen. However, there is no doubt that a new window to the universe is opening up.

At the same time, humanity is moving fast to

manipulate cells and molecules in genomics- the sphere of the living, and molecular manufacturing- the sphere of the non-living. Nano-technology will soon make it possible to produce delivery systems for medicines that can enter specific cells for targeted cures. It will make it possible to produce low-cost high quality material by reorganising molecules. However, in the next several decades, nano-technology may be overtaken by something on an even smaller scale that is capable of entering into an atom, and not just cells and molecules.

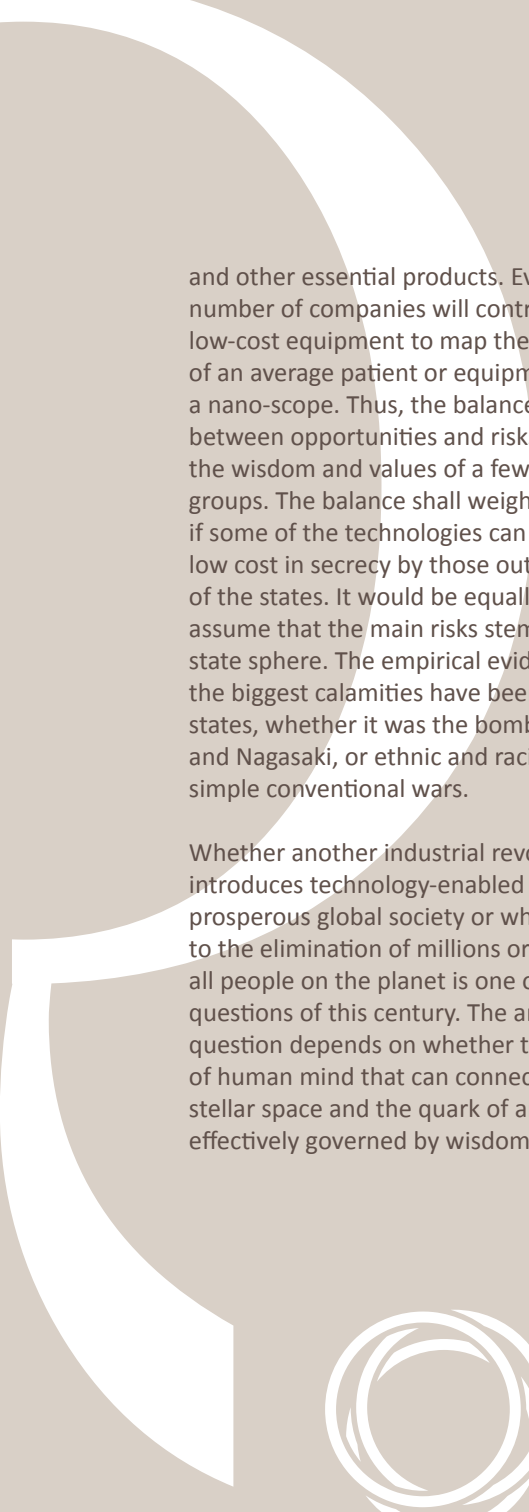
In the interim period, there are possibilities that will change our daily life in the next two-three decades. Precision irrigation that monitors water consumed by each plant in a large field, nano-conductors that can carry large voltage of electricity without getting hot, new material for solar panels that may require much smaller space than the miles that we need today to service large population centres, genetic modification to eliminate some of the diseases are some of the most talked about possibilities. A new form of Internet, known as the Grid, 10,000 times faster than the current speed of the fastest Internet today, as well as a stratospheric aeroplane that will make geography irrelevant, are on the anvil.

With new inventions come new risks as well. Scientists talk about nanobots and artificial germs and viruses spreading across the planet

and ending all life forms in a short period of time. Sir Martin Rees and Nick Bostrom have provided many detailed scenarios which threaten humanity. Their writings are easily available on World Wide Web; so I will not repeat them.

Research in new technologies is concentrated in the United States, parts of Europe, Israel, Japan and China and to some extent in Russia. A few other countries including South Korea, India, Brazil, Singapore and South Africa have their eyes open and had success in specific sectors – India in space technology, Brazil in alternative fuels and Korea in nano-technology. However, both beneficial and destructive results of new technologies will be experienced by people across the world. If nano-technology brings down costs of some of the essential medicines and materials, while increasing effectiveness, it will benefit the poor in Africa and Asia even though research effort might be concentrated in the United States and Japan. Similarly, if by accident or intent some nanobots occupy the earth's atmosphere, they will kill millions of people irrespective of their state of development.

It's not just a few countries but more significantly, a few companies in each sector that will dominate certain technologies. Presently, a small number of companies monopolise the production of desalination plants, vaccines,



and other essential products. Even a smaller number of companies will control the supply of low-cost equipment to map the genome codes of an average patient or equipment to produce a nano-scope. Thus, the balance of prospects between opportunities and risks will depend on the wisdom and values of a few individuals and groups. The balance shall weigh in favour of risks if some of the technologies can be replicated at low cost in secrecy by those outside the control of the states. It would be equally erroneous to assume that the main risks stem from the non-state sphere. The empirical evidence proves that the biggest calamities have been inflicted by the states, whether it was the bombing of Hiroshima and Nagasaki, or ethnic and racial cleansing, or simple conventional wars.

Whether another industrial revolution introduces technology-enabled fair and prosperous global society or whether it leads to the elimination of millions or billions or all people on the planet is one of the biggest questions of this century. The answer to this question depends on whether the brilliance of human mind that can connect to interstellar space and the quark of an atom will be effectively governed by wisdom and values.



Question 21

Is the Theory of Everything Possible?



