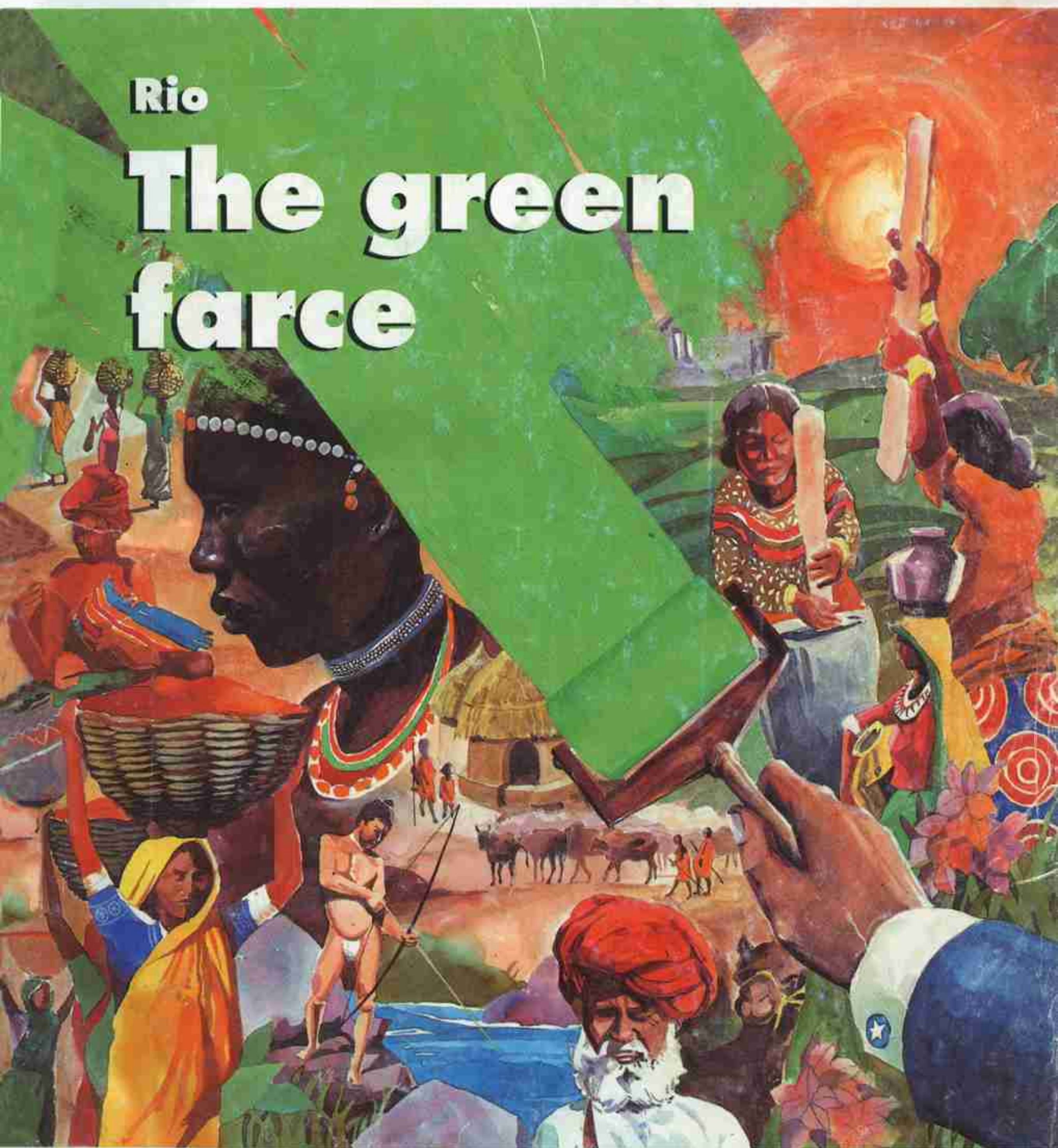


# Down To Earth

MAY 31 1992

Rio

## The green farce



Environment vs liberalisation  
Arunachal's declining forests  
Row over patenting human genes



## ANALYSIS

# The global green farce



**At UNCED the industrialised countries do not want any serious restructuring of their economies or their lifestyles to save the earth. But the Brazil conference will see a major effort to get developing countries to share the burden of change. Desperate for hard cash, the South will most probably go along and the conference will be hailed a success**

**ANIL AGARWAL & SUNITA NARAIN**

*It was something that nobody would have expected to hear at a global environment conference. The scene: the last preparatory committee meeting for the Rio conference. The US delegation suddenly threw a bombshell. It demanded that all references to control of overconsumption be deleted as these had "very low priority" in industrialised countries.*

*Developing countries immediately retaliated by asking for all references to the environmental impact of population growth to be deleted.*

*Finally, USA had its way. While references to population stayed in, two key paragraphs on unsustainable patterns of consumption and production were bracketed — UN procedure to denote an area of disagreement open for further negotiations — under US insistence.*

**18** THIS exchange between the North and South, which took place at the last preparatory committee (preprom)

meeting held in March in New York, is a good example of the antagonistic and often farcical debate that the UN Conference on Environment and Development (UNCED) — billed by its high profile secretary general, Maurice Strong, as "the last chance to save the earth" has been reduced to. And it also shows how little developing countries have been able to achieve at the conference.

With just a few weeks to go before UNCED begins in the Brazilian city of Rio de Janeiro, the fate of the earth looks bleak. No agreement has yet been reached on any of the critical issues before the conference and the North-South divide has only sharpened.

The US President, George Bush, has stated categorically that he will not attend the conference if it will mean less American jobs. Faced with the prospect of writing what has been called the largest cheque for environmental damages, the US government has tried to divert attention towards environmental problems in the South. When talks on global warming began to heat



up in 1990. Bush conveniently told the Group of Seven (G-7) Summit in Houston that it was not possible to argue with any certainty that high carbon dioxide emissions would cause global warming. But in the same breath he argued for a global tropical forest convention so that the South can protect its forest resources better and reduce carbon emissions arising out of deforestation. In one stroke, the US President changed the global warming concern from one relating to too much energy use in USA to too much logging in the South.

The Southern leaders, in turn, have failed to seize this opportunity to become the environmental spokespersons for the world. Their insistence that they will participate in the global environmental clean-up only if they are assured additional aid and technology transfer at preferential terms, has largely met with derision. The suggestion of a Green Fund by the Group of 77 (G-77) has been described by western diplomats as the Greed Fund. Western environmentalists have unabashedly criticised the Southern position as "blackmail": "For once, we want something from you, and now you are holding us to ransom." This stand-off notwithstanding, UNCED will most probably grind its way to what the North will finally describe as a "modest success". Worried that Bush's absence from Rio could destroy UNCED, his Brazilian counterpart, President Fernando Collor has reportedly requested him on phone to come, saying his presence is critical. Northern leaders themselves are under public pressure to make the conference a success, which mainly means that the proposed treaties on global warming and biodiversity should get signed in Rio.

Therefore, the last two months in the run-up to Rio have been spent on hammering out compromises and watering down commitments. Strong recently admitted, "Weasel words are creeping in."

The South, battered by foreign debt and adverse economic conditions, is not keen to lose any of the green dollars and yens that may come its way. A high-level Brazilian delegation despatched by Collor to meet Prime Minister Li Peng of China and P V Narasimha Rao of India told them that even a fund of a few billion dollars should be good enough for the South to accept.

## Global challenges

There is no doubt that the world faces an enormous environmental challenge. The world's rich have been living well beyond the means of global ecology. There are serious threats to the ozone layer, global climate and the oceans. Simultaneously, vast areas of croplands, grasslands and forests in the South are being degraded to produce luxury biomass goods and mineral products to meet the needs of the rich.

The world's market systems are failing to set prices in a way that they include the ecological costs of production. In this entire process, developing countries are getting shortchanged and the worst impact of environmental destruction is getting passed onto the world's poor. Products ranging from tea, coffee and cocoa to peanuts, prawns and pineapples — all of which are produced by developing coun-

tries at heavy ecological costs — have been suffering from declining terms of trade. This results in increased distortion of local land use systems. An FAO estimate claims that 14 per cent of the South's croplands are devoted to cash crop production for the rich nations.

Developing countries cannot easily opt out of this vicious cycle. The international monetary policies set by the IMF and the World Bank have led to a crushing debt burden. This forces developing countries to put their land and water resources at the service of the world market. In fact, the devaluation of local currencies enforced by IMF's structural adjustment policies has made local ecological resources increasingly cheaper on the world market.

But UNCED has made no attempt to address such issues. The agenda before the conference is, thus, largely North-determined and intensely political. It makes no attempt to deal with the issues of survival or the global economic and cultural processes that cause the problem.

An example of UNCED's brave attempt to deal with such issues is contained in one subpara in its 700-page-long Agenda 21, which asks for coordinated action to reduce the debt owed to commercial banks by developing countries. But even that paragraph has been opposed by USA and it now merely refers to the need for negotiations between debtor countries and the creditor banks — a weasel statement indeed!

So what are the earth-shaking things that UNCED will be discussing? The conference is tied into knots discussing, at one level, everything under the sun, from soil erosion and drinking water to war and disease. But underlying the apparent confusion of tonnes of papers and four prepcoms, there are, at another level, about half a dozen political issues that mark the ecological deadlock.

