

The 1885 Bengal Earthquake

How prepared are we for any recurrence?

DR. AFTAB ALAM KHAN

THE 1885 Bengal Earthquake, also known as Manikganj Earthquake, is one of the major earthquakes triggered in the historical past. It is not only the 1885 Bengal Earthquake, the 1762 Bengal-Arakan Earthquake located somewhere in Chittagong hill tracts and the 1918 Earthquake located near Srimongal / Kishoreganj (?) are the two other major earthquakes of great concern in Bangladesh. In addition, the well familiar 1897 Great Assam Earthquake that devastated almost entire Bangladesh is categorized as the great earthquake due to its >8 magnitude on Richter scale. However, the 1885 Bengal Earthquake with its possible epicenter near Kudalia in Saturia (Manikganj) and magnitude between 7 and 8 is of great concern for a megacity like Dhaka. The earthquake damage and consequent casualty risk of Dhaka are very high because of its very high population of about 13 million and large percentage of unplanned buildings and structures. The earthquake disaster risk index (EDRI) for Dhaka stands top among the twenty high risk cities in the world.

The earthquake of 19 December 2001 with its location 23.6° N 90.4° E, magnitude 4.5 - 4.8, and focal depth 10 km and couple of other low magnitude earthquakes in the mid seventies located near Dhaka possibly are the knocking alarm for Dhaka city. Roger Bilham and Philip England, in their paper published in

It is high time to have subsurface imaging of the entire Dhaka city and identify the zones characterised by faults, gully-fills and buried channels. Unless this is done, the micro-zoning earthquake hazard map of this megacity is unlikely to be prepared. Until such hazard map for Dhaka city is prepared, the pre-disaster physical planning and earthquake damage risk reduction will remain at a tell-tale stage. Recurrence of an earthquake is not a fairy-tale rather it is an inherent character of each earthquake event of all magnitudes globally.a

the *Nature* science magazine, opined that 1897 Great Assam Earthquake constitutes a significant seismic threat to nearby densely populated regions of Bangladesh and to the very large city of Dhaka. My investigation and assessment suggests that 1885 Bengal Earthquake projects much greater threat to metropolis Dhaka. The return period calculation suggests that 1885 Bengal earthquake is likely to recur by 2015 having return-period character of 130 years. John W. Whitney of USGS opined that 7 large or 1 great earthquake is likely to occur in every 135 years in and around "eastern seismic belt" of the Indian plate.

Characterising 1885 Bengal Earthquake as a major one there stands a high probability for its recurrence between 2015 and 2020. The field investigations exhibit an average fault displacement of 7 m occurred along several neo-faults aligned with Dhaleshwari and Buriganga rivers. These active faults have potentials for generating seismic energy of magnitude as high as 7.5. In addition, several local shallow faults and high amplified liquefiable zones within Dhaka city where large number of buildings

and structures are constructed without following standard building codes are certainly in a very high stake of earthquake disaster risk. The building collapse at Sakhari Bazar and Savar and building tilt at couple of localities in Dhaka city in recent times indicate its vulnerability to earthquake damage.

The classic example of ignorance and negligence has been set due to Savar event where collapse of 9-storey large garments factory cost hundreds of lives and caused considerable property damage without an earthquake. It is simply unimaginable what a magnitude of

loss of lives and property would occur in the sites characterising similar subsurface conditions during an earthquake. Although, the present article is not written for describing the possible reasons of Savar event, but temptations could not be resisted as to the inquisitive minds tried to explore the possible reasons. It is learnt from various news paper reports and seminars what some survived persons expressed pertaining to the building collapse. Among the information, the notable are, a) there was no boiler explosion, b) the heavy machinery used to

shake entire building when started, and c) more importantly the entire building used to tremble when high horse power pumps were used to abstract groundwater from subsurface.

When these information are critically analysed there emerged certain conclusions: The structure was not built on the geologic basement which is commonly known as engineering bed rock. However, the engineering bed rock might be confused with the geologic bed rock if the same is situated over a buried channel characterised by channel fill materials. The shear strength of these channel fills is much less than the shear strength of the geologic bed rock. In addition, the buried channels are highly potential from groundwater resource point of view that continuously keeps the channel fill materials in saturated and wet condition. As a result, the ambient shear strength remains quite low. The second factor is the withdrawal of groundwater with large pumping capacity that had developed interim cone of depressions with downward pull of hydrostatic pressure towards the cone of

depressions. As a result, the structure used to tremble during the pumping of groundwater.

Hence, the shaking of the structure due to long time operation of heavy machineries and the trembling due to groundwater pumping had continuously weakened the base of the foundation and eventually the structure collapsed. A major buried river has been identified between Tongi fault in the south and the Nayarhat fault in the north. An appreciable horizontal off set has also been identified along Nayarhat fault. The area between such buried river and fault is an ideal site for structural collapse. Unless, such sites are definitely identified, the risk of structural failure would remain high.

