

## GLOBAL WARMING

# The real inconvenient truth

ROBERT J. SAMUELSON

**"GLOBAL warming may or may not be the great environmental crisis of the next century, but regardless of whether it is or isn't we won't do much about it. We will (I am sure) argue ferociously over it and may even, as a nation, make some fairly solemn-sounding commitments to avoid it. But the more dramatic and meaningful these commitments seem, the less likely they are to be observed. Little will be done. Global warming promises to become a gushing source of national hypocrisy."**

-- This column, July 1997

Well, so it has. In three decades of columns, I've never quoted myself at length, but here it's necessary. Al Gore calls global warming an "inconvenient truth," as if merely recognizing it could put us on a path to a solution. That's an illusion. The real truth is that we don't know enough to relieve global warming, and barring a major technological breakthrough we can't do much about it. This was obvious nine years ago; it's still obvious. Let me explain.

From 2003 to 2050, the world's population is projected to grow from 6.4 billion people to 9.1 billion, a 42 percent increase. If energy use per person and technology remain the same, total energy use and greenhouse gas emissions (mainly, carbon dioxide) will be 42 percent higher in 2050. But that's too low, because societies that grow richer use more energy. Unless we condemn the world's poor to their present poverty and freeze everyone else's living standards we need economic growth. With modest growth, energy use and greenhouse emissions more than double by 2050.

Just keeping annual greenhouse gas emissions constant means that the world must somehow offset these huge increases. There are two ways: Improve energy efficiency, or shift to energy sources with lower (or no) greenhouse emissions. Intuitively, you sense this is tough. China, for example, builds about one coal-fired power plant a week. Now a new report from the International Energy Agency in Paris shows all the difficulties (the population, economic growth and energy projections cited above come from the report).

The IEA report assumes that existing technologies are rapidly improved and deployed. Vehicle fuel efficiency increases by 40 percent. In electricity generation, the share for coal (the fuel with the most green-

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house gases) shrinks from about 40 percent to about 25 percent much carbon dioxide is captured before going into the atmosphere. Little is captured today. Nuclear energy increases. So do "renewables" (wind, solar, biomass, geothermal); their share of global electricity output rises from 2 percent now to about 15 percent.

Some of these changes seem heroic. They would require tough government regulation, continued technological gains and public acceptance of higher fuel prices. Never mind. Having postulated a crash energy diet, the IEA simulates five scenarios with differing rates of

technological change. In each, greenhouse emissions in 2050 are higher than today. The increases vary from 6 percent to 27 percent.

Since 1800 there's been modest global warming. I'm unqualified to judge between those scientists (the majority) who blame man-made greenhouse gases and those (a small minority) who finger natural variations in the global weather system. But if the majority are correct, the IEA report indicates we're now powerless. We can't end annual greenhouse emissions, and once in the atmosphere, the gases seem to linger for decades. So concentration levels rise. They're the villains; they

presumably trap the world's heat. They're already about 36 percent higher than in 1800. Even with its program, the IEA says another 45 percent rise may be unavoidable. How much warming this might create is uncertain; so are the consequences.

I draw two conclusions: one political, one practical.

No government will adopt the draconian restrictions on economic growth and personal freedom (limits on electricity usage, driving and travel) that might curb global warming. Still, politicians want to show they're "doing something." The result is grandstanding. Consider the Kyoto Protocol. It allowed countries that joined to castigate those that didn't. But it hasn't reduced carbon dioxide emissions (up about 25 percent since 1990), and many signatories didn't adopt tough enough policies to hit their 2008-2012 targets. By some estimates, Europe may overshoot by 15 percent and Japan by 25 percent.

Ambitious US politicians also practice this self-serving hypocrisy. Gov. Arnold Schwarzenegger has a global warming program. Gore counts 221 cities that have "ratified" Kyoto. Some pledge to curb their greenhouse emissions. None of these programs will reduce global warming. They're public relations exercises and they impose costs that are undesirable. (Note: on national security grounds, I favor taxing oil, but the global warming effect would be trivial.)

The practical conclusion is that if global warming is a potential calamity, the only salvation is new technology. I once received an e-mail from an engineer. Thorium, he said, I had never heard of thorium. It is, he argued, a nuclear fuel that is more plentiful and safer than uranium without waste disposal problems. It's an exit from the global warming trap.