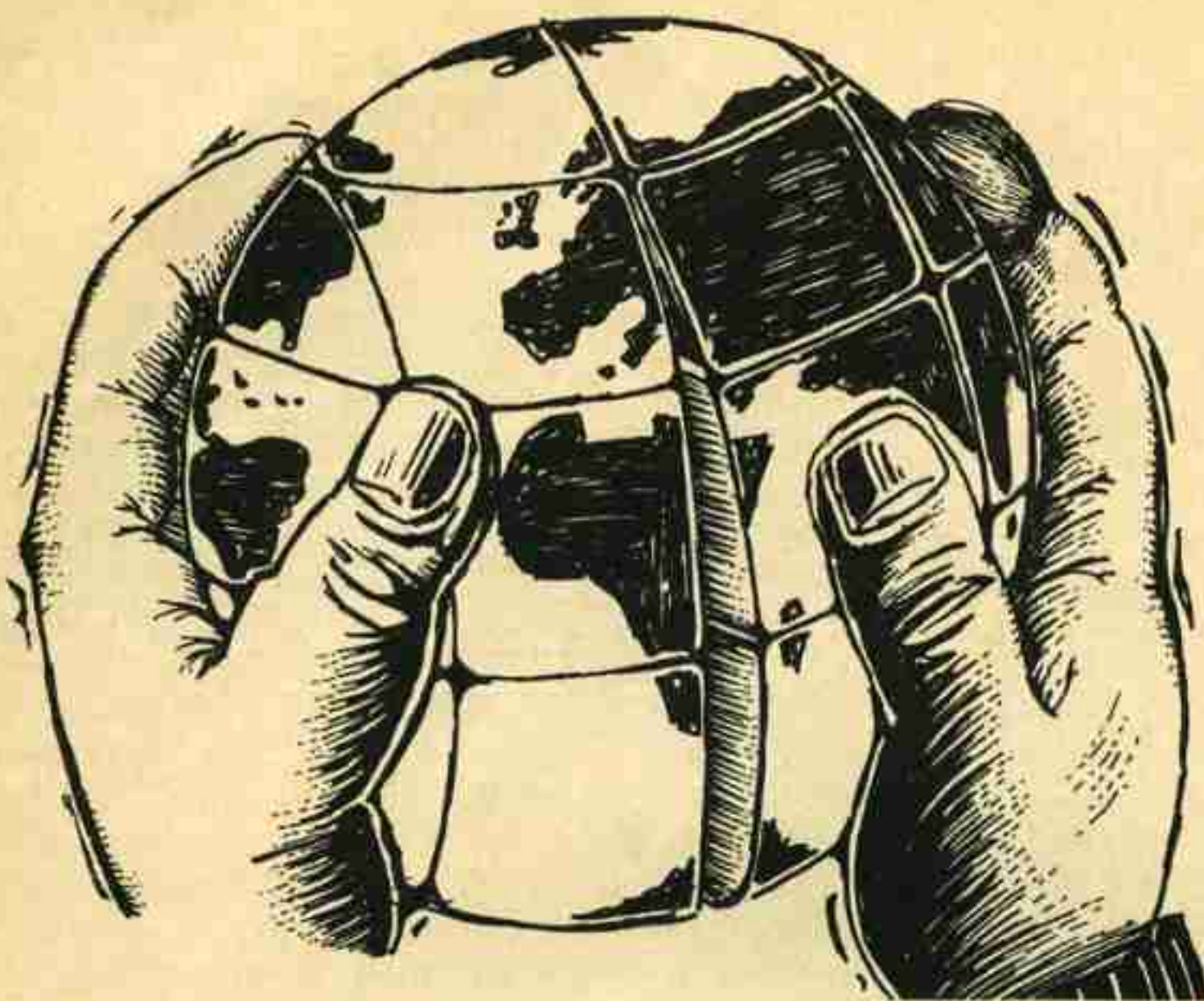
## The Earth Charter

The first bone of contention is the Earth Charter, which has now been renamed the Rio Declaration on Environment and Development at the insistence of the South because it is wary of the very environmental

The rich world's view — from the International Herald Tribune







connotation of the name. The declaration contains a non-legally binding set of principles. But the South sees this declaration as soft law which could get used to govern economic aid.

The debate centres around a key choice: earth first or people first. The North wants a poetic and inspirational document. But the G-77 wants a political declaration which firmly asserts the sovereignty of nations and puts the onus on the North to change its unsustainable consumption. The most vitriolic discussions have centred around the G-77's insistence on underlining each nation's "right to development".

At the New York prepcom, talks broke down completely. Finally, the chairperson of the conference, Tommy Koh of Singapore, desperate to get at least one thing whole and without brackets to Rio, steamrolled an extremely fragile consensus. He shepherded a core group of countries into a room; a rough draft of the declaration was put before them; two contending factions were identified and each entitled to put forward a "trade-off package" on each controversial issue; and, each was allowed only 50 per cent of the principles they favoured.

Just a few hours before Koh caught his plane back home, the chairperson's draft declaration was accepted by all countries, except Israel whose objections to the mention of occupied territories were swept aside. But most Northern delegations see it largely as a G-77 draft. Therefore, while agreeing to support the draft declaration in deference to the chairperson's wishes, they recorded their unhappiness with the "unbalanced" character of the draft. The US delegation particularly objected to the principle which linked unsustainable consumption patterns to environment degradation. The fight will now be taken up again in Rio.

## Agenda 21

The most copious document before the conference is Agenda 21 — Agenda for the 21st century — prepared by the secretariat as a global checklist of programme areas for saving the world's environment. The 700-page draft contains details of over 110 programme areas focussing on anything under the sun, from land to war

and from poverty to consumption.

The New York prepcom saw frantic efforts to negotiate the document before it closed. Delegates managed to wade through the least contentious bits, which gave Strong a chance to hail this progress as "Herculean". But Strong also admitted that "this most extensive and comprehensive international programme ever developed" was useless until it had the requisite means — money, technology, laws and institutions — to get it implemented.

## Green money

Not surprisingly, the hottest issue in UNCED is money. By the end of the last prepcom there was a total deadlock. The UNCED secretariat has costed each item to estimate the full price of implementing a global programme for sustainable development — from green villages to a green globe. According to the secretariat, the quantum of foreign aid needed to implement Agenda 21 is US \$125 billion annually — more than double the present aid transfers from the North to the South. In addition, developing countries will need over US \$600 billion from their own coffers. The secretariat has estimated that the investment needed for the amelioration of global environmental issues is about US \$15 billion a year.

The contentious issue is how much aid will actually be given and how the funds will be managed. The G-77 wants clear commitments from the North that it will share the cost of change to a sustainable future; the funds will be compensatory in nature and additional to the present aid budgets; each global convention will have a separate fund; and, in addition, there will be a Green Fund to pay for the implementation of Agenda 21. The G-77 has asked for 0.7 per cent of GNP to be given as ODA by the end of the century.

The G-77 does not want the funds to be managed by the Global Environmental Facility (GEF) which is administered by the World Bank. It wants a new democratic organisation to manage these funds.

The financial discussions have not gone anywhere. The North has dismissed the concept of compensation — that is, paying for the environmental damages caused. When a compromise paper was presented by the North at the last prepcom, the G-77 found it vague on the concept of additionality and without any time-frame for reaching the 0.7 per cent target. Worse still, it included a wide loophole for the reluctant by adding a weasel sentence, that only industrialised countries "in a position to do so" would reach the target. The North also insisted that the GEF is "the appropriate multilateral mechanism" for financial transfer but added a sweetener by accepting the need for equal participation of donor and recipient countries in the fund. The G-77 instantly rejected the proposal as "non-serious" and stopped any further negotiations.

Discussions on this tricky item were resumed again



in mid-April when a meeting of "eminent persons" was convened by former Japanese Prime Minister Noboru Takeshita to craft a strategy for green funds. For Japan, which has long been regarded an ecological outlaw, this was an opportunity to get a slice of the global green glory. The meeting endorsed the proposal to increase development assistance to 0.7 per cent of the GNP but refused to give a timeframe. But the idea of a tax for global cooperation, proposed at the meeting, has since been opposed by a section of Japanese business arguing that that could dampen the Japanese economy.

It is difficult to say how many cheques will be signed in Brazil — corridor rumours speak of a total of about US \$5 billion to US \$8 billion. Clearly, compared to the need or the level of environmental damages caused, the amount is miserly, especially when seen in the context of current South-North financial flows. A report prepared by the South Centre in Geneva, headed by Julius Nyerere, former President of Tanzania, states, "Since the mid-1980s, the flow of resources between North and South has been reversed and the South has become an important supplier of capital to the North. In 1990, there was a net outflow of US \$40 billion from the South due to debt servicing alone." If financial losses due to the declining terms of trade, protectionism, brain drain and transfer pricing by the major transnationals are included — all of which greatly reduce the financial capacity of the South to invest in environmental problems — the total annual losses suffered by the South probably run into US \$300 billion to US \$400 billion a year.

A world economic system which first pulls hundreds of billion of dollars out of the South and then provides a few billions as aid to apply an environmental poultice does not add up to much.

