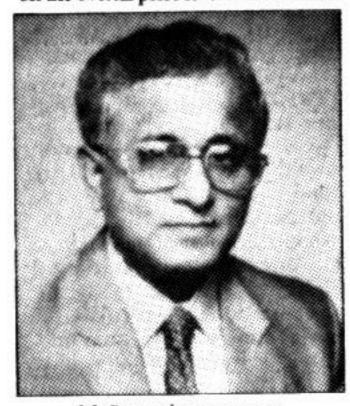
# 1995-96 Budget, Political Economy and Party Polemics

FTER listening to the Budget Speech of the Finance Minister, a friend of mine gave a sigh of relief. "It could have been much worse," he said. I agreed with him. Apparently the budget did not appear as politically motivated as some had apprehended. Going through the details of the Budget numbers my initial reactions were broadly confirmed. However, to make a final judgement one needs to go through the list of new projects in the annual development programme. I prefer to leave this to political enthusists and to research workers

Views have been expressed that the budget is business-friendly, and consumer-friendly. There are no new taxes, many tax rates have been revised downwards and import tariffs on a large number of items have been reduced. So, it should be good news for the consumers. But this is too simplistic a view. Tax accounts for only a part of the price index. The consumer prices index will depend on the changes in macroeconomic variables and their interaction with the real sector. In other words, it will depend on the balance of overall supply and demand in the economy. From this point of view, the 1995-96 Budget has some risks. In fact, all budgets have some risks, but those in this years budget are slightly different. According the fiscal measures there will be a revenue loss of Taka 350 crores which the Finance Minister ex pects to make up through adminis trative efficiency and better collection. In this respect the record of 1994-95, particularly for direct taxes. is not very reassuring. If the projected revenues loss cannot be made up as expected, government may have to go for borrowings. If the optimistic projection of inflow of foreign resources falls short of the target, and if the size of the ADP has to be maintained for political pur poses, deficit financing will be unavoidable. A very high level of food import has been projected both in the public sector as well as in the private sector. In the last week of June international wheat prices reached their highest levels in the past 16 years. International rice prices are also moving upwards. These are fac tors which might impact on the price level adversely

In his budget speech the Finance Minister has not discussed the most recent monetary indicators which are relevant for the projection of 4% rate of inflation during the year. The speech refers to the average of mon ctary expansion during '91-95. This is an incomplete picture. From the consumers point view, the most relevant indicators are those of the immediate past months as well as the trend for 1994-95. Looking at the monetary indicators, it appears that there is a substantial amount of latent liquid ity and monetary overhang in the economy. Though it has not yet been significantly activated, a careful look into the latest monetary statistics will show that the process has started. For the calendar year 1994, broad money increased by about 11%. But for the first quarter 1995 the rate of expan sion is almost 21% against a GDP growth rate for FY 1994-95 of 5%! Looking at the consumer price index, the gap between the general price level and that for the rural areas seems to be widening. In the first quarter of calendar year 1994, the Dhaka rural

price index increased by 3.6% against the general price index rise of 2.8%. In the first quarter of calendar year 1995, general price index increased by 6.2% over the same period of the previous year, whereas the index for the rural areas rose by 7.4%. There may have been some temporary fall in food prices in second quarter, but according to a recent announcement by the Consumer Association of Bangladesh, the overall price situa tion has deteriorated. There is clearly an increasing trend. If the food supply situation deteriorates due to less than careful import scheduling, or shortfall in production, the pressure on the overall price level will continue.



M Saveduzzaman

Recent reports about the situation in the Chittagong Port are disturbing. Moreover, the Finance Minister seems to have assumed that everything is fine with the distribution system of inputs. One can only hope that these assumptions are based on sound administrative measures and action plans. Low income and poor consumer

constitute about 80% of all consumers. High income, upper income, middle class and lower middle class consumers constitute the other 20% For this latter group there may be some advantages if the business community passes on the benefits of reduced duties and taxes on raw-materials, intermediate goods and final products. In a post-budget state ment the Finance Minister has expressed his dissatisfaction about the behaviour of the traders and businessmen. The intention of pleasing these vocal and urban groups of consumers may not be fulfilled, if past experiences are any guide.