Coming back to the discussion on the recurrence of the 1885 Bengal Earthquake and the possible consequence in Dhaka city, it is high time to have subsurface imaging of the entire Dhaka city and identify the zones characterised by faults, gully-fills and buried channels. Unless this is done, the micro-zoning earthquake hazard map of this megacity is unlikely to be prepared. Until such hazard map for Dhaka city is prepared, the pre-disaster physical planning and earthquake damage risk reduction will remain at a tell-tale stage. Recurrence of an earthquake is not a fairy-tale rather it is an inherent character of each earthquake event of all magnitudes globally.

Dr. Aftab Alam Khan is Professor, Department of Geology, University of Dhaka.a



MUHAMMAD HABIBUR RAHMAN

The Bangla-sun does not set in the world

In the civilization of the modern-day world
In the globalisation of the present-day world
The Bangla-sun does not now set in the world
Banglaspeaking people now all over the world

Banglaspeaking people have no empire indeed
But now engaged everywhere in all sorts of deed
In the desert or in the oasis, in all sorts of terrain
In the plain or in the mountain----
In all climes and in all time-zones
Banglaspeaking people are no longer the unknown.
The Bangla-sun does not now set in the world
Banglaspeaking people now all over the world

Banglaspeaking people had no empire indeed
But now engaged in all sorts of good deed
From blue-collar jobs-- dirty, damned and daring--
To the heroic blue helmet peace keeping
Creating safe neutral zones.
In all climes and in all time-zones
Banglaspeaking people are no longer the unknown.

The Bangla-sun does not now set in the world
Banglaspeaking people now all over the world.

Muhammad Habibur Rahman is former Chief Justice and head of caretaker government

Why a 'oui' is not enough

JEFFREY E. GARTEN

THIS Sunday, France votes on a new European Union constitution that few voters have read. It's 300 pages long. Instead, they'll be venting on the European project itself, on the prospect of welcoming new members like Turkey, on French leaders who have pushed for closer union, namely Jacques Chirac. A "yes" vote is sure to be seen as a reaffirmation of EU policies, and a "no" will bring predictions of political and economic stagnation, even an unraveling of the union.

The constitution does provide for some important organizational changes, including the establishment of a new EU president and a foreign minister. But no matter what happens on May 29, the sad truth is that the EU's economic and political

institutions have become dysfunctional. And nothing in the proposed constitution is dramatic enough to really fix that.

France, Germany, and Italy have failed to reform their labour laws so that their workers and firms can become more adaptable to hypercompetition from other nations. The big countries of continental Europe have abolished all pretense of the fiscal discipline that would be necessary to trim astronomical social-security costs. The EU has not been able to scale back its massive agricultural subsidies. It has not invested enough in science and technology. It is stalling when it comes to opening up its member-state economies in areas such as financial services. Caught between the United States and China, Europe is unable to compete successfully with either. It's no wonder that multinational com-

Therefore, the EU needs a massive jolt in order to make dramatic policy changes. This includes deregulating the workplace and upgrading universities, reining in budgets and farm subsidies, creating one unified market for financial and other services, and enhancing two-way communications not just with member governments but with European citizens.

panies such as IBM and General Motors have announced plans to reduce their work forces in Western Europe by more than 10,000 people each, or that firms like Novartis have moved R&D operations across the Atlantic.

While the Brussels bureaucracy has been expanding to accommodate 10 new members, European citizens are feeling increasingly divorced from the supranational entities that have been created. Last summer, for example, voter turnout for the European Parlia-

ment was scandalously low. On a national level, leaders like German Chancellor Gerhard Schroeder and French President Jacques Chirac have failed to tell their citizens just how much it would take to restore dynamism to the EU.

The implications are ominous. Germany, France, and Italy -- 60 percent of the GDP of the euro zone could see growth slow from the current, anemic pace of 1.5 percent. Unemployment rates, already in double digits, could

move higher. Such conditions would provoke even louder calls for protectionist measures in the world's largest trader, one that accounts for 30 percent of global economic activity. In an era of intense globalization, this would be a serious blow to North America, Asia, and other regions.

Under these economic pressures, anti-immigration sentiments, already running high, could get worse. They could be part of growing extremism on both the left and the right that leads to political

paralysis all over the Continent. It is also easy to envision an EU that turns inward and loses interest in providing leadership on international problems from curtailing the spread of nuclear weapons to increasing foreign aid to impoverished Africa.