Albert Einstein devoted the second half of his professional life to the search for a unified theory of physics. Since then it has been probably the most engaging scientific passion to construct such a theory. Stephen Hawking, the greatest mind on earth at the beginning of the 21st century, concludes his *A Brief of History of Time* with a hope that someone will come up with a unified theory of physics. Richard Dawkins, another great mind, suggests that a unified theory of physics will put an end to the idea of God, that has seized the human mind for millennia. The investment of billions of dollars in the Large Hadron Collider is partially driven by the search for the unified theory.

The search for the unified theory has become intense in the last 50-60 years due to the lack of harmony between Einstein's General Theory of Relativity, which explains gravitational force governing planetary bodies, and Quantum Physics, which explains electro-magnetism at the subatomic level. Since the universe is made of atoms, and atoms are made of protons and electrons, scientists believe that the laws of nature determining the behaviour of protons or quarks have to be the same as those shaping supernova. Some scientists hope that a string

theory may pave the way for the unified theory. In fact, Hawking also shares this hope in his recent writing. Some others are not so hopeful.

There is no one string theory but indeed there are several of them. String theories allow more than three dimensions of space and more than one universe. The search for a unified theory has therefore resulted in a search for more dimensions. It has raised questions whether there was another universe before the Big Bang created ours, and if indeed there are other

universes existing at the moment, with their own laws of nature. It has also opened the debate whether the universe will ever contract to singularity, or whether it will merely crunch to a certain extent and expand again, or whether it will continue to accelerate without any limit.

The search for a unified theory has also raised questions about whether all phenomenon of nature can be measured by mathematics. The constants of nature, in simple numbers, precisely explain how one subatomic particle is related to another. The fine structure constant explains dynamics between electrons and photons. The gravitational constant explains the relationship between gravity, protons and speed of light. John Barrow summarises in his book *The New Theories of Everything* that the sizes of all astronomical bodies are determined by the relative values of these two constants alone. Barrow also explains that it is not possible to compute and predict everything with a formula – for instance emotions, creativity and anguish.

Since the unified theory of physics is often equated with the Theory of Everything by physicists, who believe that science is the only explanation of nature, the debate on the unified theory gets blended with a debate on philosophy. There are some commonalities between the laws of nature and the laws of society. Whatever expands does collapse when it runs out of energy. When something collapses

into a black hole, it cannot be retrieved again. In fact, it attracts into itself all objects that are near. These laws can be observed in the functioning of science as well as society. But as we move away from phenomena that can be computed, physics encounters its limitations.

The world has entered the era of petaflop computers, those which are capable of 1000 trillion calculations per second. China, Japan and the United States have several computers between 2-3 petaflop capacity. They are engaged in a race to produce a 10 petaflop computer and will almost certainly succeed in a few years time. When they do, they will begin a new competition for a 100 petaflop computer and then the computers will be far ahead of human brain in their ability to compute. Such 10 or 100 petaflop computers will be able to produce spacecrafts and map the genome code at a low cost. But there is no indication that they will be able to contain human greed, jealousy and excessive ambition.

The unified theory of physics, if constructed, will therefore not be the Theory of Everything, since it may not be able to explain the phenomenon of mind and therefore of human nature. We can extend the same logic to intelligent beings, if they exists somewhere in the universe. If these extraterrestrial beings are like machines working on the basis of mathematical formulae, the unified theory will be able to explain their

behaviour. But if they are even more irrational than human beings, no single theory will be able to explain their thought process, even though it might explain the elements that construct them. If these beings are able to transform, as depicted in mythology, from one substance to another or from substance to a non-substance and back again at their own will, the unified theory of physics, based on constant equations between various particles, will not be able to explain their thought process or their existence.

I may be expressing such scepticism because knowledge that exists in the early part of the 21st century is not adequate to envisage a theory that can provide a unified insight into all probable laws of nature and the functioning of the mind. But who knows whether in another 100 or 1000 or 10000 years our knowledge base will expand so significantly that it will deliver the Theory of Everything. Whether we exist for such a long time will ultimately depend on our mind, irrespective of our ability or failure to understand its working.



Question 22

Exorcising the Ghost of Xunzi



On the surface, the world is facing triple crises – financial meltdown, environmental degradation and climate change, and the spread of terror and weapons of mass destruction.

However, if we scratch beneath the surface, we will find that these crises are mere symptoms of a deeper malaise. The world we live in is divided between 3.3 billion inhabitants in the market and 3.3 billion people living in the periphery. By 2030, there will be more than 8.5 billion on our planet. And if we maintain current growth rates, we will still have 3.3 billion in the periphery. These 3.3 billion people do not merely suffer from developmental deficit. They also experience the deficit of political opportunities and dignity.

We have created a world with spaceships, antibiotics, computers, and skyscrapers. However, we have also created a world that is short in compassion towards almost half of the human species and ruthless towards other species. Scientific reports indicate that temperatures will rise and many of the world's glaciers will melt by 2050. This will result in the

shrinking of rivers, disappearance of lakes, death of flora and fauna and the depletion of sea life. The inequity and environmental injustice we find beneath the surface are symptoms of even deeper problems.

At the deepest level, mankind needs to determine whether its driving force should be mere power or certain principles. This will depend on our understanding of the nature of man – whether it is good or evil. When we understand the true nature of man, we will be able to construct a model of global governance derived from it.

In the 3rd Century BC, the Chinese philosophers were the first ones to initiate a debate on the core question of how society should be governed. Mencius professed that the nature of man was intrinsically good and it should apply to the society. Therefore, the institutions of

governance should be benevolent and shaped to harness the best of the human spirit. Xunzi advocated that the nature of man was evil and therefore the state should be shaped to exercise control. Han Fei went a step ahead and argued for a strong state. Since then, Xunzi's and Han Fei's theory of a powerful state and a power-driven world has attracted not only rulers in China, but also those elsewhere in the world.