But given the desperate financial straits that the South finds itself in, it will compromise on this issue. Within India, the ministry of finance has advocated a soft approach and there is growing pressure from India's embassy in USA not to take stands that may be construed as anti-USA. In May, the 32 member-nations of the GEF, including India, agreed that the GEF should be offered to UNCED as a possible multilateral funding mechanism. The meeting agreed, according to GEF chairperson Mohammed T El-Ashry, that membership to the facility should be made universal and its decision-making structure should be so balanced that developing countries get adequate representation while donor countries get adequate weightage for their funding efforts. This latter point will probably remain a sticky issue in Rio.

### Green technology

The fourth major issue in UNCED concerns transfer of environmentally sound technology — technologies for cleaner and more efficient production; for prevention of pollution; and for waste disposal and management. But the North has found it difficult to accede to these proposals because of private ownership of technology.

A fragile consensus was reached on the phrase that the North would promote, facilitate and finance where appropriate, the access to and the transfer of environmentally sound technologies on favourable, concessional and preferential terms as mutually agreed. Given that the phrase "mutually agreed" distorts the entire

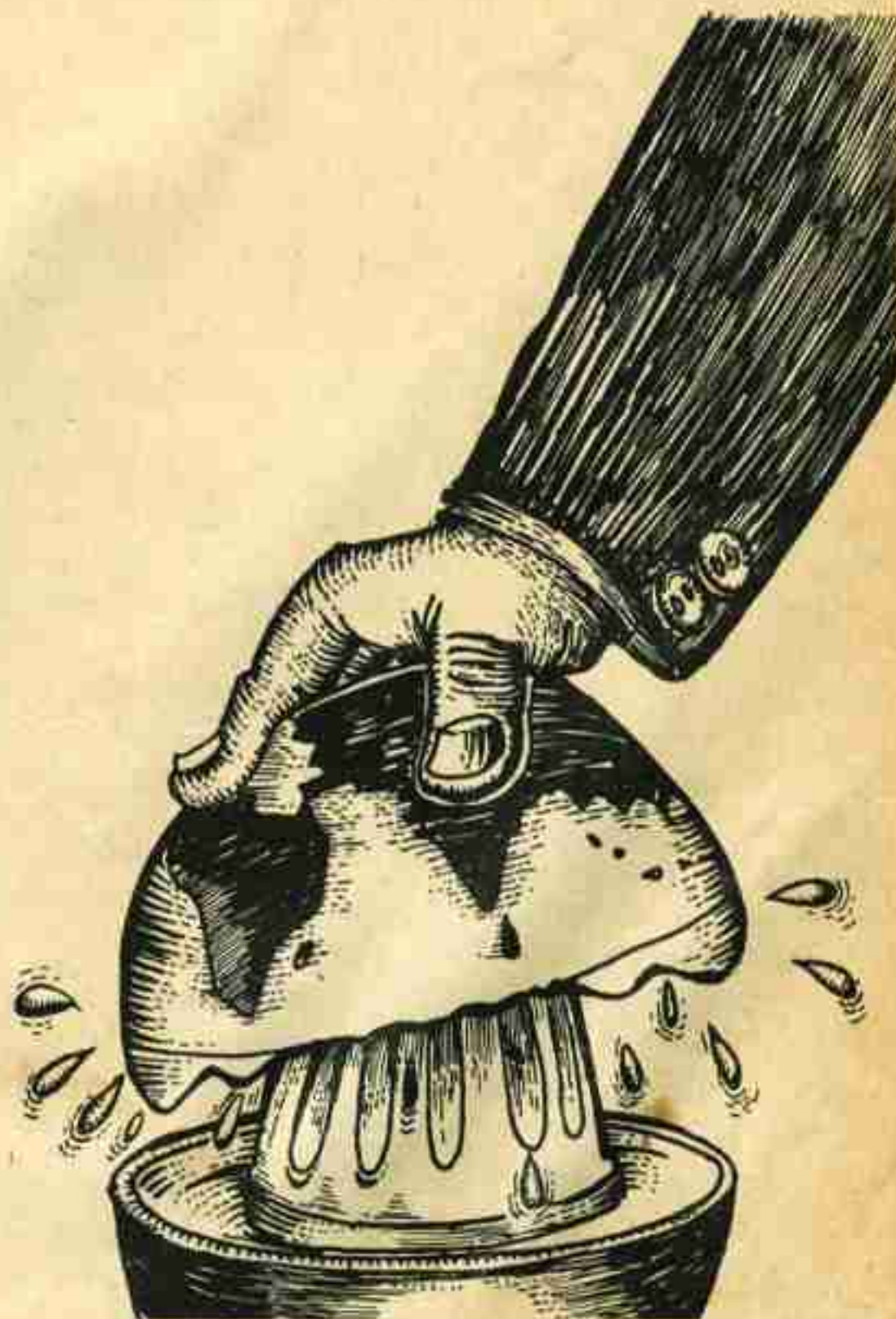
meaning of the otherwise magnanimous concession, the meeting saw antagonistic discussions last for over a week on whether a comma could be introduced before the phrase "as mutually agreed". The fight over the comma ended when USA, which had initially agreed to the text without the comma, decided to withdraw its consent. With USA saying no, all the negotiations over the fate of the comma went waste.

### South's forests

The most persistent demand from the North has been for a legally binding convention to manage the world's forests. The convention has been bitterly opposed by the South — in particular, India and Malaysia — which sees it as an assault on its sovereignty and a ploy of the West to pass on the buck of sustainable development.

But in spite of the Southern anger against the proposed global policing of forests, the efforts of the North to ram down the forest convention have been unending. Even though the idea of a legal convention was shelved at the insistence of the South as early as the second prepcom in March 1991, the Northern delegates at the New York prepcom were able to sneak in a para arguing for the convention yet again. Fully aware that the South would fight the idea, the move was done in an underhand manner. The Swedish chairperson of the working group, Bo Kjellen, inserted a fresh para on the need for a legally binding international arrangement on forests leaving the Southern delegates appalled.

The discussions will now continue in Rio. Many diplomats from developing countries fear that in Rio, Southern leaders will be under pressure to agree to a new negotiating process for a forest convention. With several northern NGOs like the Sierra Club and Friends





of the Earth campaigning for the convention and European public opinion against tropical timber logging mounting, the forest convention looks like a possibility.

## Global climate

The proposed convention to limit greenhouse gases and thus prevent climate change is being negotiated separately. This is a legal document that Northern governments and environmental NGOs would like to see definitely signed in Rio. The climate convention has run into rough weather as USA is dead set against any bad deal and constraints on its energy use. At the New

York prepcom, during discussions on the atmosphere section of Agenda 21, USA succeeded in getting even proposals for nationally determined targets for reduction in energy consumption deleted from the text.

But there has been considerable movement



## What's not in is more important

### What will UNCED discuss?

*Theoretically, everything. But it will focus on:*

Long-term issues like global warming.

National resources in the South like tropical rain forests and conservation of biological resources.

Mechanisms to transfer aid to the South.

Quantum of aid that the South should get to avoid exacerbating global environmental damage and reduce domestic environmental problems.

Global institutions needed to manage and monitor global environmental changes.

### What will UNCED gloss over?

A lot, especially everything which relates to the immediate needs of the South.

International financial mechanisms like debt payments and declining terms of trade which drain US\$300-400 billion every year and reduce the South's ability to manage its economy and environment.

Poverty and the needs of the world's poor, who ultimately pay the ecological costs of the consumption of the rich.

Rights of all human beings to their immediate environment and the global environment.

New levers of power to create a worldwide democratic system of checks and balances.

Control of overconsumption.

### The North-South stand-off

*A strong northern threat:* If the South does not accept environmental discipline, as defined by the North, all available levers of economic power — aid, trade and debt — will be used against it.

*A weak and wimpish Southern threat:* We will not participate in the negotiations if our sovereignty is not respected.

in recent weeks towards a compromise with the US position and the chances of a climate convention, however weak, now look much brighter. A 10-page memo prepared by four US government agencies was circulated recently to a few governments which shows that USA can achieve seven per cent to 11 per cent reductions in its projected carbon dioxide emissions by the year 2000 with the help of federal energy conservation programmes already proposed or underway. But USA is still not keen to make specific commitments. It apparently wants a two-step approach. In the first stage, it wants governments to do the best they can while periodically reviewing new scientific data as it emerges. And when and if the US becomes convinced that global warming is a major, imminent threat, it could go into the second stage — steep carbon taxes to force energy conservation.

A quiet meeting was held in April within the OECD — the Paris-based think tank of the Northern countries — to thrash out a common Northern position. The deliberations of this meeting, little known to the outside world, will definitely have an impact upon the last meeting to be held in New York to finalise the draft of the proposed climate convention. If Europeans are prepared to accept a text which says "countries will try to stabilise emissions" instead of "countries will stabilise emissions", then nothing can stop the treaty from going ahead.

Whether any Southern condition like "equal human rights to the benefits of the atmosphere" will get incorporated at this stage looks extremely remote. The South will get some concessions in the form of an allowance to increase its emissions by a limited amount — something along the lines of the Montreal Protocol, which allows developing countries to phase out their CFC consumption 10 years after the industrialised countries. But the treaty will surely freeze global inequalities in per capita energy consumption levels. It is unlikely that the South will stand united against this assault on human dignity.