After reading many articles, I gave up trying to decide whether he is correct. But his larger point is correct: Only an aggressive research and development program might find ways of breaking our dependence on fossil fuels or dealing with it. Perhaps some system could purge the atmosphere of surplus greenhouse gases?

The trouble with the global warming debate is that it has become a moral crusade when it's really an engineering problem. The inconvenient truth is that if we don't solve the engineering problem, we're helpless.

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## WITHSTANDING ENVIRONMENTAL SHOCKS

# How much are we ready?

CAPT GHAZI ABU TAHER

THE months of April and May have gone dry. The advent of monsoon is inadvertently tardy as it has not yet showered its rain as much as expected, that means we may have late monsoon. A late monsoon means a lot to an economy, when the economy, in particular is based on agriculture. The after effect is generally predicted to be abysmal.

The environmental changes are already evident. The ground water level is gone down drastically. The northern part of the country is showing signs of desertification. Unusual rise and fall in temperature is experienced every year. The wetlands, lowlands, canals etc are encroached upon by man in the name of development and civilization almost every day. Real estate business is at its boom and non-renewable resources are being indiscriminately spent up in abundance. Therefore the natural vengeance is felt at every step. It's not only in Bangladesh, but almost everywhere. However the condition of Bangladesh is rather precarious, over population may be the single great cause. Ignorance about environment may be the next.

We have meteorological department and research centres in our country that have the capacity and capability of having prognosis and data collection facilities exchanging/gathering information with from other/neighbouring countries. But no alert has been made so far to aware the class of people whose life and living is contingent upon cultivation and agriculture. A late monsoon is palpable as experienced by the people but why a research on that did not take place to provide necessary signal to the farmers in advance and of course a guideline to follow to face such crisis. We are helpless to nature alright but not totally without tools to face the odds more or less effectively.

Our technology is still of primitive type and the so-called bumper harvest is yet a dream when most of the rest of the world enjoys that practically. It is almost history now that we had ponds, rivers abound with fish of various kinds, fields full of paddy and trees full of fruits! The scene is just turning opposite. Probably Inbe-Batuta would have felt ashamed and scrupulously changed the line of his literary work describing this part of the planet as a dry, husky, and country rather than a green, tranquil country.

The major responsibility befalls us, because basically we have over exploited our land maliciously, due to which our sustenance is in jeopardy now. Our posterity would definitely



Water management is an answer.

throw the question, "Is this the kind of land you were supposed to leave behind for us?" No adequate sanitation, no pure drinking water, no fresh air rather heavy burden of loan and curse of poverty forwarded to the generations to come.

Now late monsoon is our concern. Late monsoon means less rain and less water means less irrigation to the fields and ultimately lesser yields. The chain reaction would definitely cause price hike of agro-products and augment poverty. Already the upward trend of price of daily necessities is being felt by people. We cannot make arrangements for rain to occur but our most important job is water management: The most challenging topic for the millennium. The respective government agencies, NGOs associated with above matter should have earmarked possibilities and guidelines to get into the job to alleviate the crisis situation.

Therefore the important tasks can be highlighted as collection, preservation and distribution (proper use) of water.

The following can be a guideline to achieve Good Water Management:

- Objective setting based on the needs.
- Water preservation: Statistically we should be able to find the total hectares of wet lands, low lands, ponds, lagoons, haors, baors, canals, rivers etc. and their capacity to hold water in cuses that can be used for irrigation at the time of need. A comprehensive hydrographic survey is essential.
- Gap analysis: As we know most of the rivers of our country have lost their draught. The charted datum has shrunk to lowest level. Many tributaries have already silted to death. Canals,

lakes, lagoons etc. are being filled up either with silt or encroached upon for human settlement. Therefore in rainy season the banks overflow and cause serious flood, people get marooned, waterborne diseases outbreak and immense misery are experienced.

- Brain storming: Personnel from planning, agriculture, ports and shipping, geology departments as well as politicians, economists, and the common peasants can discuss the problems and probable solutions.
- Idea generation: Based on the discussion ideas like hydrographic surveys, dredging, water catchments, water treatment plants, embankments etc. are sure to come up.
- SWOT analysis: Based on our needs and wants, the internal strengths and weaknesses along with the opportunities and threats can be discussed, reviewing social and economic conditions.
- Decision making: Such discussions must lead to decisions.
- Good governance: Good governance is necessary for implementing the important decisions.
- Very friendly relationship politically and/or economically with neighbouring countries must be maintained.
- Amicable political solution in terms of water sharing: Joint River Commission can play a vital role.
- A forward looking, development oriented foreign policy is also necessary to create a win-win situation in matters of dispute resolution.