Unfortunately, for almost a thousand years, nobody in the world revived the debate initiated by Mencius and Xunzi. A millennium later it surfaced again when Thomas More recommended a society based on the goodness of human nature, fairness, equity and a benevolent and accountable state in his *Utopia*. At the same time, Machiavelli created the model of a ruthless state, constantly involved in expanding power, trampling ethics and principles, in his treatise, *The Prince*. The model presented by Machiavelli was inspired by the life of Cesar Borgia, a cruel prince who had totally failed once he lost the benefit of his father's patronage. And yet state after state since then has followed Machiavelli. Rousseau and Kant tried to introduce balance but without any success. Hobbes's view that man is a wolf and needs to subjugate to a powerful state has dominated.

The worldview promoted by Xunzi, Machiavelli and Hobbes over the last 2300 years has created

powerful states that are constantly competing for more and more power. The competition for power in the higher orbits invokes more of such competition in lower orbits. It creates a world where everyone wants to maximize his own interests at the cost of others, giving rise to conflicts and arms race. It is a world in which a few bankers profit at the cost of millions of depositors. It is a world in which a few energy companies enrich themselves at the cost of 6.6 billion inhabitants of the earth. It is a world in which terrorists and manufacturers of weapons of mass destruction build palaces, while 100 million people died in various wars of the 20th century and several hundred million may perish if major wars take place in the 21st century.

Even if we solve the current financial, environmental and security problems of today, we risk encountering worse threats tomorrow. The swelling number of unemployed youth, underestimated at 100 million at present; the number of children dying due to malnutrition and lack of basic healthcare, underestimated at 100 million per decade; and the number of people without access to water and electricity, much underestimated at 1,000 million are not merely statistics. These numbers are about the lives of real people.

The economists who study these statistics may prepare policy packages for alleviating poverty. Those who actually experience deprivation

may train themselves in stealing material for radiological or biological weapons to destabilise the world as we know it. The winners in the game of power purchase more and more sophisticated weapons. The losers in the game of power may acquire cruder and more unpredictable weapons. On the surface, one side is legal and the other illegal. Beneath the surface, both are practitioners of the Xunzian and Machiavellian thinking.

The greatest priority for mankind is to exorcise the ghost of Xunzi and seek the blessings of Mencius. It is to rid the phantom of Machiavelli from around our neck and practise the wisdom of Thomas More. It is to abandon Hobbes's assumption that man is a wolf and to draw a new social contract for the world, as Rousseau had envisioned for the ancient regime. Indeed, our challenge is to recognise that the power driven model we have adopted since the establishment of the first state in Egypt some 5000 years is now outdated, ancient, dying and dangerous. We need a new global social contract based on ethical and collaborative principles.

I am not arguing for a world devoid of power. It is not possible to have such a world in reality. Also, I recognise that the pursuit of power has made material progress possible. Power produces entrepreneurs and politicians. It is an essential ingredient for the movement of life on the earth.

However, unrestrained power that makes us callous not only towards half of the planet's population but also plants, animals, rivers, lakes, glaciers and the climate is self-destructive. It must be restrained by the operation of certain universal principles. Just as we need a horse to run the cart and reins to restrain the horse, we need power to move the economy and principles to restrain it. We need a balance between power and principles, which I would describe as the basic balance for the sustenance of life and the advancement of human civilization.

A world ensconced in basic balance between power and principles will be a world where new rules for technology transfer, intellectual property rights, exploration of space and seas, trans-boundary watercourses, transfer of financial resources will prevail. It will be a world where the death of ten million children every year due to malnutrition will be considered a crime against humanity and all leaders, from regional to global, will provide their time and resources to eliminate it. It will be a world where warmongers will find no enemies and terrorists will find no cause.

Lest you believe that such a world will be a boring place, there will be other interesting challenges to pursue- How to tap solar energy in space and distribute it to all people even though only a few companies will have the technology to capture and deliver such energy. -How to turn

the tide of seas that are rising and rivers that are shrinking so that we all may benefit from their bounties. -How to create global education so that our future generations treat our world as one community rather than a set of bickering countries.

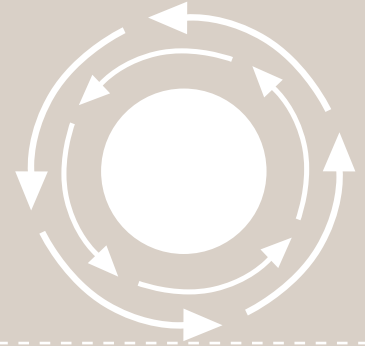
I once took a simulated flight out of the earth in Disneyworld. It made me realise what a little dot our planet is when we look at it from the vicinity of the sun, the centre of the solar system, and how it vanishes if we look at it from still farther away in our galaxy. It is so sad that we have allowed the ghost of Xunzi to rule our minds because we have treated every inch of our land and water as a big deal. The greatest priority for mankind is to acquire greatness of mind to understand the teachings of Mencius and Rousseau and humility to realise our dot-like presence in the universe. Our habit to treat symptoms has only given birth to a new generation of problems over the last five millennia. It is about time we question the foundation of our belief system and go deep inside our mental framework to its root. Once we reach there, we will find a smiling Mencius.

(This essay was first published in Green Herald Magazine as cover story on the occasion of the WEF Annual Meeting of New Champions held in Dalian, China)



Question 23

From Nation State to Global Community



Prof Zhao Tingyang, a Chinese philosopher, has created a stir by proposing that ‘the world’ should be the primary unit of social organisation, instead of the nation-state. He rejects an international system, which is based on relations between nation-states, and advocates a global system. In his philosophical framework, all people on the planet should have loyalty to ‘the world’ and participate in its affairs as global citizens, not as representatives of their nations. In such a world, the United Nations Organisation is irrelevant. Zhao would prefer some other form of the world government.