## South's genes

The proposed biodiversity convention has also run into extremely contentious issues because the convention is trying to deal not just with the conservation of the world's life forms, but also with access to the world's biological resources. This has given the convention a strong commercial character and has seen strong North-South conflicts emerge. Though developing countries had earlier agreed in the Food and Agriculture Organisation (FAO) to biological resources being described as "common heritage" of humankind, they now find that this position only opens up access to the South's biological resources without any corresponding access to the new seeds, life forms and industrial products developed by the North using the South's genes and the tribals' knowledge of biological resources.

The South has, therefore, asserted its sovereign rights over its biological resources and has argued for access to biotechnological products in exchange for its genes. Numerous NGOs in the South see the biodiversity negotiations as extremely perverse. A joint statement issued by South Asian NGOs categorically demands that Southern governments refuse to sign the convention until major contradictions are resolved.



The rights of local communities to their biological resources and the knowledge of their use raise another set of vexing issues. The draft convention recognises the role that local farmers, herbalists and tribal communities have traditionally played in improving the world's knowledge of biological resources. But the convention is vague on the rights of local innovators. Article 7 of the present draft states, "Subject to its national legislation, respect, record, protect and promote the wider application of knowledge, innovations and practices of indigenous and local communities ..." The phrase "Subject to its national legislation" was added to accommodate the interests of the US government, which makes this article extremely weak.

Despite their extreme contentiousness, there has been almost no public debate on the implications of the biodiversity convention in the South. The intergovernmental committee negotiating the draft is meeting again soon to finalise the draft before Rio. Little is known about the rabbits that may get pulled out of this global hat.

Last but not the least, UNCED will decide what new institutions should be set up or old ones strengthened to watch over everyone's environmental behaviour. This question has been the least discussed till now. The last prepcom has sent two separate proposals to Rio: one, a high-level Sustainable Development Commission which reports directly to the General Assembly of the United Nations; two, a subsidiary committee under the Economic and Social Council of the UN, a far weaker alternative.

But Rio may change all this. Northern political leaders may well find that to convince their voters back home, they could demand a stronger institution for global environmental policy.

### South's weakness

It is vital that the South negotiates well at UNCED as it could easily mortgage its future. Latin Americans, especially the Mexicans and Brazilians, have already started adopting soft positions. There is no dearth of officials in India advocating a soft approach. After all, why annoy the North!

The biggest weakness of the South is its own lack of unity. With respect to global warming, the South is essentially divided into four informal camps. Firstly, the OPEC countries do not want any reduction in oil consumption or carbon taxes in the North because they believe this will hurt their economies. Secondly, countries which have large forest areas but relatively small populations like Brazil and several Latin American countries are more interested in forest-related issues. The Central American countries, for instance, have opposed the idea of "equal human rights to the benefits of the atmosphere", which several populations of Asian countries have been advocating. Thirdly, countries like



India and China and several African nations which have large and poor populations, are more interested in the quantum of aid received. Lastly, there are numerous island nations which feel very threatened by global warming and want the North to reassure them about their future. They are not too interested in poverty or forest related issues.

Julius Nyerere took a statement specially prepared by the South Centre in Geneva to the Group of 15 (G-15) meeting of developing countries held in Caracas, Venezuela in November 1991. The meeting spent a whole day discussing the need for a common Southern position, but failed to bring the leaders together.

At a time when most Southern nations are getting restructured under the dictates of the IMF, they have no common position beyond rhetorical words. Each country is afraid that the other will make private deals. No country, therefore, wants to be caught out on a limb and "isolate itself" to a point that it becomes a target of the powerful North.

What then can the world's people expect to get out of a bunch of ragtag, penurious and indebted nations from the South and another group of nations, which wants to determine the destiny of the world? Whatever happens, or does not happen in Rio, the South and its people are going to be the losers in the new



## Analysis, Monsoon, Weather Forecasting

## Monsoon prediction

## Clearing the clouds

Scientists are learning that the Indian monsoon is an integral part of the global ecosystem. Knowledge of these 'global teleconnections' is helping them to predict the monsoon

ANJANI KHANNA

THIS was one storm that the meteorologists couldn't predict. When Vasant Gowariker, scientific advisor to the Prime Minister, and a team of meteorologists from the India Meteorological Department (IMD), announced in early April that the coming monsoon will be on the lower side of normal, the prediction drew a great deal of flak.

BJP leaders, for instance, felt that unscientific and alarmist predictions, though tentative, will only encourage anti-social elements to hoard foodgrains. Many scientists too were critical of Gowariker's monsoon models, which, they felt, had received undue publicity, especially since their scientific veracity was debatable.

But nobody can dispute the fact that it is very important to be able to predict the nature of the most crucial weather-related development in India — the summer monsoon. Union finance minister Manmohan

Singh is reported to be extremely worried about this year's monsoon. Poor rainfall could send the country's economy and the government's structural adjustment programme into a tailspin.

After the severe drought in 1987-88, scientists at IMD were forced to find an appropriate forecasting technique. They were severely criticised for having failed to predict the severest drought to have hit the country in 20 years. The then Prime Minister, Rajiv Gandhi, reportedly told a meeting of environmentalists, "Till the middle of July 1987, the meteorologists kept telling me that the monsoon would be normal. Then they sprung the El Nino at me." Subsequently, a committee was instituted within the IMD to focus on predicting the monsoon and gauging its intensity.

The monsoon, which is really a sea breeze on a planetary scale, is caused by the differential heating of the vast Asian land mass and the ocean. The mechanics of the monsoon is well known, but there are a number of global and regional factors which must be taken



ACHINTO



## What is El Nino?

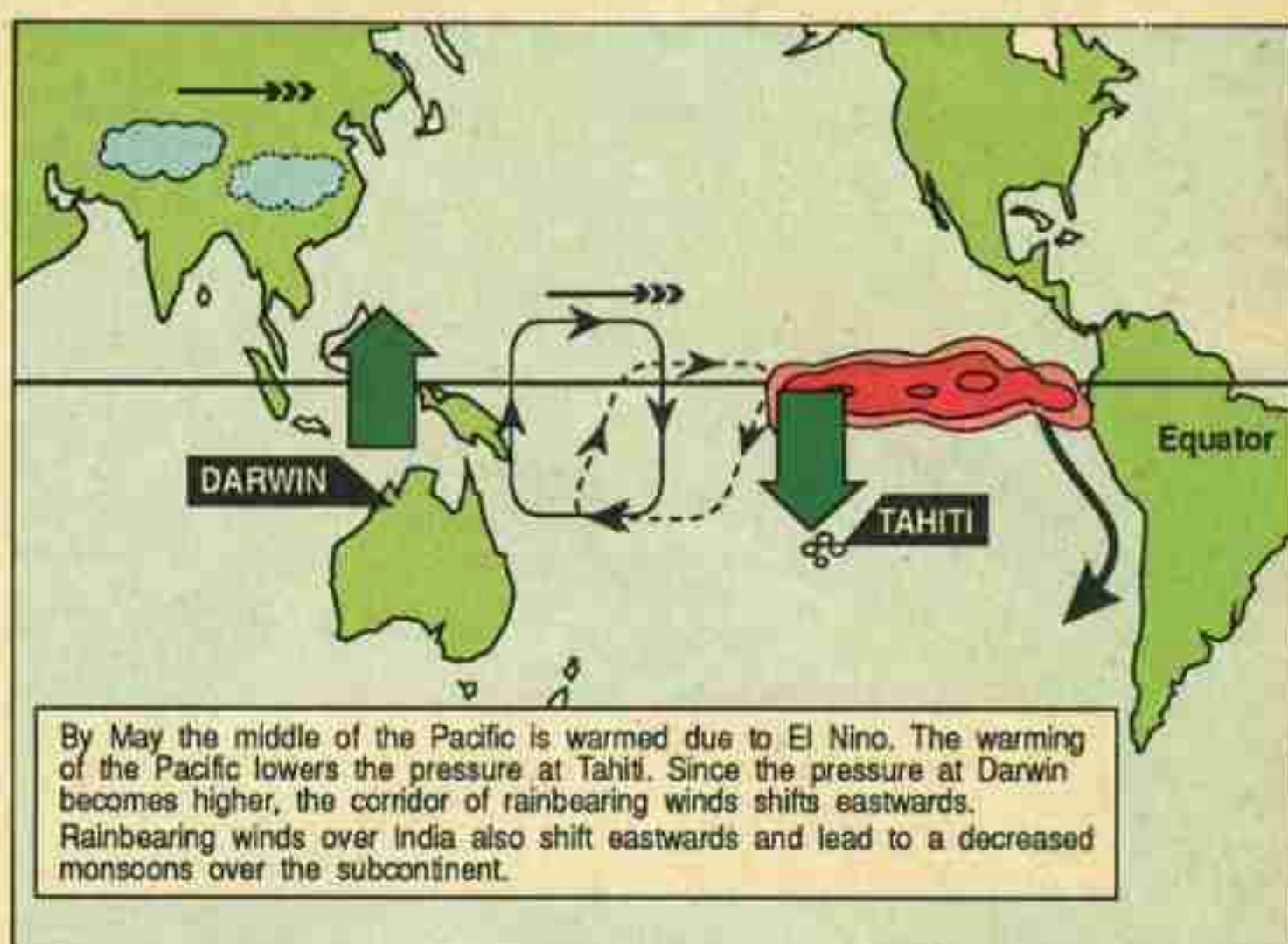
El Nino refers to the warm current that flows southward along the coasts of Ecuador and Peru, between January and March.

Some years, however, the temperature continues to remain high. This anomaly occurs every two to seven years.