We all know that economics and politics are intimately linked. We all know that there is a thing called political economy. But political economy is not be mixed up or confused with party

politics. I have studied with great care all the budgets presented by Mr Saifur Rahman — the first two during his earlier term, and the five budgets of his present term. I had the privilege of being associated with almost all the budgets of Bangladesh since 1973-74 until I left the Government a few years back I must say that the 1994-95 budget of Saifur Rahman was perhaps his best. Every item of economic policy reforms was expounded logically, professionally, analyzed from on economic grounds, and from the point of view of efficiency. The justifications for every policy meaby M Syeduzzaman

sure adopted by the Government were carefully analysed and established. This is totally absent in the budget for 1995-96. Perhaps not. Only on one issue, tax holiday, the Minister gave sound arguments why the tax holiday period should not be extended. The reasonings are economically and technically absolutely sound. But in announcing the decision he has taken a completely opposite position and extended the tax holiday period. One can only speculate that either the lobbying for extension was highly effective or that it was a political decision for obvious

unavoidable.

reasons. The issue is relevant from the

consumers point of view. If we look

at the tax structure, it appears that at

present almost 85% of our tax rev-

enue comes from indirect taxes and

only about 15% from direct taxes.

Until a few years ago, direct taxes

used to account for about 20% of to-

tal tax revenue. This change in charac-

ter of the tax structure with increas-

ing share of indirect taxes, always

puts pressure on the weakest section

of the consumers in all countries. If

the Finance Minister has any compen-

satory measures in view, these are not

clear from the allocation of resources

We hope the Minister will have some-

thing to say on this at some future

date. Another point which needs to

be mentioned is that a large section

of the people who live below the

poverty line is practically outside the

They depend on the vulnerable

group development programme, the

food for work programme and other

relief assistance. Looking at the allo-

cation for these items over the past

years, it appears that their total share

has gone down noticeably in recent

sector corporations is closely linked

with the welfare of consumers. The

Finance Minister in his budget speech

has expressed his dissatisfaction,

anger and disappointment about the

performance of these corporations

more than once. It might give the

impression that one part of the gov-

ernment is fighting another part. The

Minister has referred to the "laxity

and inefficiency" of public sector

corporations. This is only partly true

the government, government's mi-

cromanagement of many corpora

tions, their pricing policy, wages pol

icy, and pandering of the unions?

Like all previous governments the

government appears to be unwilling

or unable to overcome the organized

pressure of a small number against the

interest of a much larger number of

consumers in the rest of the society.

not to speak of the huge drainage of

the public exchequer, the rate of

which has accelerated. At the same

time a healthy public sector corpora

tion like the BCIC is being damaged

by the Government policy of selling

fertilizer and newsprint below their

costs of production, even when the

cost of production of some items

like Urea is well below the interna-

What about the overall guidance of

The performance of the public

monetized sector.

tional price! These measures are not consistent with the market oriented policy so strongly advocated by the Government. It is difficult to imagine of any consideration other than political in this respect.

On a slightly different note, the process of appointment of Finance Minister presents an interesting study. If we look at the appointment of Finance Ministers since liberation, we find that in this long period of 23 years only two elected public representatives were appointed Finance Ministers, Mr Tajuddin Ahmed was Finance Minister for about three years

If the projected revenues loss cannot be made up as expected,

Minister is therefore expected to maintain a balance in the midst of all these pressures, and to present a budget which is non-partisan, reflects professionalism, and is in the best in-

terest of the overall economy. We all know that economics and politics are intimately linked. We all know that there is a thing called political economy. But political economy is not be mixed up or confused with party politics. I can say with the loudest voice that Mr Saifur Rahman is a very competent professional and is perhaps the most competent Finance Minister Bangladesh so far had. But unfortunately in his last budget speech he has introduced party

government may have to go for borrowings. If the optimistic projection of inflow of foreign resources falls short of the target, and if the size of the ADP has to be maintained for political purposes, deficit financing will be

> and second person was Mr Saifur Rahman during his past tenure. In between and after that, we had Finance Ministers who were respected personalities like an educationist and professor of history (Dr. A R Mallik), a reputed professor of economics and political personality (Dr M N Huda), a technocrat with engineering background (Dr. F U Mahtab), a politically oriented bureaucrat (Mr A M A Muhith), an apolitical technocrat (the present writer), a Major-General (General M A Munim), an internationally reputed Bangladeshi economist holding a foreign passport (Dr. Wahidul Huq), and at times Chief Martial Law Administrators and President (General Ziaur Rahman and General Ershad). A pertient question is, why it had to be like this? This has happened also in Pakistan and India (Dr Mahbubul Huq, Sartaj Aziz, Mohammad Shoaib, and others in Pakistan, CD Deshmukh, H M Patel, Sachin Chowdhury, Dr Dantvate, Dr