As expected, Zhao’s thesis has attracted criticism in academic circles. Some accuse him of promoting a world system dominated by China. Others dismiss him as a romantic theorist whose ideas reflect lack of understanding of human nature and its frailties – greed, revenge, desire for kinship, in particular. It is true that Zhao has used many references from Chinese history, culture and philosophy to explain his theory. He assumes imperialistic intentions in Western thinking and dismisses liberal and humanistic schools of thought. He does not tell us how we can shift from a greedy and tribal mindset to a genuinely human and global one. However, all

these weaknesses reflect Zhao’s naivety and the evolving nature of his thesis. It would be unfair to attribute motives to Zhao or to assume that merely because he works for the Chinese Academy of Social Sciences, he is propagating Chinese domination. Instead, it is necessary to discuss the substance of what he has proposed – the need to move from the nation-state to a global community in a world that is increasingly integrated and global.

In recent history, Immanuel Kant had made such an appeal in 1795. Kant did not do away with nation states altogether. His world involved the

co-existence of republican states with some form of world citizenship. Such a world never came into being. Instead, we have experienced several large and small wars in honour or in the interest of the nation state, killing almost 200 million people. When it was revealed that powerful states had developed a thermo-nuclear weapon, Einstein and Russell issued a manifesto in 1955 calling for the abolition of war, subordinating the national interest to the future of humanity - or else risk the abolition of mankind. Since 1985, HRH Prince Hassan bin Talal has been advocating a new international humanitarian order, an idea also mentioned in the UN resolutions and reports. Nevertheless, conflict continues to influence our life in the name of the fatherland/motherland, even though we have averted what might be described as another 'world war' and refrained from using nuclear weapons since Hiroshima and Nagasaki. Now some groups advocate violence in the name of religion and ethnicity, instead of the nation-state. The philosophical clock is moving backwards.

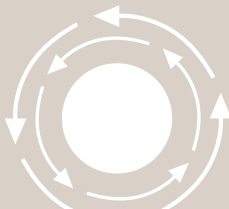
Against this background, we must look at Zhao's thesis, which calls for shifting from loyalty to the nation-state to loyalty to humanity. It is difficult to digest the concept of 'the world' as a unit of social organisation since there has never been a global society or civilization. Whenever society has been organised in a framework larger than a nation or a state, it has always been on a regional or parochial basis. There have been

regional civilizations, such as Arabic, Chinese, Indian, Mayan and European civilizations. There have been religions and revolutions, encompassing many nations. There have been empires and their colonies extending across continents and competing with one another. In recent years, there has been debate about utilizing 'universal values' to bind all societies by certain principles enshrined in the Universal Declaration of Human Rights; but very much using the nation-state as the primary mode of social organisation. There has never been a global civilization or a global community. There is no empirical experience, which can be used to test the concept of 'the world'.

An order based on the hypothesis of the selfishness of human nature may appear real in terms of past experience and present conditions. However, the past need not be the sole guide of the future. The concept of the nation-state has only been in existence since the unification of Germany in 1871 or rather since the end of the First World War in 1919, even though historians ascribe its birth to the Peace of Westphalia in 1648. The concept of the nation-state was not considered sanctimonious at that time. It worked in the context of the supremacy of geopolitics. Now, financial fraud, climate change, global crime and terrorism and pandemics undermine its credibility.

Let's not underestimate the human ability to

conceptualise and create. Not too long ago, electricity, aeroplanes, Internet, synthetic cells, and other inventions would have been impossible to imagine. Innovation in technology is much easier and faster than innovation in social organisation. But over a long period of time, the modes of organising society do transform. Five thousand years ago, it would have been impossible to envisage city states, merchant states and religious dominions. A thousand years ago, it would have been impossible to visualise republican states. Five hundred years ago, it would have been impossible to expect doctrinal states. Today it is impossible to foresee a global unit of society. It does not therefore mean that it will always be impossible to have a global community. Whether such a system of global community can be based on Kant's duality of federation of republican states combined with world citizenship, or Zhao's concept of a global social unit, or something completely different, are issues that must be discussed. If humanity survives for the next five hundred years, we will live in a post natural evolution, post human, and post earth world. Such a world will have to be congruent with the post nation state global mindset. Critics can focus on the lack of empirical experience. Critics know how to criticise; they don't know how to create. It is the task of the visionaries to anticipate and craft the concepts of global future.



Question 24

Ferguson's Fears



A few years ago, I read an interesting article by Prof Niall Ferguson, drawing parallels between the period leading to the First World War and the current global scenario. More recently, I read his book *The Pity of War*, which analyses factors contributing to the First World War, including some reasons which have not been discussed much, but which are very convincing. He makes a very persuasive argument that the First World War was a major error of the modern era. More significantly, it was an error that could have been avoided.

The world saw a tremendous rise in prosperity in the fifty years from 1865 to 1915. It was an era when efficiency and globalisation won over stagnant tradition. In the United States, the civil war established the dominance of the industrial economy by crushing the agrarian South. Commercial use of the internal combustion engine, petroleum, telegraph, and aircraft made the world integrated and prosperous. The world saw unprecedented growth in investments across boundaries. The major powers spent heavily on building military machines.

The world was then riding the wave of industrial revolution. We are now riding the wave of information revolution. As it happened then, we are witnessing high-speed technological

growth, increase in prosperity and global movement of capital. Each economic revolution creates its own elite and its political counter-revolutionaries. If there was the Propaganda of Deed in the late 18th century, there is Al Qaeda now.

Sometime back, *The Economist* carried a special article comparing the situation in the late 18th century to the current one. It analysed the acts of violence carried by anarchists influenced by the Propaganda of Deed mindset and the current spate of violence promoted by jihadi groups. It concluded that the philosophical basis of terror could change from anarchy to jihad to something else in the future, but the world would go on.