It was in the 1960s that a Scandinavian scientist, Jacob Bjerknes, first established a link between this anomalous surface temperature event and the Southern Oscillation, which is a global seesaw of atmospheric pressure over the Indian Ocean and the Pacific Ocean.

The Southern Oscillation itself was discovered by Gilbert Walker, the first director-general of the Indian Meteorological Services in 1924 when he was trying to track the variability of the monsoon. He observed that when pressure is high over the Pacific Ocean, it tends to be low over the Indian Ocean from Australia to Africa. As pressures are inversely related to rainfall, it implies that low pressure over the Indian Ocean would result in a good monsoon.

The Southern Oscillation Index (SOI) — essentially the difference between sea-level pressures at Tahiti in the south central Pacific and



Darwin in Australia — which provides important clues to the monsoon. The differential heating of land and water generates two circulation cells, namely the Walker and Hadley cells, which dominate the monsoon's working. The ascending branch of the Walker cell is located over Indonesia where because of convection and heavy precipitation, a heat source is generated. The descending limb is located over northwest India, Pakistan

and West Asia.

Sometimes, prior to the El Nino, the Walker Cell is displaced eastward to the region between New Guinea and the international dateline. With the moisture feeding mechanisms shifting eastwards, rainfall over the Indian subcontinent, Indonesia and other areas decreases. An El Nino in one year invariably means a drought that year, although it holds promise for abundant rain the following year.

into account while gauging a particular monsoon's strength and progress. They involve complex land-atmosphere-ocean interactions some of which are poorly understood.

An ocean current from Somalia that cools the Arabian Sea just before the monsoon or a high-pressure zone over Tibet apparently have an effect on the monsoon. A number of other parameters that have a bearing on the rains have also been identified.

Prediction models have been developed using meteorological teleconnections, or statistical associations in space and time of widely separated events that have a physical connection with the monsoon.

In 1988, Gowariker, who was then secretary to the department of science and technology, with a team of meteorologists from the IMD, New Delhi, and the Indian Institute of Tropical Meteorology (IITM), Pune, developed a new approach to long-range forecasting.

Using 16 temperature, pressure, wind and snow cover parameters from across the world, which appear to have a bearing on monsoon circulation, the team developed parametric and power regression models which provide both qualitative and quantitative forecasts of monsoon rainfall.

The basic premise of the Gowariker models is that the earth's land-ocean-atmosphere systems start their preparatory work for the monsoon event much before its actual occurrence. The factors that determine the shape of the coming monsoon start surfacing one by one and become significant in their own time frame as a cumulative phenomenon. This build-up process starts from the winter months and the full picture

unfolds itself by the end of May "This is when the IMD sticks its neck out," says S M Kulshrestha, director general of IMD, "to give a quantitative assessment."

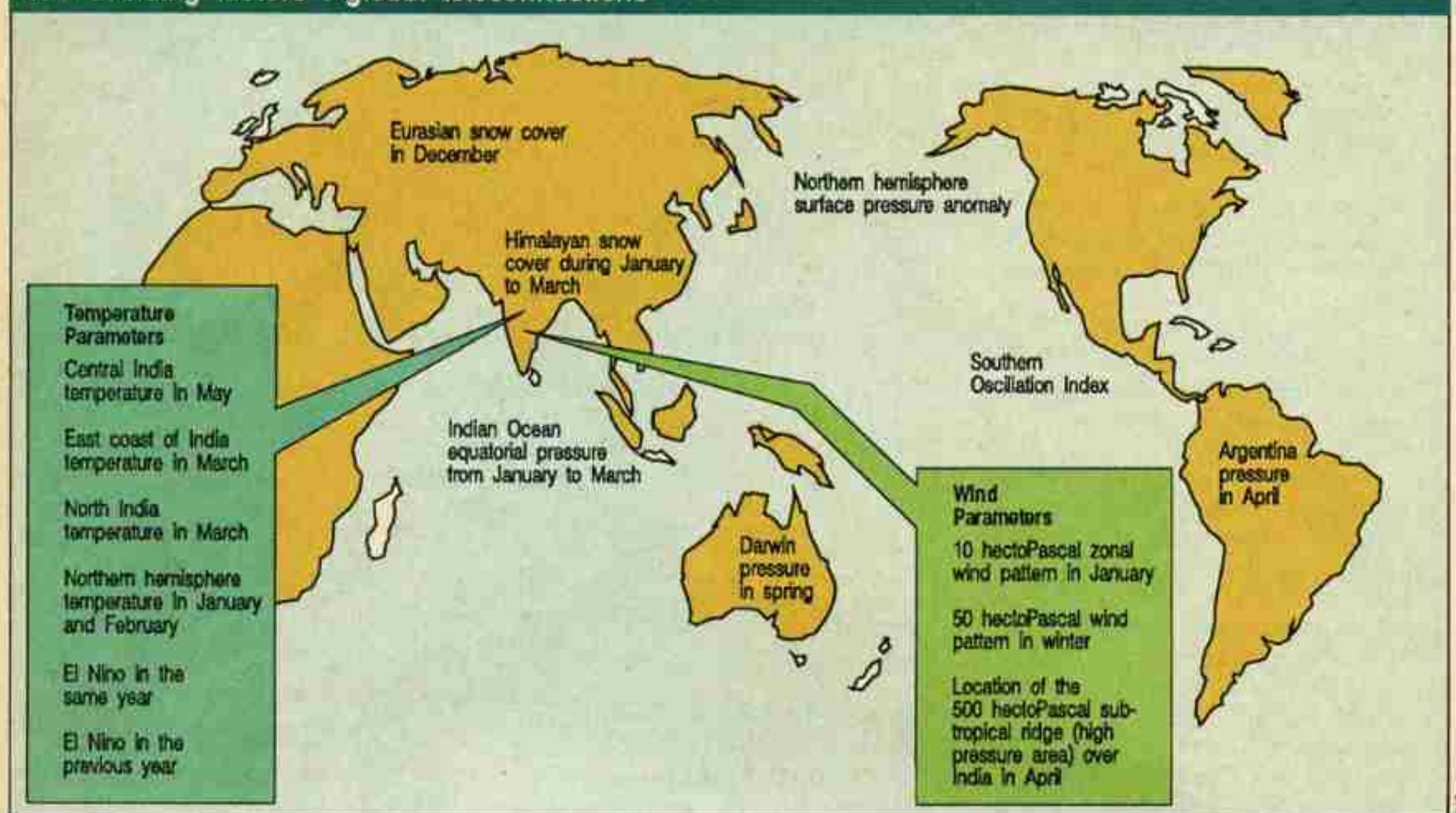
The models were first put into operation in May 1988. The team had confidently predicted that the rainfall would be normal or more than normal that year. The rainfall turned out to be 19 per cent more than normal. Last year, they indicated that rainfall would be 90 to 98 per cent of normal. Actual rainfall was 91.2 per cent of normal.

G S Mandal, deputy director at IMD, who was part of the team that developed the models, says, "The forecasts made so far have been fairly reliable and the meteorological department is quite confident." But,

Gowariker model: how accurate?		
Year	Forecast	Actual Performance
1988	Bountiful monsoon	One of the three best monsoons of the century
1989	102 per cent of normal	101 per cent of normal
1990	101 per cent of normal (plus or minus 4 per cent)	106 per cent of normal
1991	94 per cent of normal (plus or minus 4 per cent)	91 per cent of normal



## The deciding factors : global teleconnections



Kulshrestha is more cautious. "Forecasts, like medical diagnoses, are not conclusive", he points out.

Temperatures over the eastern coast and northern parts of India (including Jaipur, Jaisalmer and Calcutta) in March, central India in May, and the northern hemisphere in January and February are recorded and used in various computations. High temperatures are conducive to a good monsoon. The snow cover on the Himalaya from January to March is still monitored. Because of the reflective or albedo effect of snow, the greater the snow cover, the less is the net radiative solar heating on a continental scale. This translates into a poor monsoon. Normal snow cover, according to Kulshrestha, extends for some 25.9 million sq km. This year, the snow covers as much as 26.1 million sq km which is going to affect the monsoon adversely.

The El Nino ("Child of Christ") phenomenon, or the warming of surface waters off the west coast of Peru, was apparently partly responsible for the 1987 drought. An El Nino in the previous year indicates a good monsoon in the following year, while an El Nino in the same year has an adverse effect on the monsoon. (See box: What is El Nino?).

In 1988, Gowariker's team found that over the last 37 years (1951-1987), there had been seven moderate and severe El Nino years and on all these occasions but in 1966, the monsoon in the subsequent year was normal. When the period under study was extended to 87 years (1901-1987), there were seven severe El Nino years and the monsoon was found to be normal in all the ensuing years. However, scientists caution that no single parameter alone has a one-to-one relationship with monsoon. The 16 parameters are thus analysed in combinations of two or more.

Analysing all the parameters together, it was found that the level of confidence with which a good monsoon can be forecast increases as the number of favourable parameters increases. They found that when 60 per cent or more of the parameters were favourable, the subsequent monsoon was normal on all occasions.

When less than 50 per cent of these parameters were favourable, the monsoon was not found to be deficient on all occasions.