Monmohan Singh in India.) From my long periods in the Finance Department of then East Pakistan, in the Ministry of Finance. Government of the then Pakistan. and in the Ministries of Finance (and Planning) in Bangladesh, I perceive three reasons for this. The first is the thinking, attitude, and judgement of the Head of the Government. whether a President or a Prime Minister. The second is the special feature of the work of the Ministry of Finance — need for a minimum amount of professionalism, certain technical ities and need for continuity. The third dimensions is the influence of the Ministry of Finance on the overall management of the economy. Every Finance Minister has to be responsive to some sensitivities of the Head of the Government. When a Finance Minister with clean conscience is unable to support unreasonable personal agenda of the Head of the Government, he has to quit. Secondly, no Finance Minister can start with a clean slate. There are ongoing projects, ongoing policy reforms. ongoing public commitments at home and abroad. Thirdly, the Finance Ministry is perpetually under pressure from other Ministries and agencies of the Government, from obbies by different actors on the economic scene, as well as from the Head of the Government, not to

speak of pressures from donors and

international agencies. The Finance

polemics, as if to score points over political opponents. I feel strongly that this has to avoided by all Finance Ministers. Unless this tendency is resisted, it may become a pattern and a trend may be set for the future, which will not be in the interest of the society as a whole. Every Finance Minister has to make special efforts that the professional character of the budget is not compromised, and that it is not tainted by party polemics. Here I draw the attention also of others who are keen to form the Gov-

ernment in future. The Minister's speech has referred to "economic anarchy" of the 1972-75 period. The relevance of this is not quite clear. In my opinion a better description would have been 'economic unrest". I feel that all those who consider themselves as professionals, have to keep the realities in perspective. I would like to remind all professionals and economists that the emergence of Bangladesh coincided almost to the date with the Smithsonian Agreement of December 1971. That Agreement brought to an end the original Bret ton Woods System. The violent changes that followed in the international economic scene, threw out of balance even the most competent professionals in the industrial coun-

In his budget speech the Finance Mini**ster has not** discussed the most recent monetary indicators

which are relevant for the projection of 4% rate of inflation during the year.

tries. Then came the first oil shock. In most OECD countries, not to speak of developing countries, the professionals and politicians were grappling with rapidly changing situations to keep the economies under control, and in many countries gov ernments changed. In Japan, where inflation is a taboo, the rate of inflation reached 20% in 1973-74 Bangladesh was a war devastated country in that period, with an empty exchequer, zero foreign exchange reserves, a disorganized national administration, and trying desperately to establish its identity. In this situation the country had to face the impact of the first oil shock and of the

unprecedented international infla-

the waste products of a nuclear

power generation is plutonium an ex

tremely toxic substance: just inhaling

riod. Along came the world food crisis. The prices of everything that Bangladesh had to import, food, petroleum products, fertilizer, cotton, cement, edible oil etc went up 3-4 times in that period. The Finance Minister has referred to the inflation rate of 60-65% of that time. Mentioning this in isolation without reference to the attendant domestic and international factors is not a professional approach. One has only to look at the situation in Russia and other members of the former Soviet Union in the recent few years. Inflation of the level of 400-500% was very common in most of these countries in the early nineties. The reasons are known to all professionals. These are new countries with transition to a new system. Speaking of 1972-75, Mr Saifur Rahman was even then a prominent, recognized, and successful professional. He was appointed a member of the first National Pay and Services Commission. He had access to the inner picture of public resources and of the fiscal situation. Even with 60-65% inflation the commission fixed the highest salary of a public servant at Tk 3000/- per month, the same that prevailed in Pakistan. I am not aware of any note of dissent on professional grounds by any of the member

tion, the worst in the post war pe

of that Commission. person. In his budget speech he has quoted Joseph Schumpeter, quoted port, the Human Development Report and a report of the Asian Development Bank in support of the sucquote the great Greek Philopher. times leave politicians behind. mid-course correction is necessary due to the reluctance of the policy