I must add for the benefit of readers who may not be familiar with the Propaganda of Deed movement that it included the killing of six heads of large states in a short period of time and an assassination attempt on a few others. The victims included the President of the United States, Queen of Austro-Hungarian Empire, King of Italy, Prime Minister of Spain, and among the ones that escaped, the King of Germany. The anarchists also threw bombs at cafes in Paris and the National Assembly of France and some of them looted the landowning classes of Italy. Our present day terrorists have focussed on killing innocent civilians travelling by trains, attending business or shopping in the marketplace.

However the argument that terrorism has merely changed its nature from the late 18th century to now, while the world has become more prosperous ignores the fact that a twin World War happened in between. About hundred million people died in the last century in the twin World War and several regional conflicts that resulted from unstable power imbalances produced by Yalta. The world economy was destroyed and was dysfunctional for over three decades, though it has managed to rebuild itself. And nobody can say if the world would have survived if the nuclear bomb had been invented in 1915, at the beginning of the twin World War instead of 1945 at the end of it.

That is why Prof Niall Ferguson's fear about

another world war must be taken seriously. The big question is whether there is a connection between the rise of terror and the outbreak of a global war. Prof Niall Ferguson merely draws a parallel and raises the question. Unfortunately, he does not provide the answer.

On the surface, there should be no automatic connection between terrorism involving some outlawed groups and careful decisions of war taken by professional bureaucracies.

Even if there is a conflict between a state and a group of terrorists, it cannot engineer a war between states. In the late 19th century, Italian farmers attacked their King. A self-declared anarchist attacked the President of the United States. (Other anarchists disputed his claims.) French social revolutionaries attacked their own elite. Even if there was some coordination between the terrorists in different countries, and even states sponsoring some of them, there was no reason for war. Even in the case of the attack on the Archduke of the Austro-Hungarian Empire by a terrorist supported by the Serbian state, there could at worst be an Austro-Hungarian attack on Serbia, just as there was the American attack on Afghanistan. It is too far fetched to argue that Serbian terrorism automatically led to German intention to attack France or British attack on Germany. And Prof Ferguson's book vividly describes how the talk of war was in vogue in London and Berlin for almost a decade before the Sarajevo incident. Similarly, in present

times the talk of war on Iraq was in circulation in Washington DC well before the 9/11 incident; in any case even the neo-cons don't ascribe 9/11 to Saddam Hussein.

The First World War happened because each player perceived itself to be relatively strong in 1914, but potentially weak in later years. Each state believed that its rivals would take over in the future unless they were curbed in time. France, Germany, Russia and Great Britain overstretched themselves to win the big power game. Britain believed that it was necessary to stop Germany before it dominated the continent. Germany wanted to stop France and Russia before they controlled Europe. At some stage they all intuitively determined that it was the time to go for closure.

Much of the United States policy in the Middle East and Central Asia is guided by acquiring strategic depth before Russia, China and Iran acquire strength. Iran wants to build nuclear weapons before the US and Russia are able to dominate the region. China is quietly making inroads in much of Asia and Africa before the US firmly establishes its global dominance. It's not just the United States that is following a doctrine of pre-emption. China and Iran are playing the same game. Can some calculations go wrong when investors are most confident of global economic growth and political stability as they were in the years leading to the First World War?

Yet what is the connection between acts of terror and calculations, including miscalculations, by professional decision makers of great powers? Can the increase in international terror be a forewarning of a global war? It is necessary for social scientists to examine this question closely since the health of the global body politic is not different from the health of a human being. Sometimes there is only an innocuous fever. Sometimes it proves to be a mere viral infection that goes away in a week. Sometimes the fever proves to be the symptom of a major disease that causes death. And when fever does prove to be an indicator of something fatal, it is normally too late.



Question 25

Will Human Species Survive By 2500?



Philosophers and scientists have initiated a debate on the existential crisis of humanity. Since life first took birth 3 billion years ago, more than 95 per cent of all species that have ever lived on the earth have become extinct – indeed some would say that a more appropriate number could be 99 per cent. Biologist E O Wilson has been quoted very widely by the media stating that of all the species that exist today, at least half will vanish within the next 100 years. I have not seen any list, if he has prepared one, of the 50 per cent species that will survive by 2110. I wonder if human beings would belong on the survivor list.

If we discount the possibilities of a supernova gobbling up the earth or an asteroid hitting us as something not likely to happen for at least a million years, we may believe that we need not bother about the question of human extinction for several millennia. All religions predict the end of times, but provide for a chosen few to be rescued by their particular God or his messengers. As times go by most of the theological prophecies seem unrealistic. There were rumours of the end of life around 1000 AD, but we have survived another millennium. Malthus talked about population pressures