Extreme conditions have also been observed. Gowariker's team is careful to mention that their models do not attempt to elucidate the necessary conditions, but only indicate whether sufficient conditions exist for a good monsoon. It was observed that, despite a number of adverse signals, the monsoon could still be normal. There was, thus, a need to determine the importance of each individual parameter and weigh them accordingly. These were then used in what is known as a power regression model. On testing these equations using historical data, it was found that the quantity of rainfall forecast was fairly close to the actual rainfall.

However, many scientists have yet to be convinced of the reliability of Gowariker's models. Kulshrestha points out that these models do not provide a completely objective method of prediction. A great deal of brainstorming and extrapolation is necessary to produce a forecast. "The interpretative ability of the scientists involved is crucial to the success of the prediction," according to him. P K Das, the former director general of the IMD, says the onset date of the monsoon over south India and the total rainfall over different parts of India, that is, northwest and peninsular India, are determined by using regressive techniques.

Das doubts the predictive value of Gowariker's models. He argues that since the models provide an overall rainfall figure, they are of little use. Given the great variability of the monsoon, the rainfall in particular areas like northwestern and peninsular India is critical and the model fails to address this aspect.

Other scientists point out that over the last few years when the models have been in use, all the monsoons were normal. Thus, the chances of correctly predicting a normal monsoon are high. Whether the model can successfully indicate a very good or a very deficient monsoon well in advance remains to be seen. ■



*Analysis, Arunachal, Deforestation, Timber Smuggling, Grazing Lands.*

State of environment

## Chopping down the future



**About 90 per cent of Arunachal Pradesh's revenue is generated by its forests. Yet these very forests are under heavy pressure, thanks to the lucrative and often illegal timber trade thriving under political patronage**

ANUMITA ROYCHOWDHURY ITANAGAR



ARUNACHAL Pradesh is one of the greenest states in India. Yet today, despite having only seven persons to a square kilometre and about 8.4 million ha of rich vegetation, the state is gravely threatened by deforestation.

Forest officials claim an almost 14 per cent increase in forest cover between 1980 and 1987. About half this increase can be attributed to the inclusion of areas which satellite images could not analyse before because of cloud cover. But it still means a real increase of 4,87,000 ha.

But the situation on the ground is far from happy. A large part of the state's revenue is generated directly from its forests. A note prepared by the Arunachal Pradesh Forest Corporation (APFC) in March 1988 states that "90 per cent of the state's direct revenue is

generated by its forests besides indirect revenue in the form of allocable excise duty available mainly through the plywood industry".

With few opportunities for growth, the state has become heavily dependent on external assistance. Only 0.7 per cent of its total revenue comes from within the state, while as much as 90 per cent comes from the Centre. The per capita share of plan investment for an Arunachal Pradesh tribal, at Rs 8,511, is the highest in the country today, way above the national average of Rs 1,493. Despite this, only a small minority of the tribals have profited from the lucrative timber trade.

With no industrial base to speak of, more than 75 per cent of Arunachal Pradesh's population is dependent on agriculture for their livelihood. A few get government jobs, thanks to reservation quotas, or find employment in the transport and communication sectors.

Clearly, the easy road to riches is through timber operations. It was during the 1980s that forestry emerged as one of the major contributors to the state's net domestic product (NDP), its share rising from 12 per cent in 1980-81 to around 20 per cent today. The road construction sector, the most organised enterprise in the state, serves to provide better access to hitherto untouched forests.

The growing demand for timber has created an elite which wields immense political clout. Forests have become so valuable that not only are the state government and the local elite vying for greater control over them, but neighbouring states have also laid claims to them. This has heightened social tension in the area.

When market forces initially penetrated the forests of Arunachal Pradesh, a situation akin to the California gold rush was created. In 1988, it was proposed at a conference of state forest ministers that the Arunachal Pradesh government concede to a ban on timber operations. The loss in revenue, estimated at Rs 80 crore, would be met by the Centre. But the proposal was turned down by the state.

This is not surprising considering the strong timber lobby in the state. Between 1970 and 1985, the number of saw mills in the state rose from 15 to 67, while plywood units increased from five to 13. The constantly rising demand for veneer, sleepers and other industrial products from wood aided in the faster depletion of forest resources creating, in the process, a serious raw material crunch.

Today, about one-third of the total installed capacity of Arunachal Pradesh's plywood industry is unutilised. The Norbu saw mill in Shergaon, West Kameng district, is now using only 50 per cent of its installed capacity. The Mamang Borang saw and veneer mill in Pasighat remains functional for only 200 days in a year. The plywood mills in Deomali have even started importing Malaysian timber.

Almost all the timber units are concentrated in the Tirap and Lohit districts, which has all but destroyed



## How green is green?

### Forest cover in Arunachal Pradesh 1972-1987

Year	Total forest cover (m ha)	Dense forest cover (m ha)	Open forest cover (m ha)	Percentage of geographical area	Uninterpreted area (m ha)
1972-75	5.14	5.05	0.10	61.5	1.96
1980-82	6.05	5.11	0.94	61.13	0.53
1985-87	6.88	5.43	1.45	64.93	0.19

#### Note:

One reason for the increase in forest cover figures over the years is reduction in area which could not be interpreted because of clouds. In 1972-75, the uninterpreted area accounted for 23 per cent of the total area; in 1980-82 it came down to 6 per cent and finally, in 1985-87 to 2 per cent.

In the 1987 assessment, the forest cover map was prepared on a 1:1 million scale while in the 1989 assessment it was made on a 1:250,000 scale. This greatly increased the accuracy of the assessment.

Source: Forest Survey of India/ National Remote Sensing Agency

the hollock (*Terminalia myriocarpa*) and hollong (*Dipterocarpus gracilis*) forests unique to this region. The soft wood of the hollong makes it eminently suitable for making plywood. As a result, the tree has been subjected to ruthless felling. So extensive has been the deforestation here that it is feared that the hollong will become extinct in another 10 to 15 years.

Nahar (*Mesua ferrea*) is another dominant component of the wet, evergreen forests of eastern parts of the state. These trees have been ruthlessly cut down to make railway sleepers. Between 1982 and 1984, 40 per cent of sleepers were supplied by these nahar forests.

### Illegal felling

The acute shortage of timber, escalating prices and attractive profits have had one definite fallout: increased illegal felling of trees. Timber from Arunachal Pradesh has a ready market all over India, especially in Delhi. For the 1982 Asiad, Rs 200 crore worth of timber was sent to Delhi from the state.

Timber is also a political asset in the state and has spawned a great deal of corruption. In July 1989, the opposition had even alleged that chief minister Gegong Apang was granting "saw and plywood mill licences to the opposition MLAs to lure them to join the Congress". The then vice-president of the state Janata Dal, Norbu Thangu, accused the state government of "living by selling tree permits".

More recently, the ministry of environment and forests has received reports about the involvement of top officials in the destruction and plunder of the region's forest cover. On the basis of this, an inquiry was ordered by the minister of environment and forests, Kamal Nath. He is now scrutinising the report.

Corruption manifests itself in different ways. A tree plantation cultivated as part of a social forestry project near Ganga Market in Itanagar was cleared to make way for a shopping complex under "minister's orders". In January 1991, confiscated timber worth Rs 40 lakh was discovered near a forest checkpoint near Zero Point in West Kameng district.

Ingenious ways have been found to evade rules. As a tribal in Daporijo revealed, often the girth sanctioned in a permit for removing one tree is used to smuggle through many trees of a smaller girth, which are logged together to make them appear a single tree. Even without such ingenuity, more trees are felled than permitted. In 1990, about Rs 22 lakh was collected as fines for illegal logging in the Pasighat forest division alone, according to local sources.

### The politics of permits

Tree permits are routinely issued to those holding rights for the felling and sale of trees. Prior to 1980, the divisional forest officer was empowered to approve the number of permits to be issued in accordance with revenue targets. Since then, the quota system was introduced to check the alarming rise in felling. Every year, the state cabinet fixes the number of permits to be issued and quotas are allotted to different forest divisions.

Nevertheless, the timber lobby very often succeeds in thwarting the forest department's rules by applying political pressure. In the Bomdilla forest division, the number of permits issued prior to 1990 varied from 50 to 86, but in 1990-91 as many as 200 permits were issued. The denuded slopes of Bomdilla, capable of supporting only shrubs and chir pine trees, do not merit such an unprecedented rise in permits.

In some forest divisions, the total quota of permits is equally distributed among the various electoral constituencies, with the local MLA deciding the final names, rather than the divisional forest officer.

Unfortunately, resistance to such practices, apart from isolated voices of dissent, has been few and far between. In the summer of 1990, for instance, group violence broke out in the forest division of West Kameng district when the villagers of Khupi stopped the movement of logs through their territory in a bid to stop the timber operations of the Pallizi saw mill.

Technically, only local people are allowed to hold tree permits and licences to set up saw and plywood mills. But in practice, outsiders buy up these licences or enter into partnerships with licence-holders. Today,



## Cold hearths

ENERGY problems have reached alarming proportions in the Tawang and Bomdilla areas.

Since the last five years, Choizm, of Khamba hamlet of Lohu *basti* in Tawang, has been hiring help at the rate of Rs 40 per day and paying Rs 1,000 for a truckload of firewood. She has also learnt to make her wood last longer. Earlier, about eight to ten sticks were burnt at a time in her fireplace. Now not more than five are used at a time.

Choizm recalls the days when collecting firewood was a short, even enjoyable trip to the forest. With age, the distance between the forest and the village also grew. Now the forest of her childhood has receded far beyond her reach and she finds her life totally changed.