The Finance Minister is a well read

from the World Development Recess of our economic efforts. I was looking for some quotations from the Bangladesh Bureau of Statistics or from the latest Household Expenditure Survey. As an admirer of the Finance Minister I feel tempted to Heraclitus (540-480 BC) who said that the only permanent thing in life is change. Perhaps the exact quotation is "nothing endures but change." This applies to politics as well as economics. Economic situation particularly, is ever changing and may a would therefore draw the Finance Minister's attention to the need for continuous caution and monitoring of the Budget. For some years now we have become used to a low level of inflation. In fact this is Mr Rahman's singular achievement. But this may change, and it is in this respect that I request the Finance Minister to remain vigilant. If the food situation or the revenue situation changes and the Finance Minister must not hesi tate. Such corrections should not be taken as policy failure or political failure. Professional management calls for adjusting policies with changing circumstances. We have seen what happened to the economy makers to adjust to changing domestic and international situations in 1974, as well as in 1981. Refusal of the policy makers to adjust the exchange rate in 1974 brought serious damage to the economy. Again, refusal of the policy makers in 1981 to reflect the international oil prices in domestic pricing, and to adjust the exchange rate with rising domestic inflation. brought serious macroeconomic imbalances. I am sure none of us wishes to see such mistakes in the future in any area of economic policy making

### CONSTITUTIONAL CRISIS

## In Search of a Way Out

#### 'Solution is Possible without Amending the Constitution"

An Interview with Barrister K S Nabi, Law Secretary of Bangladesh Awami League, by Chapal Bashar

ARRISTER K S Nabi, Law Secretary of Bangladesh Awami League, believes that scope still exists to solve the ongoing political crisis without amending the Constitution.

"Solution of the problem through the provisions of the existing Constitution is possible, if the ruling party wants it," said Barrister Nabi in an interview with The Daily Star. Nabi expressed his views in the light of Awami League's stand on the demand for holding general elections under a caretaker government and suggested possible solutions to the constitutional crisis created over the issue.

The AL leader held the ruling BNP responsible for the political impasse saying, "The government itself created the Constitutional crisis and now is trying to derive benefit from

He alleged that after the resignation of 147 members of parliament, the BNP had not been running the country according to constitution.

The BNP is in government while the House is half-empty, the parliament is devoid of the power to amend the Constitution", he said pointing out that according to requirement under Article 142, the parliament itself cannot exist for not having such power.

"That is why our party-chief Sheikh Hasina repeatedly said that the BNP is ruling the country with an unconstitutional and illegal parliament, and therefore, she demanded its dissolution long ago," Nabi added.

The legal adviser to the AL also referred to Articles 65(2), 52 and 83 of the Constitution and said, "Considering provisions under these Articles, it can be clearly stated that the Constitution has been violated by keeping this half-empty and oneparty parliament alive."

He maintained that BNP could dissolve the parliament long before the submission of resignation letters by Opposition MPs on December 28 last and could come forward for holding fresh elections through an understanding with the Opposition. "Then the nation would not have plunged into this crisis and uncer

Nabi mentioned about British Prime Minister John Major's decision for having a fresh mandate from his party and the mid-term election in Nepal saying, "These are the bright examples how parliamentary democracy functions without creating any

Dismissing ruling party's contention that they cannot go beyond constitution, Nabi said, "It appears that the BNP is the only custodian of the Constitution in preference to the opposition parties who represent 69 per cent of the population. We also bear responsibility to safeguard the Constitution and we are very much aware of that."

Nabi termed ruling party's statements on this point as self-contradictory and said, "BNP leaders claim that they are running the country under the Constitution. But, on the other hand, they say that amendment to the Constitution is only possible with the participation of the opposition MPs who resigned long ago. Such statements only reflect their ignorance of the Constitution and it will not be unfair if we say that they just want to cling to power."

As regards possible solution of the present Constitutional crisis, he said "solution is possible under this Constitution." Elaborating his point, Nabi said, "A caretaker government for holding elections, as suggested by all the major political parties, can be formed without amending the Constitution."

In support of his contentions, Nabi suggested that the Prime Minis-

ter may advise the President to dis-



solve the parliament and the President can do it according to the provision of Article 72 of the Constitution. "Then the very basis of the Cabinet headed by Begum Khaleda Zia remains no more as she will be no longer a member of the parliament while the President will be free to choose any person to head the care taker administration until the next election which must be held within 90 days of dissolution of parliament according to Article 123(3)."

"After such dissolution of the parliament. the President is not constitutionally obliged to invite any person commanding support of the majority in the House as there will be no existence of parliament from which such majority is to be ascertained, Nabi argued and said, "even Article 56(4) will not oblige the President to request the present Cabinet to carry on as a caretaker government until the next polls.

