SACHS ON GLOBALISATION

A new map of the world

Today's world is divided not by ideology but by technology. This demands, Jeffrey Sachs argues here, bold new thinking on development

BY INVITATION

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WITH the end of the cold war, old ideological divisions are over. Virtually all nations proclaim allegiance to global markets. But a more intractable division is taking hold, this time based on technology. A small part of the globe, accounting for some 15% of the earth's population, provides nearly all of the world's technology innovations. A second part, involving perhaps half of the world's population, is able to adopt these technologies in production and consumption. The remaining part, covering around a third of the world's population, is technologically disconnected, neither innovating at home nor adopting foreign technologies.

These technologically-excluded regions do not always conform to national borders. They include southern Mexico and pockets of tropical Central America; the Andean countries; most of tropical Brazil; tropical sub-Saharan Africa; most of the former Soviet Union aside from the areas nearest to European and Asian markets; landlocked parts of Asia such as the Ganges valley states of India; landlocked Laos and Cambodia; and the deep-interior states of China. (My colleagues Michael Porter and Andrew Warner are currently developing sophisticated indicators of these new technological divisions, and confirming their importance in accounting for growth.)

Many of the technologically-excluded regions, especially in the tropics, are caught in a poverty trap. Among their greatest problems are tropical infectious disease, low agricultural productivity and environmental degradation—all requiring technological solutions beyond their means. Sometimes, the needed technologies are available abroad, but the countries are too poor to buy or license them on the necessary scale. Often, the technologies do not exist in appropriate forms, and poor-country markets offer scant incentives for research and development.

It is time for the rich countries to recognise this and respond. Note that the world's new boundaries are not fixed: many of the technologically excluded could soon become technological adopters, and a few (Taiwan, South Korea and Israel) have graduated from the middle group to become top-rank innovators. But such transitions are far from automatic. If more of the 2 billion people who live in the technologically-excluded countries are to join in the benefits of globalisation, three things need to happen.

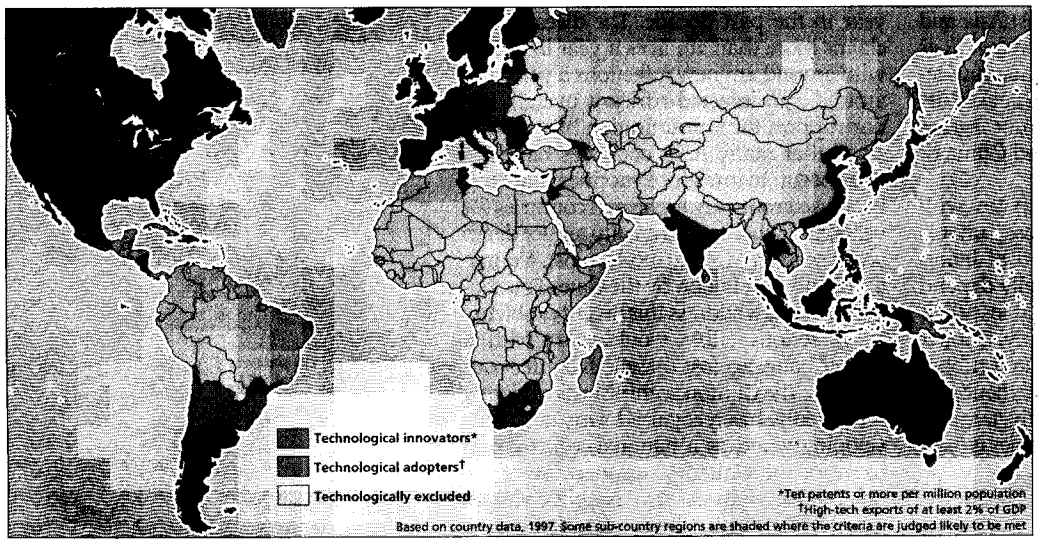
First, the new technologically-driven character of the global economy must be properly thought through: geography, public health, and ecology must be brought into the analysis of technological change and economic growth. Second, governments need to change their approach to aid, spending more, and more wisely. Third, participation in international assistance needs to be broadened and recast. Multinational firms and first-world universities and scientific establishments need to be engaged, and the official agencies charged with global development (the IMF, the World Bank and the various UN agencies) must be reformed.

Rethinking globalisation

Development has traditionally been seen as a matter of accumulating physical and human capital. Poor countries, when they are well governed, are assumed to have an advantage in this: where capital is scarce, the returns on new investments should be high, which ought to promote saving and attract inflows of capital from abroad. The gap between rich and poor therefore narrows, a process known as "convergence".