Choizm is lucky. There are other people in the area who cannot afford to pay such high amounts to meet their energy requirements. They are compelled, therefore, to trek long distances to collect firewood, which takes an average of five hours every day.

The residents of Lohu *basti* are worried about the



Women's drudgery: the long trek for firewood

situation, but they have not accepted the situation. Two years ago, they formed an *asokpa* (organisation) under the leadership of Lhentup Lama, to check the indiscriminate felling of trees in their forests and to ensure that thefts did not take place. Even felling of trees for domestic use by local villagers is strictly regulated.

Yet, all these measures cannot prevent the commercialisation of firewood. Almost 90 per cent of the energy needs of the community is met by firewood. The hydel power produced is far from adequate to meet actual demands.

the entire timber economy is being run and managed by entrepreneurs from outside the state.

Although the local tribals are making a lot of money out of these ventures, the lion's share of the profits is flowing out of the state. But chief minister Apang sees this as a "transitory phase". "Our people are poor and do not have enough money for investment. Therefore, we will have to let outsiders come in with their capital. A time will come when we will be able to manage our industry on our own," says Apang.

But other government officials are not so optimistic. In fact, there is concern over new forms of social tension in the area. Some of the saw mills located near the reserve forest are allotted quotas, but those located in the unclassified state forest area are entirely depen-

dent on tree permit-holders for their raw material.

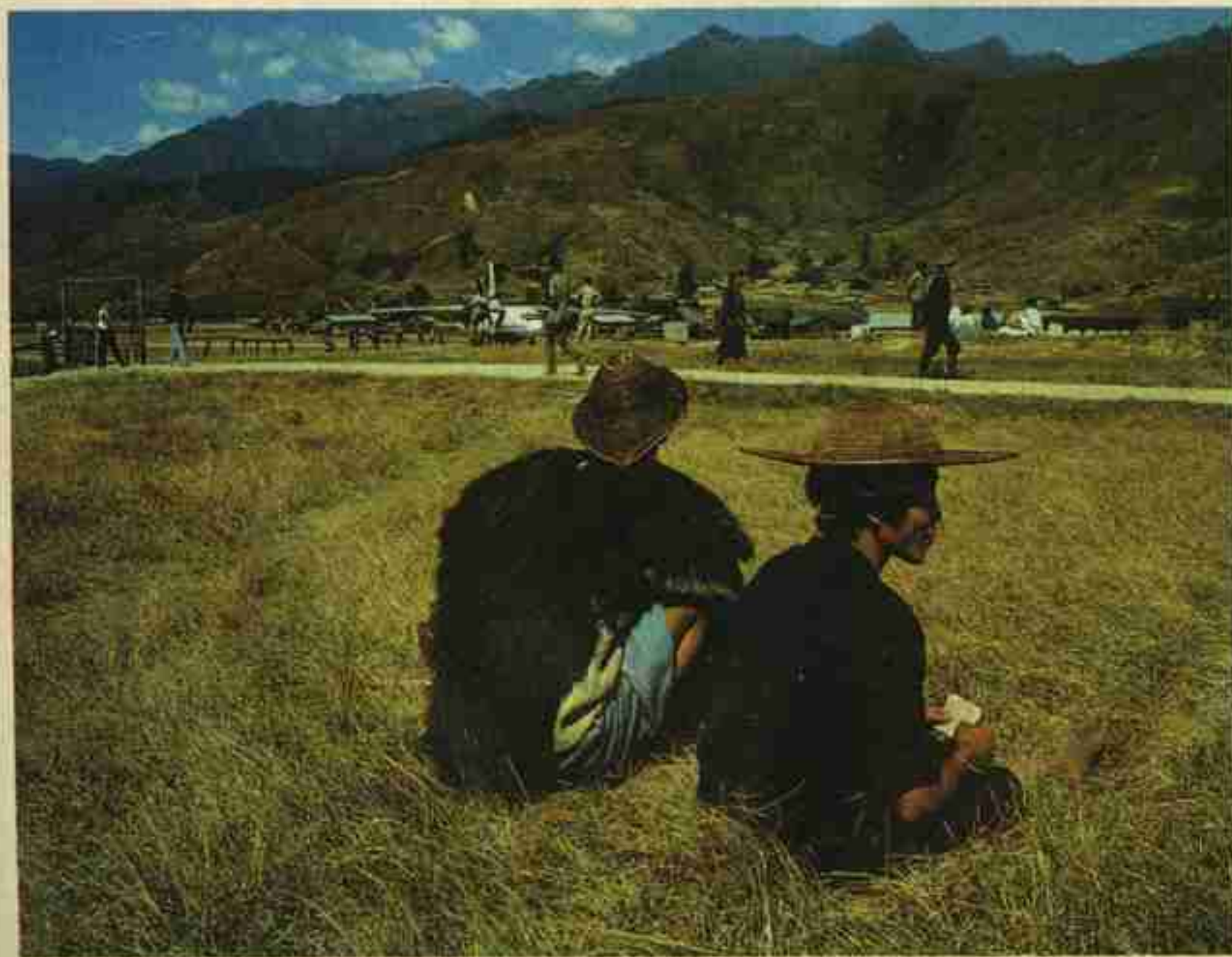
Timber merchants who have come from outside the state and have made large investments, are very unhappy over the operational constraints on their trade. Their legal status within Arunachal Pradesh is that of managers. If the actual owner of the enterprise — the permit-holder — decides to take over the business, the person who has actually put in the capital cannot demand its return legally. While local tribals may not resort to such measures as yet, their demands for money and services have been steadily increasing.

Saw-mill owners in the West Kameng district complain that they have to often provide vehicles, free of cost, on social and ceremonial occasions as well as for general transportation. On an average, mill vehicles ply on the roads for about 160 days in a year to cater to this "public demand". They also have to provide timber free of cost to the villagers.

## Conflict over forest land

Complicated ownership claims over forest land are another source of tension in the area. In the Apatani valley forest land is becoming increasingly privatised. Local tribals are now asserting hereditary ownership rights over the forest area. Vast tracts are now being claimed as individual property where even other villagers are denied entry. Boundary disputes, often leading to violence, have become commonplace.

While the tribals claim





absolute right over the land and forests, the state also claims ownership rights over them. Lax legislation, which classifies vast forest areas as unclassed state forests, complicates the situation further (See box 2: 'Who owns the land?').

Forest officials feel that customary laws make the management of unclassed state forests difficult. They are hesitant to enforce forestry programmes in the area for fear of incurring the tribal community's wrath. "Unclassed state forests," says one official, "have become a no man's land, subjected to open plunder." While tree permits are issued to harvest timber, little is invested for its management. The officials find it difficult to acquire this class of forest as the tribals perceive it as an infringement on their traditional rights.

The relationship between the forest department and the tribals has always been antagonistic, since the department has the power to reserve vast tracts of forest land which means the abrogation of all customary rights. The tribals resent this. Says Chenging, a farmer of Poma village, near Itanagar, "Elephants do not pay royalty for uprooting trees in the forest. Why should I pay royalty?"

Today, the demand for dereservation of forest land in Pasighat, Roing division, and some other areas is being articulated politically. Take Deomali township, in Tirap district, which developed within reserve forests covering approximately 200 ha of land. It will soon be dereserved. This area was developed in the 1960s when the chiefs of the Namsang and Borduria villages were persuaded to part with their hollong forest for reservation, on the condition that they would share the profits from the forest with the state.

The forests around the district headquarters and the state capital are under the most pressure. These townships are facing an acute scarcity of land with built-up area slowly encroaching upon their green fringes, threatening the plantations raised by the forest department at some places.

The story of Along town best illustrates this development. When this government outpost was established under the British, it was on land donated by Panya villagers. Today, the villagers resent the fact that outsiders are buying up their *panikheti* (irrigated terraces) land. They are now demanding plots in the town in lieu of agricultural land. The clamour for land in Along town has become so intense that the forest department's social forestry plantation here has been dug up to build houses. If the encroachment continues, the Gaur Hill Station Reserve will be completely destroyed.

### Erosion of grazing lands

The loss of forest cover is posing a serious threat to the fodder and energy resources of the villages. In and around the Nishi villages, in Lower Subansiri, the local Nishi herdpersons can be seen travelling long distances to graze their undernourished cattle.

The *chowriwallahs* (graziers) of Tawang are very worried about the fact that the region does not have enough natural grasslands. After the 1962 Indo-Chinese war, a large tract of Tawang's grazing land was taken away by the army for construction of roads, bridges and bunkers. This has caused immense hardships to the local communities. Earlier, the

### Who owns the land?

Arunachal Pradesh's tribals believe they have an absolute right over the state's land and forests. The state takes a different view of the matter.

The entire area lying between the McMahon Line and the Inner Line is technically owned by the state. In actual practice, government land constitutes only 26.16 per cent of this territory. About 73.56 per cent of the total forest area is marked as unclassed state forest where customary laws prevail and the state cannot intervene without prior consultation with village authorities. To date no land settlement has been conducted in the state, nor have ownership *pat-fas* been issued to any tribal.

The Jhum Land Regulation of 1947, which gives sanctity to the customary right to *jhum* land in favour of a village or a community, provides the legal basis for land administration. Local customs and traditions are respected and take precedence over the regulation.