I have seen while visiting Gibraltar that it has numerous water catchments at the foot of mountain. Rain water flowing down the slope is collected in those reservoirs. During dry season water is channeled to various places for plantation and vegetation. We are lucky that we have God gifted

free water, even then we suffer from its scarcity. In the Indian parliament debate took place on the issue of late monsoon. A clear picture was portrayed as to how they would face such a crisis, based on their water catchments and reserves.

We already have lost invaluable time. I hope the government agencies and the NGOs collectively can help the countrymen by just being proactive. However we must be ready with the following:

- Proper dissemination of information on causes, consequences and remedy.
- High yield seeds.
- Organic fertilizer to help revitalize the soil.
- Technical assistances.
- Water management.

Since our country is dependant on agriculture we should set priority to our demands.

Let's go back to late monsoon. Our meteorologists really need to be advance looking as weather and climate is our concern. Any deviation in nature adds extra outlays at the bottom line of the economy. Therefore the information sharing is quintessential. If we lack in very hi-tech equipments, still information can be downloaded from neighbouring countries, especially India. Regional cooperation enables access to such data. Further, periodical video conferencing can take place to share information and the interpretations. Finally training is highly crucial to update knowledge related to interpretation of weather charts, synopsis and prognosis, elucidation of satellite pictures, data processing and coordination between observatory stations. A strategic alignment process (SAP) is imperative between the knowledge existing and the technology in vogue.

We just do not want to overcome problems in the short term rather we should be ever ready to face the formidable odds boldly in changing circumstances. Economy should be able to withstand environmental shocks. Only question arises how far are we ready?

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## FOOD SECURITY

# Hybrid rice -- an alternative not an exclusive way out

DR. DEBASHISH CHANDA

BANGLADESH is an agro-based country and rice is the staple food of entire population. It is Bangladesh's most important and principal crop. Though Bangladesh produces about 27 million MT rice every year, yet we have to import about 1 million MT. With the effort and willingness of our farmers to grow more, we are standing in the first line of rice producers and our production is increasing day by day and import is decreasing year by year (2003-1, 112 million MT, 2004-0, 801 million MT, 2005-0.8 million MT and 2006 (Apr)-0.7 million MT).

In a recent review of World Rice Markets and Trade it was noted that "Global production in 2006/07 is projected at 407 million tons (milled basis), up by about 5.5 million tons from a revised 2005/06 estimate, with the largest increases forecast in China, Vietnam, Bangladesh and Brazil. Global consumption continues to outpace production and is expected to grow by 5 million tons to 423.2 million". Nevertheless, we still are in a deficit situation in rice production and have to depend upon import to a certain extent. So, we shall have to try to increase our yield and we have to do this with our limited facilities and land.

In China the average yield of paddy is 12 metric tons per hectare, in Vietnam it is 10 Mt/h and they could achieve it by using hybrid paddy seeds. So, if China and Vietnam could raise the yield of rice by using hybrid technology, why we should not? But it's not obvious that only hybrid rice seed we must use to get expected high yield. We have also some local varieties like BR-29 which is high yielding and in some areas of our country farmers are getting about 10 Mt/h. Moreover, they claim that, if there was no problem of deficit of fertilizer, irrigation, fuel and other essential materials, the yield must have gone up. But neither our government nor private sector can supply the farmers all their requirements for suitable cultivation as we have no control on fuel cost, fertilizer import and power supply. We also are not able to supply the quantity of quality seeds farmers need every season.

All the seeds being used by the farmers are not quality seeds. In our country only 18-20 percent of available seeds are quality seeds, of which the 'Seed Certifying Agency'

Mired in so many difficulties and so much of need, it's funny to talk about choosing these or those seeds. We must help farmers to produce more food on limited land, using less water, less labour, and lower chemical inputs, without harming environment and soil quality. So in fine, it could be said that, although hybrid rice cultivation has many problems and is highly expensive, yet we can take it just as an alternative to ensure food security, not as an exclusive way out.



certifies only 2-3 percent. On the other hand, farmers demanded that the seeds produced by different multinational companies should be certified by the 'Seed Certifying Agency' before marketing. Otherwise, the farmers are often cheated by purchasing these seeds.