"In other words", Nabi said, once a parliament is dissolved, the very source of present government's existence ceases to be there and in such a situation the President can form a neutral caretaker government on the basis of wishes, suggestions, and nominations from all political parties of Bangladesh including the BNP. Therefore, no amendment will be necessary.

Nabi also supported the idea from certain quarters which suggests formation of a caretaker government with the persons who will be elected members of parliament through byelections. "The idea is not had equal number of members from the ruling party and the Opposition may be nominated and elected in the by elections on the basis of consensus of both sides and these people will form the caretaker government and run the administration until the general elec-

According to Nabi, the concept of a caretaker government exists in the Constitution since the aim and objective of the Constitution is to ensure democracy which is stated in the Preamble and in Article 8.

tion is completed.

"Solution under this Constitution is possible if there is will and good intentions," he repeated.

The AL Law Secretary observed that post-facto ratification of any amendment to the constitution is possible to meet a necessity arising out of grave national crisis and the last precedent in this regard was the 11th amendment to the Constitution which validates the existence of the present government.

Replying a question, Barrister Nabi discounted the apprehension that any arrangement relating to Constitutional amendment with retrospective effect may be challenged in the Supreme Court. He maintained that if the major political parties reach an agreement on the issue of holding elections under a caretaker government, then it will be considered as a national consensus. Nabi expressed the hope that the highest seat of Judiciary will act accordingly in exercising its paramount power conferred upon it under Article 104 of the Constitution.

## Is Nuclear Power the Answer to Bangladesh's Energy Crisis? by Aasha Mehreen Amin

decades, talks of possible revival of a nuclear power plant in Bangladesh abandoned due to lack of financial backing, has made front page news in several dailies recently. The 550 MW nuclear reactor at the Rooppur Nuclear Power Plant (ENPP) in Pabna has been the subject of many negotiations, with several countries including Russia and Canada showing a keen interest to finance the project. Yet inspite of a feasibility study in the early 60s by a US firm that clearly approved the project, the RNPP has remained only a dream of the Atomic Energy Commission. Nuclear enthusiasts have blamed the successive governments of this country for their lack of initiative in getting foreign investors to back the technology that would need an initial investment of US \$600 million. Recently however, talks between the Atomic Energy Commission big wigs and the government indicate a slight possibility of the Rooppur nuclear plant becoming op-

The question is however. — do we really need this plant, if it does at all materialize? The initial response would be yes, for energy hungry Bangladesh whose gas reserves will be exhausted as early as 2015. Moreover. gas fired power plants in the country have an efficiency of only 33 per cent compared to the 90 per cent effi ciency of nuclear powered plants. And there's more to point out just how good nuclear energy is. The nuclear reactor will provide energy of a much cheaper rate than any other present source of energy and also can be used extensively in various sectors of the country including industry and

agriculture. But wait a minute. Aren't we forgetting something? It hasn't been that long since the Chernobyl disaster (1986) for us to go totally nuclear crazy. Of course, say the nuclear enthusiasts, the Chernobyl accident was due to faulty equipment and even faultier handling of the equipment So what guarantee is there that Bangladesh will be immune to such

possible discrepancies? Dr Saleemul Huq, Director of Bangladesh Centre for Advanced

FTER more than three Studies (BCAS) and a noted environmentalist says that there are no such guarantees. For a country as densely populated and situated in a seismically active zone (prone to earth quakes), a nuclear plant is not a good idea, he says. Then there is the question of nuclear waste disposal that has remained unsolved - where are we going to dispose of the waste and if it is somewhere far away from the plant, say (hittagong, how can we guarantee the safe transport of such hazardous waste? If the truck or any other vehicle carrying it has an accident it will mean a large proportion of radioactive matter spreading into the atmosphere".