The administration finds it extremely difficult to acquire land for development purposes even under the



Land Acquisition Act of 1984. Earlier, land could be acquired through persuasion and was donated by the villagers. But now the villagers, aware of the value of land, don't part with it unless suitably compensated.

All this has served to aggravate the problem of ownership claims. Traditionally, individual and community rights over land were established on the basis of mutual understanding. But these have not been recorded officially and, therefore, a curious situa-

tion exists today. A tribal may own vast areas of land, but to take up a development scheme as a beneficiary, he has to get his land demarcated and registered in his name. Development schemes are usually targeted to benefit an individual beneficiary, but not a single settlement deed exists to establish individual ownership.

There is now a growing tendency on the part of the educated urban elite to privatise large areas of land by registering it in their name. This could lead to a certain section of society acquiring land at the cost of the community by manipulating the measurement of the area in connivance with the local *gaon bura* (village head).

Over the years, the land around towns and in the foothills has become more valuable. For instance, Pasighat is a much sought after area. Obang Moyong, a farmer from Mirbuk village near Pasighat, feels that tribals are beginning to value modern facilities and, therefore, wish to live closer to towns and roadside villages. Mobility of this kind has created complex problems manifest in the disputes which regularly break out between the migratory and settled tribes.



*chowriwallahs* could move freely across the Indo-Tibetan border with their animals. Not any more.

The Arunachal Pradesh government has adopted a policy of generating employment by dealing out contracts for road building.

Of the state's total plan allocation, the public works department (PWD) gets 20.14 per cent. Another 38.4 per cent goes for transportation and communication.

While it is important to develop communications in this difficult terrain, the system, based mostly on contracts and government sanctions, is getting increasingly corrupt. According to local sources, selection of sites for roads and measurement of angles for earth cutting on fragile slopes are often not in accordance with legal stipulations. As a result, roads get constructed in ecologically unsuitable areas.

### Blaming *jhum* cultivation

Lately, *jhum*, or shifting cultivation, which has been the dominant land use option in this region, has been severely criticised for causing land degradation and deforestation. In a given year, the area under shifting cultivation is about 51.42 per cent of the total cultivated area. According to a 1989 survey, the forest area affected by shifting cultivation has increased from 7.94 lakh ha in 1975 to 8.52 lakh ha in 1984 — a 7.3 per cent increase. The shortening of the *jhum* cycle and increase in the number of persons resorting to *jhum* cultivation is also causing concern. In 1974, around 81,000 families were *jhum* cultivators; by 1984 their number had shot up to 107,000. By the year 2000, an estimated 1,55,000 families will be following this practice.

Not surprisingly, foresters are alarmed at this development. B A Mathews, state conservator of forests, fears that large tracts of unclassed state forest could be destroyed because of this practice.

While the shortening of the *jhum* cycle years in places like the Lower Subansiri has created vast deforested tracts, putting the entire blame for this on the *jhumias* is unfair. After all, there is extensive deforestation in certain tribal tracts like Tawang as well, where shifting cultivation is not practised.

According to Tabom Babla of Babla village, Daporijo, the cropping pattern of *jhum* is ecologically sound. Besides, it ensures them nutritional sustenance in a very harsh environment. "We can grow a variety of crops in our *jhum kheti* which meets our daily dietary requirement," adds Mito Lollen, of Panya village near Along. In remote areas, the dependence on the forests for food gathering is still very great.

### Complicated inter-state relations

Given the difficult topography of the region, the plains dividing Assam and Arunachal Pradesh have become very sensitive because of ownership claims by the two states. People along the 740-km border region find themselves pushed out of their traditional niche by the constitutional boundary which materialised only after the transfer of land from the erstwhile North-East Frontier Agency (NEFA) to Assam, following a notification in 1951.

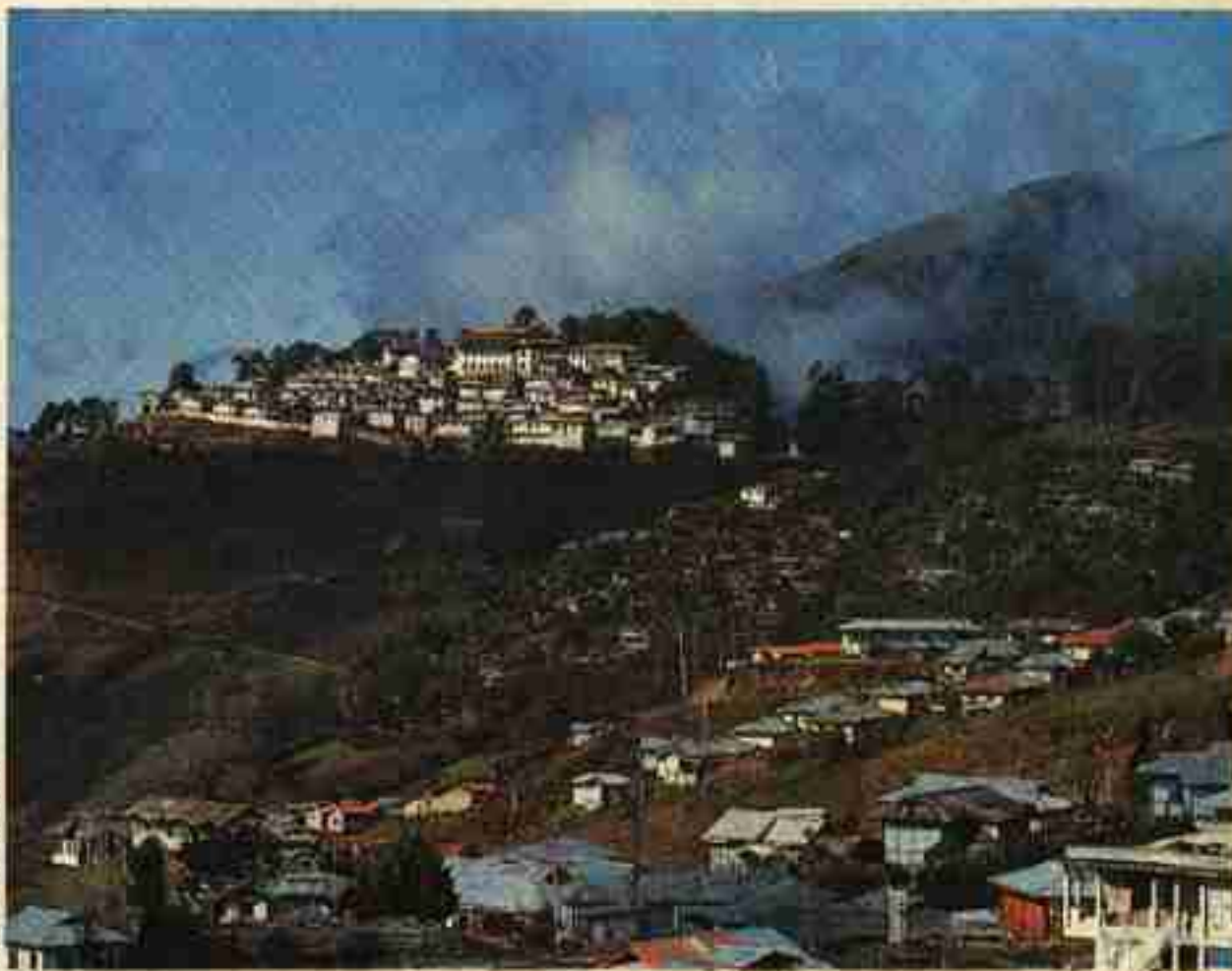
According to J E Tangu, state home secretary, the

1950 earthquake led to a large number of hill people coming down to the plains. They cleared the forests and created new settlements. Once these settlements began to grow, people realised the implication of the notification. The limited fertile land and forest resources in the area became the source of conflict between the settlers on both sides of the border.

In one such incident in the first week of last April, the Santhalis of Assam and the Nishis of Arunachal Pradesh clashed over the construction of a road linking Itanagar and Bhalukpong, which passes through the Behali reserve forest in Assam. A large number of houses were set afire, two persons were killed and several injured in a series of attacks and counter-attacks.

Meanwhile, both states accused each other of encroaching upon the neighbouring state's area and attacking villages. So much so that Assam chief minister Hiteswar Saikia alleged that Arunachal Pradesh had encroached upon 45,213 ha of land in Assam's Sonitpur, Lakhimpur, Dhemaji, Sibsagar and Tinsukia districts.

The rich forest wealth of the border area seems to have aggravated the problem further. P Lahan, conservator of forests of Assam, said that initially both the states had been tapping the timber resources of the area and, therefore, wanted to control these forest tracts. Each state has attempted to extend the constitutional



The concrete jungle: townships push back forest cover

boundary in its own favour. This conflict has led to endless litigations which resulted in a case being filed in the Supreme Court in April 1989. Finally, on August 31 last year, the two states signed an agreement resolving the dispute, but not to much avail.

Apang, however, feels that this battle of attrition between the states will soon be over. He says, "We are hoping to come to an amicable solution soon. In the past, we have sorted out many problems on the basis of mutual understanding. There is no reason why we should not be able to do the same in the future."

Apang's optimism may or may not be misplaced. But Arunachal Pradesh's survival hinges on whether its economy, which has so far been based on exploiting natural resources, can diversify. It is vital that the state reduces its dependence on resources which are basic to life-support systems, but will it be able to do this given the severe economic constraints it faces? ■