The seeds farmers save from their own harvest for sowing without rouging and proper cleaning, do not ensure quality and result in lower crop yield. Bangladesh Agriculture Development Corporation (BADC), the major supplier of seed can provide farmers only 5-10 percent of their total need. The rest comes from different sources like private sector, NGOs and multinational

companies, which together also cannot fulfil even half of the total demand.

The public sector is trying to perform a wide range of roles from the development of a new variety of seeds to final distribution to the farmers. But lack of incentives for plant breeders and absence of an inter-institutional coordination are likely to constrain the development and promotion of new varieties, and limit the expansion of rice seed market.

In this critical situation of seed market, whether we like it or not, we have to depend upon imported seeds. Most of the imported seeds are usually hybrid ones, and we are

already being used to it although it has so many problems.

Hybrid rice is a result of crossing two genetically distant parents that produce superior offspring, which is based on the theory of heterosis or hybrid vigour. However, this heterosis disappears after the first (F1) generation. So, it is pointless for farmers to save seeds produced from hybrid rice. They will need to purchase new seeds every season, and it becomes so costly and almost beyond the purchasing capacity of small farmers. The price of hybrid seeds is very high, compared to its yield. Although we talk about higher yield, what one should realise is the high cost, against which usually the yield does not appear as expected. Now-a-days, farmers often complain about low yield, high pest and disease attack, low profit and poor eating quality. Also it is heavily reliant on fertilizer and pesticides, and a very poor techno-fix to increase yield. So, after all, it is too expensive to get high yield with hybrid seeds.

In spite of all these inconveniences our farmers cultivate hybrid rice and are ready to continue if it is affordable. However, most of them are now talking about the deficit of quality seeds of local varieties. It is really difficult to find quality seeds of local varieties in huge quantity as farmers need.

Whatever it may be, we have to feed our population, which is growing by the day (Bangladesh's population now stands at nearly 150 million, making the country the most densely populated in the world). It is terrible to think that while our population is increasing our cultivable land is decreasing yielding place to the population. (Agriculture experts also say the country is losing 80,000 hectares of land to industrialisation and urbanisation each year).

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# Importance of geological information

DR AFTAB ALAM KHAN

GEOLOGY is the mother science that contains a wide spectrum of physical, chemical and biological sciences. The earth itself and each particle of the system have evolved through definite physical, chemical, and biological processes. Geology being the science of the earth, nonetheless, has benefited human generations and society for long time. The human civilization has gone through various stages like Stone Age, Iron Age, Fossil Fuel Age, and has entered in the Nuclear Age. During every stage of civilisation, geology had played the key role for the benefit of the mankind and its survival, although the survival syndrome has repeatedly been changed. Although, geology did not emerge as a science in the past, the society, since historic time, has been immensely benefited as well as severely affected by three distinct geological ingredients like geo-resources, geo-environments, and geo-hazards. Among these three ingredients, geo-resources have contributed for the benefit and development of the society, while, geo-hazards have destroyed and ruined a society also. Geo-environment has been playing the regulatory role between the development and the destruction.

Our predecessors have found georesources and exploited them. They were aware that these resources have geologic limits, and they knew that someday these resources would be depleted. Depletion was a matter of concern for people, for communities, and sometimes for the entire nation. Now, from vantage points in space and in history, we have begun to see the actual dimensions of the earth and its resources and we have begun to realise how badly we have misused these resources. In the remains of the gold-silver workings at Cassandria in Greece, there is evidence that people dug in search of faulted vein segments at some time prior to 300 BC. Their Athenian contemporaries, faced with the depletion of silver and lead ore at Laurium, recognised the favourability of marble near a schist contact and sunk more than 1000 shafts through barren rock, some to depths of 100m, in search of hidden ore bodies.

During the sixteenth century, Georgius Agricola, a physician of Chemnitz, Saxony (Germany), published several essays on prospecting, mining, and metallurgy that dominated geologic thought for two centuries. Oil and gas exploration is also a very old pursuit. The Bible contains many references to the use of pitch or asphalt collected from the natural seepages with which the Middle East abounds. Herodotus, writing in about 450 B.C., described oil seeps in Carthage (Tunisia), and the Greek island Zachynthus.