But we now know that technology is less likely to converge than capital. Innovation shows increasing returns to scale, meaning that regions with advanced technologies are best placed to innovate further. New ideas are typically produced from a recombination of existing ideas (in the phrase coined by Martin Weitzman), so environments rich in ideas produce chain reactions of innovation. But as with nuclear reactions, a critical mass of ideas and technology is needed first. Also, the incentive to innovate depends on the size of the market. Innovation involves fixed costs, such as R&D: a bigger market supports this more readily.

The public-good aspect of ideas—the fact that they can be used again and again without being depleted—



leads to further complexities. Free markets are not enough: successful innovation requires supporting institutions. Commercial innovation today is generally a product both of basic scientific insight (based mainly on ideas in the public domain) and applied engineering (backed by patents). The first relies on universities and public laboratories, the second on private, profit-driven firms. Successful innovation requires academia, government and industry to work in harness. The Internet is a familiar case in point.

In developing countries, fruitful interaction of this kind is unheard of. Few governments even have a science adviser. The results are depressing. There are 48 countries with more than a million people (in 1995), and with at least half of these living in tropical areas: with a total population of 750m, they took out just 47 of the 51,000 American patents issued to foreign inventors in 1997.

Of course, the technological capacity of an economy depends not just on its own innovations, but on its capacity to adopt the technologies produced elsewhere. This can happen through three main channels. Countries can import technology embodied in capital and consumer goods (cell-phones, fax machines, personal computers, immunisations). They can license technologies from patent holders. And they can attract foreign direct investment (FDI), so that a multinational enterprise with proprietary technology sets up production inside their borders. In all cases, countries must be successful as exporters to pay for the imports of technology (or to pay dividends on foreign investment).

Many economists assume that all developing countries are equally well placed to absorb technologies from abroad, but this is wishful thinking. Whatever the channel, geographical conditions are important. Successful importers of technology tend to be close to big markets or on principal sea routes or both. Technology is drawn across borders to countries like Mexico; or to Poland and Hungary, neighbours of the European Union; or to coastal China, Singapore, Hong Kong, the port cities of South-East Asia and the coastal states of southern India. It does not flow as easily to remote mountainous regions (the Andean countries), landlocked developing countries (Central Asia), or regions that are far from seaports (inland China or northern India).

Countries that do not keep up with global technology often collapse, unable even to maintain their standard of living, much less increase it. They usually depend on a narrow range of exports that lose their profitability in the world economy. Copper is displaced by fibre optics. Natural rubber and jute are displaced by new synthetic materials. The long-term decline in the terms of trade of many primary commodities is itself a side-effect of innovation.

Demographic pressures magnify the risks. Poor countries typically experience rapid population growth until urbanisation, education of women, and especially falling childhood mortality lead couples to reduce their fertility. In technologically-stagnant countries, however, all these factors are subdued. Urban jobs are few because technological backwardness limits export competitiveness in urban-based manufactures and services. Childhood mortality stays high. Families continue to have many children, so investment in the health and education of each one is less, and population grows rapidly. Apart from adding to the poor countries' miseries, these demographic strains also lead to environmental harms (such as deforestation and reductions in biodiversity) which threaten everyone.

Rethinking aid

Much of the world, perhaps 2 billion people or more, will fail to share in the benefits of global growth without a complete change in international strategy. This needs to be undertaken on several fronts:

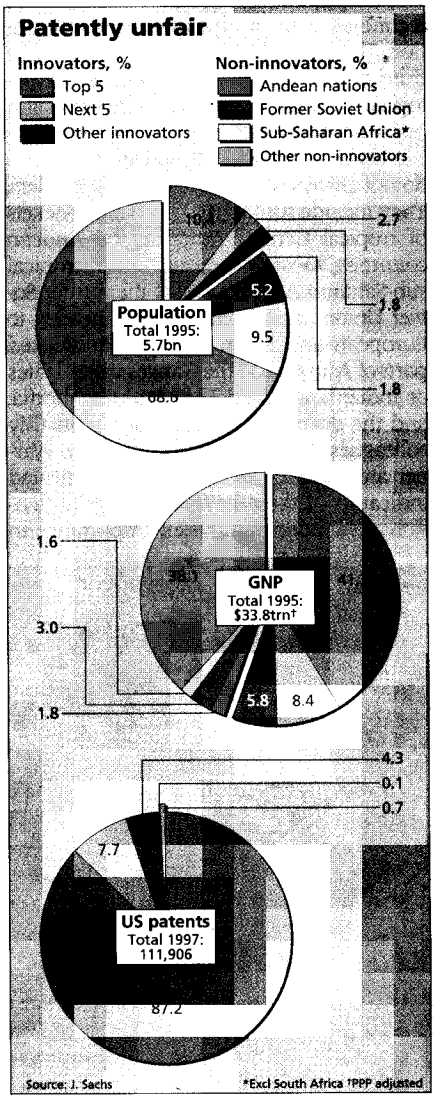
• **Public health and population**. The burden of disease on poor countries, especially in sub-Saharan Africa, is simultaneously a humanitarian catastrophe, a daunting barrier to development, and (through its effects on population) a first-order threat to critical regions of high biodiversity. Foreign investors shun the worst-affected economies, and the burdens of ill-health block development in other ways too. Sick children often face a lifetime of diminished productivity because of interruptions in schooling together with cognitive and physical impairment.