Finally, the EU model of a regional group dedicated to extensive levels of internal cooperation while strengthening democracy and eliminating regional wars among its members has been highly attractive to countries of Eastern and Central Europe, many of which are obsessed

Season of discontent in conquistadors' spoils

SYED MAQSUD JAMIL

FOR our part of the world Latin America looks like an insular another world, more precisely a backwater of the United States of America. Little do we know about the rampant exploitation of a vast resourceful region and about the existence of festering poverty creating social malaise in different shapes there! The world and its 'leader' has chosen Iraq's Saddam Hussein and hitherto undiscovered weapons of mass destruction (WMD) as the prime objects of world attention and action. America and a dwindling list of countries are caught in an impasse. It is the extrication of the leader of the world in the backdrop of an unremitting mayhem in Iraq that dominates the world.

Hugo Chavez the populist Venezuelan President has become the spokesman of the ills of Latin America by making strident remarks about the exploitation of his country's wealth by American conglomerates. The economic woes of Latin America are an unlikely event for a resource rich continent in terms of land and population ratio. It constitutes over half of the Americas covering an area of over 20,451,181 square kilometres and has a reasonably manageable population of approximately 0.52 billion people. Area wise Latin America constitutes 12 percent of the world area and population wise it constitutes 8.4 percent of the world population. Population density at 19.75 persons per square kilometre is one of the lowest in the world, although urban population around mega cities like Mexico City, Rio de Janeiro and Sao Paulo is one of the densest constituting two thirds of the total population.

Oil and gas, copper, timber and a host of agricultural and plantation produce make Latin American countries a major exporting region of the world. Brazil, the largest country of Latin America both in terms of area (8,511,965 square kilometre) and population (over 182 million), has per capita GDP of 8,100 US Dollar. Venezuela has a per capita GDP of 5,800 US Dollar,

Mexico 9,600 US Dollar, Argentina 12,400 US Dollar, Chile 10,700 US Dollar and the poorest is Bolivia with a per capita GDP of 2,600 US Dollar. Judging by per capita GDP the countries of Latin America are in a state of sufficiency and prosperity in comparison to the impoverished people of Africa and to a greater extent the peoples of South Asia.

Nowhere in the world per capita GDP is so deceptive as in Latin American countries. Tucked away from the focus of international media the Latin American countries are home to surprisingly large number of impoverished and extremely poor people. It is painful that most of them are the decimated indigenous Aztec, Maya and other people, the *mestizos* or children of inter-racial interaction, and the colonial Hispanics. The malfeasance of so much unattended festering poverty right under the glitter of the fabulous wealth of the few is a tragic fact of Latin American countries. A look at few statistics will present the reality with all its glaring disparities. Out of today's Latin American population of 507 million 43.2 percent or 220 million live in poverty and close to 95 million (18%) are considered indigent. On top of that the richest 10 percent earn 48 percent of the total income and the poorest 10 percent earn only a meagre 1.6 percent of the total income. Discontent is therefore getting bolder in Latin American countries.

The phenomenon is visible in almost all the Latin American, particularly South American countries. Bolivia the poorest among the South American countries has the saddest story to tell. Out of its population of 8.8 million 70 to 80 percent live below the poverty line. The scenario is of utter misery and cruel deprivation. Two third of the poor live in dire poverty, two million Bolivians face chronic hunger and only 12 percent among them gets the minimum calorie intake. As for employment, 45 percent of the economically active population is believed to be unemployed. And most of these people are native Indian peasants living in the rugged Andean highland. Bolivia has the

second largest gas reserve in South America and is seen as a possible flash point.

The ills of Bolivia started when the western educated outgoing President Sanchez de Losada started acting on the prescriptions of IMF on privatisation. He believed in the infallibility of economic solutions, thus incapable of perceiving the woe it will bring on the common man and oblivious of the dispossession his country would suffer, because he only saw the immediate gain. Losada's Bolivia encapsulates a typical case of a third world country succumbing to dispossession by accepting the logic of the Leviathan in immediate gain. This led Bolivia to a gas treaty, which allows it to keep only 18 percent of sales proceedings, even though the standard practice is 50 percent. It went to the extent of privatising water supply in an arid country leasing the source to a foreign conglomerate.

For Ecuador its oil resources became its bane, bringing environmental disaster to the forested equatorial region inhabited by the indigenous Indians. A unit of Texaco decimated the entire area, clearing forests, polluting waterways and leaving behind large reservoirs of toxic wastewater. The native Indians are in rage.

In Latin America the two successful economies were Argentina and Uruguay the end of the last century. Things however changed drastically in Argentina after the 2001 collapse. It landed Argentina in trouble with 55 percent of its population living in poverty and almost 38 percent in dire poverty. This is attributed to the ever-increasing profiteering hunger of market economy with little regard for the welfare of the common man. On the other hand Uruguay has relatively manageable socio-economic problem with 28 percent of its population living in poverty.