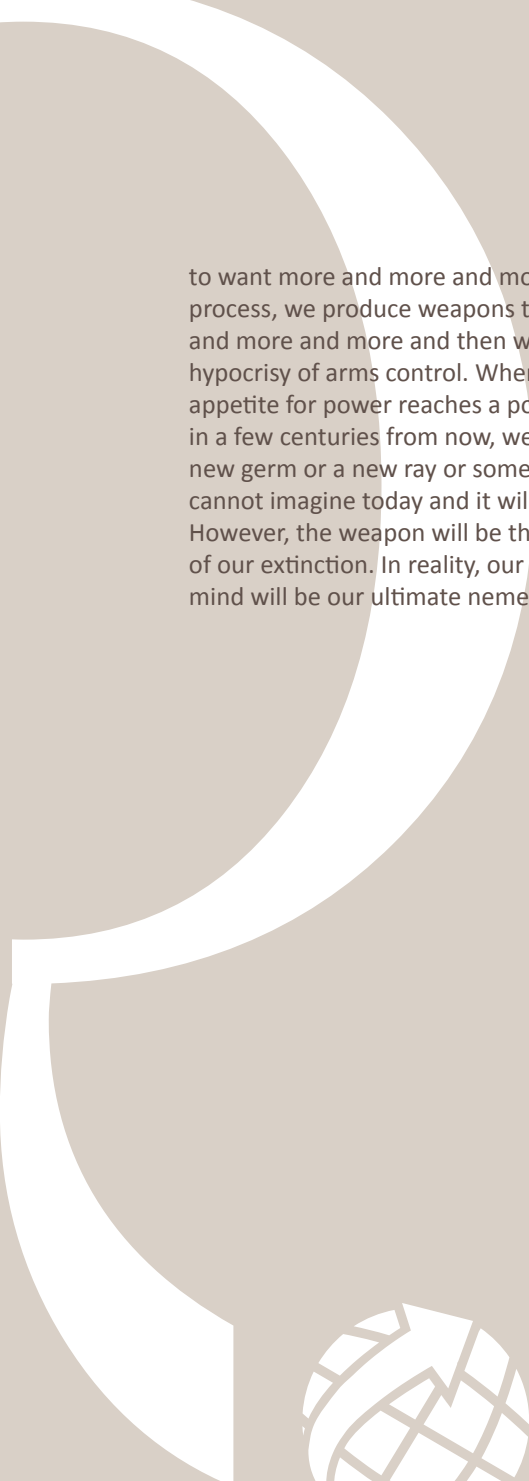
creating shortage of food and threatening our survival, but we have learnt to manage despite increasing our numbers to 7 billion from 1 billion in his time. As Malthus would have never believed that a world with 7 billion people could survive, today's sociologists and economists would find it impossible to imagine a world with 30 billion people in the next two or three centuries. Would they be wrong in any Malthusian resource-based calculations? Will the world survive next few centuries with several billion people more?

Those who are concerned about the risk of human extinction do not put forward the resource argument. Some mention climate change causing massive floods or other natural calamities. Some worry about nuclear wars, biological wars, spread of dangerous nanobots or a new type of pathogen, pandemics, and accidental creation of black holes in physics experiments. Some even do not rule out an attack by an alien civilization, even though all our efforts so far to detect the presence of any other intelligent life in the known universe have failed.

Underlying all these possibilities, accidental as well as deliberate, there is one common factor. It is the human greed for power. Our pursuit of power has led to the stockpiling of weapons of mass destruction, exploitation of environment to the extent of changing climate patterns, alienation of half of the world's population driving some of them to terrorism, scientific experiments that carry the risk of accidents with unintended consequences. So far all efforts to contain dangers have been on the supply side. Arms control treaties are a typical example. They are designed to limit the spread of a particular kind of weapon (or actually create monopoly in the hands of a few states). Emission controls are intended to limit the release of green house gasses into atmosphere. Bio-ethical laws put restrictions on producing certain kinds of organisms outside the laboratory.

Supply side restrictions impose some discipline on the behaviour of states and limit exercise of power. However, they do not do away with the current model of conducting inter-personal, societal and international relations on the basis of power dynamics. In fact, scientists and fiction writers extend the same theory to the extra-terrestrial world. Most authors assume that a technologically superior civilization would survive – underlying this view is the belief that extra-terrestrial beings also believe in domination, competition, survival of the superior, which are essentially human values. It does not occur to anyone that extra-terrestrial beings, if they exist anywhere at all, may have an opposite view. They may abhor conducting relationships based on power and if they see us, they might find our way of thinking regressive.

Species become extinct not only because they are attacked or deprived of their living conditions by mightier or smarter species. Species can become extinct if they fight between themselves by more and more sophisticated means in the pursuit of power. The species that are used to the psychology of conflict at the basic unit level – be it family or tribe – continue the same thought processes in different forms. Tribe becomes a religion when it acquires a book. It becomes a nation when it hoists a flag. In the name of a book or a flag, mosque or temple, church or synagogue, honour or patriotism, we try to hide our naked desire



to want more and more and more. In the process, we produce weapons that can kill more and more and more and then we indulge in hypocrisy of arms control. When our insatiable appetite for power reaches a point of no return in a few centuries from now, we will create a new germ or a new ray or something that we cannot imagine today and it will exterminate us. However, the weapon will be the apparent cause of our extinction. In reality, our own greedy mind will be our ultimate nemesis.



Question 26

One World, One Dream



We live in two worlds. One is the world of hope. The other is the world in despair.

In our world of hope, the Internet will soon operate at ten thousand times its present speed. In this world, a new scalpel will dissect a single cell in our blood. Gene-line modifications will enable the birth of designer babies. In this world, human civilization will spread to outer space, sea waters will be sweetened using nano-technology for desalination and synthetic germs will absorb carbon dioxide from atmosphere.

In the world in despair, 10 million children will die this year and every year because of inadequate nutrition and healthcare. In this world, there are 50 million refugees, 100 million homeless and 1000 million slum-dwellers. In the world in despair, a billion people do not get clean water. Over a billion and half live in darkness without power.

Those of us who live in the world of hope live in an illusion that we can escape the world in despair. We build electric fences in Johannesburg. We hide slums in Karachi and

Cairo. We perform laser shows in Wan Chai. We honour the corporate bigwigs in Mumbai and host lavish wedding parties in New Delhi. We erect high walls to safeguard our settlements in Jerusalem. We block roads outside our embassies all over the world. We believe that might can neglect the right and name and fame can ignore shame. We live in an illusion.

The world in despair can encroach on the world of hope. When its level rises, the sea assaults the land and makes groundwater saline. When a black hole expands, it absorbs all stars nearby. Climate change, pandemics, crime and terrorism are varied expressions of the same malaise. They demonstrate the potential of the world in despair to aggrandise itself. Our barricades, walls and soldiers are of no use.