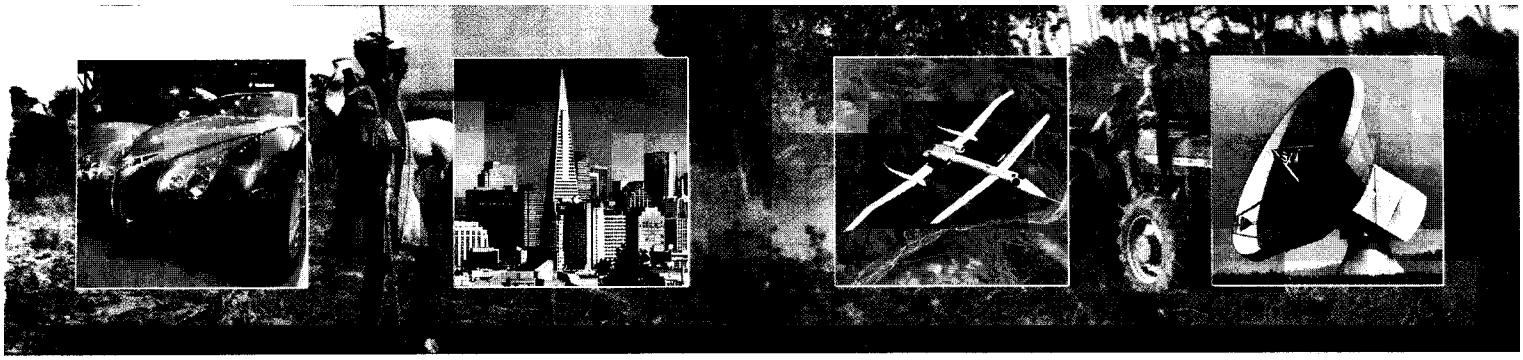
Donor countries' efforts to control infectious disease in the poor countries are small. Worldwide support for malaria control in Africa is probably little more than $50m-75m a year, although malaria claims perhaps 2m lives annually (a million or more directly, and another million or so from diseases in which malaria is a factor). Donor efforts for AIDS control in Africa have averaged no more than a few tens of millions of dollars a year in the past decade. The disease now claims more than 2m lives a year in Africa, with around 4m new infections a year, and around 23m infected Africans overall. Donor support for immunisation has been so small that many poor countries have not even begun to introduce vaccines that have been used routinely in the rich countries for years, and which could greatly reduce death and disease in Africa at modest cost. A donation of up to $1 billion by the Gates Foundation will at last address this urgent problem.

A serious effort would start with a proper battle against these lethal infectious diseases. The Clinton administration, rightly if belatedly, has recognised AIDS in the developing world as a national-security problem for the United States, because of the potential of the disease to destabilise vast regions. Africa's leaders have recently pleaded for $1 billion a year in donor support to help them partially reverse the devastation of malaria. The UN has pleaded for another $4 billion a year to address the AIDS epidemic. A few billion more is needed to address the growing epidemic of TB, and the millions of deaths due to measles, diarrhoeal diseases and other communicable illness.

In all, these initiatives would demand perhaps $10 billion a year from the rich countries. At roughly $10 per person per year for the 1 billion citizens of the first world, the cost of saving millions of lives is paltry.

• **Connecting the marginalised regions**. In recent years NAFTA has bound Mexico into the global high-tech economy and the European Union has developed new trading arrangements with North Africa and Central Europe. These preferential approaches have greatly helped the immediate beneficiaries, but harm more distant regions by drawing FDI and trade away. The cartelisation of global shipping makes things worse: trade routes linking marginal traders with major markets tend to be much less competitive than the high-volume routes. A new





multilateral trade round, with a focus on better market access for the poorest countries, could do much to put this right.

The World Bank and IMF must adopt a new approach in helping marginalised regions to connect to the world economy. Both reject the use of special incentives to attract FDI, such as export-processing zones, tax holidays, and joint ventures between host governments and foreign investors, even though these methods have worked for others. When Costa Rica wanted to attract Intel, it gave incentives. Israel has done the same. Ireland's rapid growth was supported by low rates of corporate tax applied to foreign investments. Rich and poor countries could design co-operative schemes to bring new technologies to the marginalised regions, sharing the fiscal costs.