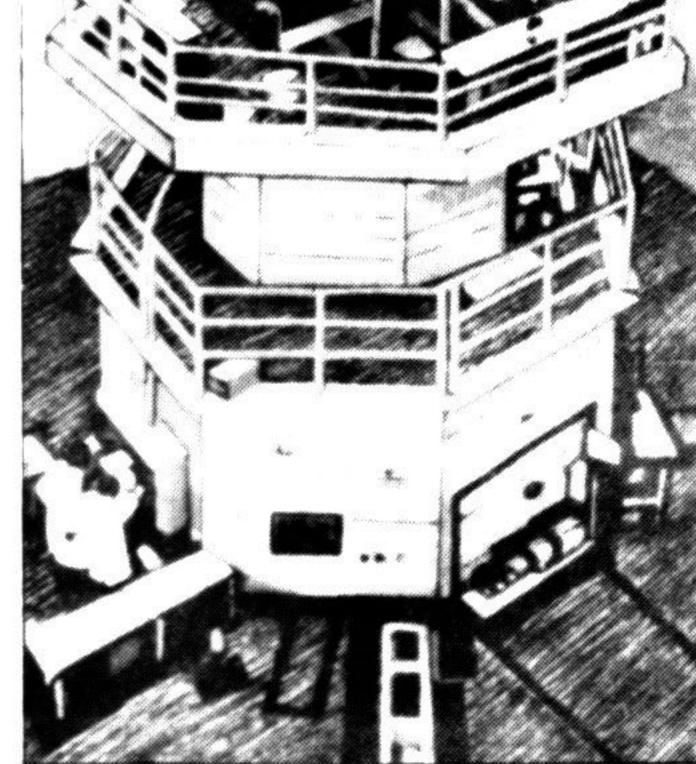
Operating the plant, he continues, requires a high level of sophisticated skills that are very different from those needed for ordinary power generation and so this must be ensured. There will also be a lot of extra nuclear waste with low level radio activity from the special clothes, gloves etc worn by the operators. "So the plant will generate a large amount of radio active rubbish that Bangladesh will be stuck with," says

There is also the issue of decommissioning of the plant i.e getting rid of the plant after its utility has finished, a period of say thirty to forty years. This is a very costly process and more importantly, we will be leaving our children this nuclear legacy. points out the environmentalist.

The plant's total cost which must include environmental considerations, in Hag's opinion, makes it economically not viable. Hug thinks the enormous capital investment needed for the nuclear power plant to become operational, makes chances of it becoming a reality, quite slim and so is not an issue for environmentalists at the moment.

Perhaps they should not be so complacent. Only this May, members of the Atomic Energy Commission's implementation committee held a meeting with its Chairperson, the Prime Minister, to discuss the viability of the plant. Says Dr M A Qayyum. Chairmen of the Atomic Energy Commission, 'we have been asked to give a proposal and the government will consider whether to approve it or





A SKETCH OF THE TRICA MARK IS REACTOR FOR THE AERE SAVAR

not." One possible way of financing the project, says Qayyum is through a joint venture of Bangladesh and private foreign funds. So far USA, China. France, Russia and Canada have shown keen interest in the project

As for the environmental concerns, says Qayyum, the Energy Commission has taken them all into account in planning the Rooppur plant so that there are no loopholes and maximum safety will be ensured 'Quality control will be very strict and operators will be highly skilled. We will have a plant to reprocess the waste material and then have a separate unit at the power station itself to store it. The radio activity becomes lower over time. We will also have a decommissioning plant which is why the initial capital cost is so high."

Qayyum further adds that there is no possibility of accidents akin to Chernobyl's and the one at Three Mile

Island in California which were due to faulty operating or faulty design. \*Nowadays, he says the quality control rules of reactors are even more stringent. Before a reactor is established there are many stages to go through such as site approval, getting construction and operating permits, criticality test, and so an. Only after all safety rules and regulations are met

can a reactor start operating. There is no doubt that a nuclear power station will greatly fulfil Bangladesh's energy needs. According to Atomic Energy Commission estimates, the annual saving in fuel cost by using nuclear fuel instead of oil. will amount to over a hundred million U5 dollars. Fast depleting gas reserves will be saved and a reliable source of electricity will boost up the econ-

Yet the environmental implications just cannot be ignored. One of

0000001 grams of it can give you lung cancer. What happens if the nuclear waste somehow leaks out of its storage unit? Plutonium has a radioactive half-life of at least 24,400 years, which means it will be in the soil ten thousands of years contaminating plants and water. What would be the fate of the thousands of people living in and around Rooppur, one shudders to think. The more sensible alternative to nuclear power is solar energy which is environmentally friendly and inspite of the initial high capital cost, is something that will

live forever — as long as the sun shines on us. Experimental solar energy projects have been very success ful in of Bangladesh. Investing in it would give the country an endless source of energy that would be much cheaper than nuclear energy. Wind and biogas are also valuable sources of energy that have no adverse ef fects on the environment. Clearly, in world already so threatened by environmental degradation these alternatives should take precedence over an energy source that may prove to be more hazardous than good. It certainly beats waiting for a nuclear nightmare to happen at any point in time.