The difference between the two worlds is not merely material. It is about different concepts of power, which is derived from conflicting ideas of the nature of man. It is about our willingness to

be guided by a moral compass. Our sages strived hard to impart wisdom. We adorn our libraries with Analytics of Confucius, Ethics of Aristotle, Vedas, Upanishadas and the Holy Koran. But we immerse our lives in avarice, glitter, hypocrisy and a blind pursuit of power.

There is nothing wrong with power per se. The world of hope is driven by power in Bertrand Russell's vision. It is the ability to achieve intended outcomes. It is about capacity to create, learn, progress. The world in despair is driven by power in Max Weber's vision. It is the strength to force someone to do what you want them to do against their resistance. This conflict has its origins in a debate in China more than two millennia ago. An old sage called Mencius professed that the nature of man was intrinsically good as did Rousseau centuries later. He was challenged by Xunzi who argued that the nature of man was intrinsically evil and he found a follower in Hobbes some 1800 years later. Russell drew his inspiration from Confucius, Mencius and Rousseau. Weber was persuaded by Xunzi, Machiavelli and Hobbes. The two visions created two worlds in which we live now.

We could afford the dichotomy for centuries because the stakes were low. The wars of the seventeenth century annihilated one third of the European population but spared enough to build a new continent and conquer the rest of the world. The wars of the last century killed

100 million people, but spared enough to build a new planet and conquer outer space.

The twenty first century is different from the past. We now live in an era where terror, technology and temperature have evolved to a level that does not recognise boundaries between nations. We live in era where shrinking rivers and fleeing refugees do not read constitutions. We live in era where pathogens do not recognise patriotism. We live an era where our world of hope is no longer secluded from the world in despair.

If we want the world in despair to retreat, we must ensure that the world of hope expands. It means we practise Bertrand Russell's concept of power and trust Rousseau's explanation of human nature. It means we allow compassion to replace competition, dialogue to replace discord, sharing to replace secrecy and generosity to replace greed. It means we all have one dream, a dream of one world where everyone lives in hope and none in despair.

The greatest challenge of the twenty first century is for entire mankind to have one dream. We must remember that most impossible dreams are possible. Once upon a time, a frail old man dreamt of an independent nation and today India is liberated from foreign yoke. Once upon a time a preacher dreamt that son of a black man and son of a white man would sit

at the same table. And today a son of a black man and a daughter of white parents shape the affairs of their world together. Once upon a time a politician dreamt that a nation needed inner strength more than an army to protect itself. And today the two safest countries in the world are the ones without weapons and armed forces.

Since dreams come true, let's dream of a world where there are no refugees and starving children. Let's dream of a world where nature is nurtured. Let's dream of a world where human spirit is harnessed. Let's dream of a world in which everyone has a stake. Let's dream of a world that is one.

(This essay was first published in Forbes India and also delivered as an address at a conference of Rotary International)



Question 27

In 50 Years



Am I being prescient or puerile in speculating about questions that will shape the next 50 years? Since change is the most certain dimension of future, what hypothesis can one use to explore how the world will transform from 2010 to 2060? A lot of people mistake the future as the continuation of trends. Actually, the future is more about discontinuities. The most significant developments in history – transition of life from bacteria to human beings, domestication of plants and animals, industrial revolution, development of surgery and medicine, colonisation and decolonisation, manned flight to space and later on to the moon, invention of high speed computers – were all discontinuities. Therefore, we need to ask questions about which discontinuities will be significant in the next 50 years.

In my view the most fundamental questions that will determine our future are:

- • Will any universally agreed principles replace power as the primary driver of relations within and between societies, in theory as well as practice?
- • Will the bottom billion people on the planet have adequate and sustained food, water, housing, energy and education?
- • Will the post-human society where biological and technological beings blend become a

reality?

- • Will the constants of nature be found to be not so constant and will such a discovery enable circumventing or even exceeding the speed of light?
- • Will there be a total worldwide financial collapse that brings an end to all commercial food production, molecular manufacturing, and all scientific research?

I would now like to list some questions of secondary importance:

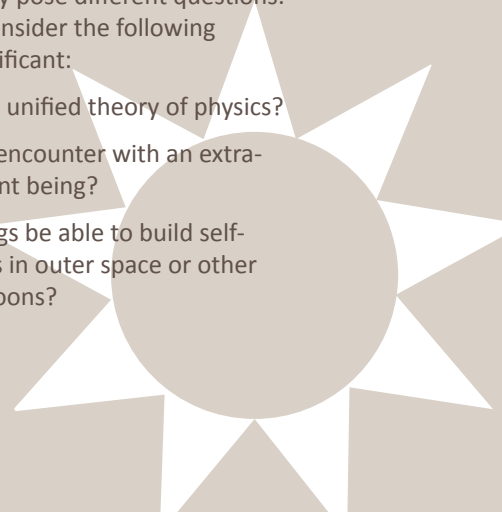
- Will the world produce adequate energy and water in a way that protects our climate and environment? (There is no question that technologies enabling the restoration of rivers and aquifers, inexpensive desalination, treatment of waste water and generation of energy from non hydro-carbon sources will be available. The question is whether there will be a desire to use resources for harnessing the full potential of such technologies and ensuring that the benefits reach all people of the world, including the bottom billion.)
- Will GRID, which will carry data at a speed 10,000 times faster than the present Internet, make it possible to have universal education? (There is no doubt that GRID will be available to the top billion people in the world within a decade. The question is whether the bottom 3-4 billion people will live in conditions to benefit from it and whether GRID will make their education and empowerment possible?)
- Will a Third World War take place? (There is no doubt that international politics driven by desire for power and greed, with advanced technology in the hands of certain leaders, will tempt them to play war games, which could lead to a devastating world war. The primary question is whether statesmen around the world will foresee such a catastrophe and commit to global governance by ethical and collaborative principles.)
- Will supercomputers capable of making

calculations at a speed higher than human brain become abundant and will nano-technology be passé and replaced by pico-technology? (There is no question that this will happen in one or two decades but a more fundamental question is whether these developments will merely create more tools or whether they will actually begin the post-biological evolution of humanity.)