Bangladesh is blessed with geologically occurring potential resources like coal, building stones including hard rocks, boulders, gravels, and gas in economically exploitable form. Contrary to geo-resources, geo-hazards can bring an absolute misery to the society and nation. Lack of proper understanding of geology and geological processes may bring misery to the society and nation.

He gave details of oil extraction from wells near Ardericca in modern Iran. Oil, salt, and bitumen were produced simultaneously from these wells. The first well in the Western world specifically sunk to search for oil appears to have been at Pechelbronn, France, in 1745. Oil and gas production in Illinois, USA began in 1853 when marsh or drift gas was produced from two wells drilled near Champaign. This gas came from rotting vegetation buried in the glacial deposits.

At the time, people knew little about where gas or oil came from, or how to search for it. Nevertheless, the control on the search, exploitation and development of these valuable resources has never gone to any one outside the region. They have developed themselves in every aspect of exploration, exploitation and development ensuring interests and benefits of the nations. Bangladesh, geographically, is one of the smallest countries in the world. In contrary, it is one of the most densely populated countries in the world. Nonetheless, it is blessed with geologically occurring potential resources like coal, building stones including hard rocks, boulders, gravels, and gas in economically exploitable form. In addition, white clay, glass sand, beach sand containing heavy minerals, and oil have also been found signifying their potential prospects.

The economic deposits of coal in Bangladesh became certain when the then Geological Survey of Pakistan (GSP), now Geological Survey of Bangladesh (GSB), first drilled exploratory wells in Jaipurhat in the year 1962. Subsequently, more discoveries of coal deposits were made by GSB at Boropukuria, Khalaspir, and Dighipara in 1985, 1989, and 1995 respectively. Phulbari coal deposit was discovered by BHP, a foreign mining company, in 1999. Much talked about oil and gas exploration activities for its finding begun as early as 1910. The first phase of the activities continued until 1933 during British colonial rule in India without any success. After the Second World War, the activities for finding oil begun in 1951 by major international oil companies like Shell, Stanvac, Pakistan Petroleum Limited, and by the national Oil and Gas Development Company (OGDC) and continued until 1971. Most of the gas discoveries were made during this phase. Coal, oil, and

gas play the prime role in meeting nation's energy demand and industrial development.

The oil and gas discovery activities in Bangladesh gained momentum in the early Nineties. However, very little and insignificant gas discovery, except the Bibiana discovery, was made in this phase of the venture. Currently, nation's entire gas resource is in the hands of foreign investors. The coal resource of the country is also on the verge of going to the hands of foreign investors. We are virtually ignoring the local investors and local geo-resource personnel defying the nation's interests. Our own discovered Jalalabad gas field has been gifted away disregarding billions of dollar revenue earning for the nation. Can we justify throwing away Moulvibazar, Feni and Chatak gas fields defying minimum interest of the nation? Even before the gas controversy is over, the coal drama has emerged. The country will loose about US\$37 billion if both Phulbaria and Boropukuria coalfields are given to foreign investors for open-pit venture. Unless, a nation has a very transparent policy and honest vision, it is very unlikely that geo-resources would ever contribute to nation building.

Contrary to geo-resources, geo-hazards can bring an absolute misery to

the society and nation. Earthquake is one of the major geo-hazards threatening life, property, and economic well-being of many nations. Death tolls from major earthquakes in recent time are 255,000 in Tang Shan, China in 1976; 10,000 in Mexico City in 1985; 9,783 in Latur, India in 1993; 13805 died and 167000 were injured in Bhuj, India in 2001. South Asia Quake in Pakistan claimed nearly hundred thousand lives ruining billions of dollars investment in a small region. The Asian tsunami, which was the result of a great earthquake has taken more than four hundred thousand lives and ruined billions of dollars investment. The economic loss in the 1995 Kobe (Japan) earthquake was more than US \$100 billion. Nations striving for full economic development may find the investments and progress of decades wiped out in a moment. Any physical phenomenon associated with an earthquake that may produce adverse effects on human activities is termed as earthquake hazard. This includes surface faulting, ground shaking, landslides, liquefaction, tectonic deformation, tsunami, and their effects on land use, man-made structures, and socio-economic systems. Land losses and riverbank erosions are the results of continuous changes in the destructive geological processes. Water resource depletion and groundwater contamination are the outcome of adverse geoenvironment regulated by geological processes. Lack of proper understanding and education or ignorance about geology and geological processes may bring misery to the society and nation.

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