Information technology offers another huge opportunity, because it can overcome many of the disadvantages of distance. A landlocked region, say Mongolia, surely would have a comparative advantage in IT-based service exports (software, data transcription, telemarketing) as against export-oriented manufactures. America has a sophisticated industrial policy for the uptake of IT; so should the developing countries. Even more important, the political leadership of the developing countries should work with leaders of the IT industry to develop policies for a rapid increase in bandwidth in the poor countries.

• **Fostering technological advance.** At the core of the global divide is the vast inequality in innovation and diffusion of technology. Globalisation policy has barely scratched the surface of this central problem. World Bank lending and grants for science and technology are probably less each year than one-tenth of the R&D budget of a single large American pharmaceutical company. The World Bank devotes around $50m a year to tropical agricultural research, around $10m to tropical health research, and a little more in a scattering of other loans. Merck's R&D budget in 1999 was $2.1 billion.

The model to emulate is the Rockefeller Foundation, the pre-eminent development institution of the 20th century, which showed what grant aid targeted on knowledge could accomplish. Rockefeller funds supported the eradication of hookworm in the American South; the discovery of the Yellow Fever vaccine; the development of penicillin; the establishment of public-health schools (today's undisputed leaders in their fields) all over the world; the establishment of medical faculties in all parts of the world; the creation and funding of great research centres such as the University of Chicago, the Brookings Institution, Rockefeller University, and the National Bureau of Economic Research; the control of malaria in Brazil; the founding of the research centres that accomplished the green revolution in Asia; and more. Not one of these accomplishments was assisted by means of a high-conditionality country loan.

The Rockefeller Foundation worked mainly with universities and governments. A new strategy of technological promotion must be based on an interplay of academia, government and industry, with participation from rich and poor alike. A first step would be a promise by international high-tech firms to increase their technological co-operation with developing countries, combined with a far greater commitment by the poor countries to promote science and technology. The big drugs companies give hundreds of millions of dollars in medicines to poor countries, and under pressure they have agreed to supply anti-AIDS drugs at low cost. But they could do more.

First-world universities and scientific associations could and should help too. Many American and European universities have established overseas campuses or long-term exchange relationships, but these are typically directed towards undergraduate education rather than long-term collaborative research. Research links are underfunded. American universities receive more than $25 billion a year in philanthropic and foundation giving. They ought to devote much more of these funds to deepening their research and teaching relationships with partner institutions in developing countries.

Philanthropy is only part of the answer. Public money will also be needed. Last year Michael Kremer and I proposed to use public-sector pledges to buy new vaccines as a way to direct global research towards malaria, TB and AIDS. President Clinton adopted that approach in proposed new tax breaks for successful vaccine developers. Public funding should aim at a combination of new "push" strategies, in which R&D efforts directed at poor-country problems are explicitly subsidised, and "pull" strategies in which market incentives are enhanced by rich-country commitments to buy new technologies on behalf of the poor countries.

At the government-to-government level, the international community should make a firm commitment to promote scientific and technological capacity in the poor countries. As part of this, rich countries should exercise restraint in the use of property rights. Rich countries are unilaterally asserting rights of private ownership over human and plant genetic sequences, or basic computer codes, or chemical compounds long in use in herbal medicines. These approaches are of dubious legitimacy and will worsen global inequities. A better balance needs to be struck between incentives for innovation on one hand, and the interests of the poorest on the other.

A start, at least

This by no means exhausts the new agenda on policy towards globalisation. The Bretton Woods institutions need to be moved away from the old country-based model of interaction with the third world, and to concentrate their efforts instead on a world dominated by concerns over technology, disease and the environment. The World Bank needs to do less country lending and more to create and disseminate knowledge for development. UN agencies, especially the World Health Organisation, must be redesigned and expanded. The IMF should get out of development altogether and go back to monitoring global financial markets.

More resources will be required. Here, above all, American attitudes need to change. Technological leader and beacon of hope for much of the world, the United States has been the meanest donor of all. It musters a trifling $5 per American each year in budget assistance for the poorest countries. Successive administrations have sought to define assistance in the cheapest possible way. Lecturing poor countries about weak governance, while providing precious little money for technological advance, public health and other needs, is cheap all right. But it does not work.

Quarrels over ideology have ended. The prosperity of the richest countries is at an all-time high, and so is their capacity to look beyond their own immediate needs. At the same time, the crisis of the poorest countries is acute, and the shortcomings of the current strategy of globalisation painfully evident. At the UN's Millennium Assembly later this year, the world's leaders will have a chance to will both the ends and the means for the kind of globalisation that can serve all the world. They must seize that chance. ■