- Will there be worldwide pandemics? (It is known that new viruses can be easily released into atmosphere by accident, such as the mouse-pox virus, or by unexpected transfer of germs from another species to humans and then global trade and transport function as their carriers. The relevant question is whether countries will have a collaborative international system and self-disciplined societies to prevent such a tragedy.)

The ten questions I have listed above are not exhaustive but there are on the top of my mind. Other observers may pose different questions. Scientists tend to consider the following questions most significant:

- Will there be the unified theory of physics?
- Will we have an encounter with an extra-terrestrial intelligent being?
- Will human beings be able to build self-sustaining colonies in outer space or other planets or their moons?



- • Will space-based instruments be able to transmit solar power to the earth?
- • Will a synthetic germ or synthesis of genomes between two species create a chimera capable of terminating life on the earth?

I have not included these very significant scientific questions among in my list for a number of reasons. While science is extremely important, the future is determined by a number of drivers. It is the interaction between various drivers that produces futures. I have included the most important interacting drivers among my fundamental questions. Of course, if scientists find a unified theory of physics, it will not only affect science but all aspects of life, but it is impossible for me to imagine how this will happen. Critics might wonder why I did not choose this question but included an equally challenging question about the constants of nature. This is because there is already some speculation about the constancy of the fine structure constant both in time and space. Overall, these five scientific questions are important for eternity, not just for the next 50 years.

I must finally dismiss one question which is sometimes raised by some people as significant for this century. "Which countries will become great powers?" This is an impractical and idiotic question to ask in any country whose elite

have proved to be incompetent in providing more than 90 per cent children with adequate nutrition, healthcare and primary and secondary school education; any country whose elite have proved to be incapable of removing the cause for slums and refugee camps; and any country where the elite have shamefully failed to protect rivers, lakes and air. This is an egoistic and illusive question to ask in any country whose leaders are worried about terrorist attacks from abroad because of their deeds or perception of their policies; whose leaders are scared of their hosts failing to provide adequate security while travelling overseas; and whose diplomats hide their chanceries behind high walls and barbed wires. It is an irrelevant question to ask whether the Spaniards are a great power capable of killing Incas to be defeated by the British one day, or the Japanese are a great power capable of killing Chinese to be defeated by the Americans one day, or the Americans are a great power capable of killing Vietnamese, Iraqis and Afghans. There is neither greatness nor any proof of power in bombing unarmed women and children. Finally, I am not sure if countries will exist as countries for some of them to become great powers, or whether they will be replaced by clusters and communities by 2060.

The critical question for the next 50 years is whether the human mind that seems to be on the verge of breaking the speed of light barrier and the blood-brain barrier will break the

barriers that have imprisoned it in the pool of darkness, ego, greed and obsession with power. The critical question for the next 50 years is whether, as a result of post-biological evolution or enlightened self-realisation, the human mind will liberate itself and save project earth from extinction. The critical question for the next 50 years to ask is whether the human mind will understand the real meaning and essence of humanity.



About Strategic Foresight Group

Strategic Foresight is about seeing light before the sunrise. Ever since its inception in 2002, Strategic Foresight Group (SFG) has been engaged in an endeavour to enable decision makers to look beyond the horizon. It is a think tank based in India. As it draws its input from around the world and its advice is sought by governments and institutions from all continents, SFG represents global intellectual capital.

SFG is active in four areas: geopolitical futures, resource problems, peace and conflict, major global shifts. SFG conducts research and dialogue to develop future scenarios and find solutions to intractable problems.

SFG is known for crafting several new concepts. Its concept of Cost of Conflict measures costs of a given conflict on a multitude of parameters in the most comprehensive exercises of this nature so far undertaken anywhere in the world. Its Blue Peace concept transforms water from a source of crisis to an instrument of peace, using concrete policy measures. Its 4-G framework helps provide reliable scenarios of the future of countries and regions.

SFG has been a lone voice of reason in times of crisis. When Indian and Pakistani troops were at the borders in 2002 and the world media was speculating about nuclear catastrophe, SFG predicted confidently in Newsweek and BBC World Television that there would be no war that year. When the Western and Islamic countries disagreed on the role of religion in terrorism, SFG collaborated with the Alliance of Liberals and

Democrats in the European Parliament and the League of Arab States in 2004-2006 to convene round tables of senior parliamentarians, ministers and former ministers from Western and Islamic countries to forge a consensus on strategies to deconstruct terror. As the financial crisis of 2009 exposed fault lines in globalisation, SFG initiated a trends monitoring exercise, at the invitation of Rockefeller Foundation, to identify scope for innovation among poor communities in Asia. With growing water crisis in the Middle East, SFG is involved in crafting and negotiating new policy instruments with governments in the region.

Government leaders have closely followed SFG work. The President of India inaugurated SFG conference on Responsibility to the Future in 2008. The President of Switzerland launched the Blue Peace report in 2011. Foreign Ministers of several countries formed a panel to discuss SFG report on Cost of Conflict in the Middle East under the auspices of the United Nations Alliance of Civilizations in 2009. Malaysian Deputy Prime Minister (presently Prime Minister) played a key role in a scenario planning exercise conducted by SFG in 2007. SFG reports have featured in floor debates and special meetings at the British House of Commons and House of Lords, floor debate and committee debates of the Indian Parliament, annual meetings at Davos of the World Economic Forum and several hundred newspapers and Internet sources from almost 100 countries in the world. Sundeep Waslekar and Ilmas Futehally are co-founders of SFG. They are supported by a team of 20 full time researchers based in Mumbai and horizontal partnerships with scores of think tanks, governments and national institutions from all parts of the world.





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ISBN 978-81-88262-16-8