## Wary Eye on the Hot-Spots as the Sea-Bed Erupts by Pamela Cowan writes from London

cruption which began in early line under Tonga's Ha apai Islands is still crupting but is a quiet affair, as volcanoes go — a

series of small explosions. The South Pacific volcano has formed an island about a hectare in size and about 15 metres above sea level. Clouds of ash have reached heights of 2.450 metres and ships and aircraft have been advised to avoid the area.

Volcanoes are rarely the killers they used to be, says Dr John Murray of the department of earth sciences at Britain's The Open University. The worldwide death toll between 1969 and 1993 was 1,009, according to the Red Cross 1995 World Disasters Re port. Another 279 people were injured, 12,513 left homeless and 94,665 affected in other ways.

But even when the roughly 60 eruptions a year from the world's 500-600 active volcanoes do not kill people directly, explains Dr Hazel Rymer, a geophysics research fellow at The Open University, death can come from secondary causes," such as when cows quit giving milk because the crops have been covered (with volcanic ash) or when floods are triggered by snow melt, or when communication networks have been knocked out as a result of the volcano.

In April. about 5,000 people in

Cape Verde were evacuated to the coastal villages of San Filipe and

Moisteiros when the Fogo volcano

began erupting. Dr Rymer adds that it is not only people living on the flanks of active volcanoes that are affected by eruptions. The Mount Pinotubo eruption in the Philippines in 1991 reduced global temperatures which affects the ability of farmers to grow their crops,

Contrary to Hollywood's version of voicanoes, great balls of fire and thunderous roars do not precede all eruptions, says Murray. In fact, it is the quiet ones you have to watch out

which in turn affects the global

Murray cites his experience on Mount Etna, Europe's most active

When he and two colleagues started monitoring the Sicilian volcano one morning in 1986, the volcano was totally silent, though it had been erupting steadily for 10 days.

But there were cracks in the ground — a sign that a major change had occurred. "By the time we were working our way down the volcano, huge clouds of ash and rocks were blown out — we call them bombs.

"We were about one kilometre from the vent when bombs were thrown 600 to 700 metres in the air.

We could hear a sound like the rushing of the wind and the range of the bombs was increasing rapidly. Within

the space of one minute, the rocks

increased their range to two kilome-"Soon there were falling bombs every 100 metres which sounded like artillery shells and they left craters two to three metres across. We could

feel the heat of the eruption even

though it was a mile away." Murray's team wear gas masks and helmets when they work, but helmets would not have saved them had they been hit by one of Etna's "bombs, estimated to weigh a quarter of a ton. Fortunately the trio, and two tourists they warned as the raced

down the slope, escaped the volcano's wrath. Mount Etna has been active for

3,500 years and hundreds of eruptions have been documented. The volcano is one of about a dozen the International Association for Volcanology and Chemistry of the Earth's Interior has targeted as high risk and are monitoring in a special project during The International Decade for Natural Disaster Reduction.

Two areas are being kept under particular scrutiny, says Murray:

'Mammoth Mountain in the United States — increased emissions of carbon dioxide gases have led to speculation of movement in the magma (molten rock):

'Volcano in the Mediterranean Sea, the origin of the word volcano. It was active for several thousand years, only stopping for two brief periods. Its last eruption was in the 1890s, but gas emissions have increased recently.

Although scientists cannot prevent volcanic eruptions, says Rymer, their effects can be mitigated.

"Monitoring volcanoes is helpful for civil defence officials when they are deciding whether it's worth bombing a volcano to divert the lava flow," she says, "It also means peace of mind for civilians who are living around a volcano because it adds to their quality of life if you can say a volcano is entering a quiet stage."

Scientists monitor volcanoes by measuring shifts in the ground caused by rising magma, as well as thermal heat output and gravity changes.

Ground deformation can be measured by various surveying methods, which include the use of strategically placed satellite receivers which detect horizontal and vertical movements down to a centimetre. Satellites can also obtain thermal images of volcanoes, so when an eruption takes place its progress can be moni-

tored — GEMINI NEWS About the Author: PAMELA COWAN is a Canadian journalist on a scholarship at Gemini News Service.