Brazil with a population of over 182



Hugo Chavez: Spokesman of the ills

million, the largest in Latin America, along with Chile have the most unequal societies in South America. The poor or the *favelas* of Rio de Janeiro living in squalid poverty is a sharp contrast to the glittering opulence of the rich. More than 11.8 percent of its population live in dire poverty, which is a large number in terms of its large population.

A look at the poverty and the disparity of income of Latin American countries would not be complete without looking into Hugo Chavez's Venezuela. The free riding market economy of oil rich Venezuela in the eighties and in most part of the nineties brought it to the brink. The country fell

into terrible economic crisis at the end of the eighties with massive flight of capital, compounded by falling oil prices and increasing interest rates. A country dependent on oil export had no option but to borrow more money for pumping the economy. Rafael Caldera, the predecessor to Chavez, was the president and he had to cave in to bitter prescriptions of the international lending agencies in undertaking massive privatisation, restructuring, deregulations and other stiff and uncaring conditions. More than one third of its population fell into poverty. What followed was run away inflation, soaring prices, labour unrest, unemployment and poverty.

The season of discontent was a perfect setting for populist Hugo Chavez to come to power. He inherited a beleaguered economy. Firmness along with the good fortune of soaring oil price helped in stabilising the Venezuelan economy. It was the flight of capital he targeted first. Venezuelans were restricted to spending not more than US Dollar 2,000 in a year during foreign trip. Royalty tax on foreign oil companies was increased from 1 percent to 16 percent. He kept on accelerating oil production. There was a strong backlash with the oil executives of Petroleos de Venezuela PDVSA enforcing a 48-hour total shut down

which cost Venezuela US Dollar 8 billion. There was a three-day failed coup in April 2002 engineered by the business organisations, *Fedcameras* and *Consicommercio*. Hugo Chavez is talking of Bolivarian self-dependence after Simon Bolivar, the South American hero who won independence for South American states. The cornerstone of his policy is to fight poverty through redistributive policies like rural and urban land reform, micro-credit lending, public education, food distribution, and health clinics. But the fact remains that still a large number of Venezuelans subsist on less than US Dollar 2.00 per day.

In most of the Latin American countries caught in the vortex of economic woe, it is largely the native Indians who are suffering the most followed by mestizos and poor Hispanics. It is the Venezuelan President Hugo Chavez not the ageing Fidel who is the voice of this discontent. In contrast to the growing appeal of communism during the era of cold war, the growth of discontent is wholly endemic. Deprivation has driven the poor of Latin America to desperation. Extreme poverty has left little meaning in their lives, their consciousness as self-respecting human beings has sank to the lowest level. Popular belief that they are being abused and subjugated, their wealth of oil, gas, timber, copper, other minerals, agricultural produce, labour, land, water and air is being flagrantly exploited by the big brother up north and their local underlings are in the garb of corporate Leviathan is growing stronger.

The *haciendas*, *estancias* or large estates and plantations are no less culpable for the exploitation of cheap indigenous labour. One can guess the intensity of the seething anger by listening to populist leader Hugo Chavez, the true cause of the fall of governments such as Sanchez de Losada's [in Bolivia] has to do with the poverty and misery generated by neoliberal policies imposed by imperialist models. That's the real cause of instability in the continent."

Now Ecuador, Bolivia, Venezuela, Brazil, Argentina, Chile, Peru and Paraguay have also elected populist leaders. Venezuela's Hugo Chavez and Brazil's Luiz Inacio Lula de Silva

are foremost among them.

It is a fact that exploitation in Latin America has a brutal past from the day the conquistadors started landing in the new continent. The original inhabitants of Latin America, the indigenous Aztec, Maya and host of other people suffered a brutal fate at the hands of the rampaging conquistadors from Spain and Portugal. By a conservative estimate approximately 50 million indigenous people inhabited the Americas in the late fifteenth century. What remains of them is anybody's guess. The demographic decimation equivalent to 90 percent has converted them into a neglected minority in their own lands.

It was the medieval age and the brutality and tyranny of the conquistadors in indiscriminate killing, ruthless subjugation and serfdom in the forms of tribute or *encomienda* and *repartimiento*, *catequil*, *mit* et al re-crafted the demographic landscape of Latin America. The ragged remnants of the acts of savagery and tyranny exacted by history toils today in the fields as poor peasants and in the tropical forests and Andean hills as fugitives from the business of governance in Latin America. The pathogen of this dispossessed people needs to be sincerely addressed by Latin American countries for redemption from the ills that may continue to afflict the continent. The season of discontent in Latin countries is reminiscent of the words of the words of Honore de Balzac that 'Behind every great fortune there is a crime.' At least the brutal disparity between wealth and poverty in Latin American countries tells us how equally true it is for improvident states.

Syed Maqsud Jamil is a freelance writer.