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SUSTAINABLE DEVELOPMENT IN POOR AND FORMERLY POOR NATIONS

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THE SHELL CENTER FOR SUSTAINABILITY

The Shell Center for Sustainability of Rice University supports research, outreach and education related to building a sustainable future in developed and developing countries.

The Center seeks to enhance exchange of information by serving as an independent forum for open discussion and constructive dialogue on sustainable development issues and policies across a broad spectrum of stakeholders, including U.S. and international business, academia, non-governmental agencies (NGOs) and government organizations.

The Center is honored to publish the keynote address for the Center's March 2003 Inaugural Conference, delivered by Dr. Malcolm Gillis, President of Rice University. Dr. Gillis is also a leading international expert in the overall field of sustainable development and related public and private sector policies needed to foster sustainability.

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Biography

Dr. Malcolm Gillis received his B.A. and M.A. degrees from the University of Florida and his Ph.D. from the University of Illinois. He began his academic career at Duke University, followed by a 15-year tenure at Harvard. He returned to Duke in 1984 as Professor of Economics and Public Policy and in July 1990 became Vice Provost for Academic Affairs. In July 1993, Dr. Gillis became the sixth President of Rice University. Before assuming leadership roles in university administration, he was a frequent consultant to the U.S. Treasury Department, Canadian Ministry of Finance, World Bank, and the governments of Colombia, Ecuador, Bolivia and Indonesia. He has published over the 70 articles and is author, co-author or editor of eight books.

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SUSTAINABLE DEVELOPMENT IN POOR AND FORMERLY POOR NATIONS

Malcolm Gillis

March 12, 2003

The concept of sustainable development, obscure just fifteen years ago, now appears regularly in the mainstream media. There is now even a Dow Jones Sustainability Index, to guide managers to opportunities to securing “green growth.”

The august Federal Reserve System has also given the concept pride of place: in its latest announcement on interest rate policy on January 29, the Fed cited sustainable development as a goal co-equal with price stability. When President Bush announced in the January State of the Union address new initiatives on fuel cells to convert chemical energy into electricity and heat, that too was all about sustainable development. The President even made a point of being photographed examining a hydrogen powered car that would vastly reduce pollution and increase sharply long-term energy availabilities.

Under other labels sustainable development has engaged the interests of physical and social scientists since the beginning of the nineteenth century, when Rev. T. R. Malthus predicted the inevitable collision between population and subsistence. Through a series of staggering revolutions in industry, science and technology never envisioned by Malthus, this apocalypse has been deferred time and again. Nevertheless, there is no assurance that humankind can continue to count upon technological innovation to keep the Malthusian wolf at bay for all time. Increasingly,

we have had to turn our attention to the possibilities for creating conditions for sustainable use of nature’s bounty. Sustainable development is all about trying to bring about green growth, which benefits both the natural environment and the humans who depend upon it for clear air, clean water, healthy foods, and so much else.

Today I will be speaking not about the whole panorama of sustainable development, but some neglected aspects of good sustainable policies.

I begin by noting that Rice University is ideally suited as a center for research on sustainability. The search for paths for sustainable development necessarily will involve many disciplines: ecology, biology, and geology/economics, sociology, ethics, political science/mathematics, physics, chemistry, statistics, and engineering. The academic community at Rice is well-accustomed to communicating and working across disciplinary boundaries. We have established a broad spectrum of interdisciplinary centers and institutes to facilitate the exchange of ideas and to leverage each individual’s contribution. At Rice, we are equally at home with interinstitutional alliances, in which the institutions can be combined with our own capacities. In sustainable development as in biotechnology, we are proud of our joint programs

with the many institutions of the Texas Medical Center, U.T. Austin, Texas A&M, UTMB, and institutions in Britain and Germany.

These attributes together enabled us to convince the Shell Oil Foundation and other donors to fund the Shell Center for Sustainability at Rice, which we celebrate today.

There is no universally agreed definition of what is meant by sustainable development. Nor are all definitions of sustainable development sensible. But for the ecologists, economists, and biologists who understand the essence of resource scarcity, sustainable development perhaps may be best defined as the path that maximizes the long-term, net benefits to humankind, net of costs of environmental degradation. Net benefits include not merely income gains, and reduction of unemployment and poverty, but also healthier living conditions. Interpreted this way, sustainable development stresses not the need to limit development, but the need to develop sensibly, in order to be better able to conserve.

Sustainable development seeks to make conservation the handmaiden of development, while protecting the interests of future generations. In sensible sustainable development preservation is valued not for its own sake, but for what it can do for the welfare of present and future generations. One vital condition for approaching sustainability in development is that natural resources and environmental services not be undervalued or underpriced, a condition frequently violated in practice. This is my prime focus today. Sustainable development is an important concept for all societies. But, poor people in developing countries

are far more dependent on their soils, rivers, fisheries, and forests than are citizens of rich countries. Therefore, degradation of resources and environment looms as a much larger threat to life and health in developing countries. Fortunately for low-income nations, sustainable development does not necessarily imply low rates of income growth. It does, however, require less wasteful, more efficient growth.

Poverty itself is the prime adversary of good ecological practices in poor nations. In contrast, for affluent countries such as the U.S., Canada, Japan, and France, many of the most serious environmental problems are caused by affluence. Examples include too much pollution of the air from overuse and wastage of motor fuel, street and highway congestion caused by the addition of several hundred thousand more automobiles each year, conversion of fragile watersheds and beaches into vacation homes on Cape Hatteras, or Hilton Head Island, and housing developments on mountain slopes in Aspen or Jackson Hole.

But the situation is very different in almost all of Africa, much of Latin America, and south and Southeast Asia. In much of the rest of the world outside the U.S. and Europe, many of the most serious environmental problems are caused not by affluence, but by poverty.

For example, there can be little doubt that poverty by itself, or in combination with other factors is the main cause of tropical deforestation in most tropical nations.

Consider, for example, Ghana. In 1900, one-third of Ghana's land area was covered by natural tropical forest. When I first worked in Ghana in 1967-71, the forest still covered about 20 percent of the land; there was still a lot of forest for me to study. No more. By 1995, forest cover had shrunk to less than 5 percent. As elsewhere in West Africa, Southeast Asia, Brazil, and Central America, poverty has been killing the forest. Poor landless Ghanaians, Ivorians, Indonesians, and Burmese practice destructive slash-and-burn agriculture, not because they are ignorant or venal, but because they have no other options. These are not the traditional shifting cultivators of Africa or Asia who for centuries past have moved from parcel to parcel. Rather, I refer to the landless, mostly urban people who have become "shifted cultivators," driven to migrate to the forest by hunger and population pressures.

Slash-and-burn agriculture is not the only manifestation of the effects of poverty on deforestation. In many poor nations, the role of poverty in deforestation has been magnified by the ever-more-desperate search for fuelwood by impoverished people. In Ghana in the mid eighties, for example, for every tree harvested for lumber, nine trees were cut down for firewood, leading to a pattern of deforestation that accelerated soil erosion, groundwater depletion, and loss of agricultural productivity. For developing nations generally, 80 percent of trees cut down are for fuel for cooking or other domestic use, not for export as logs or wood products.

Most of the species on earth occur in the tropical forest. The tropical forest used to cause 12

percent of the earth's land surface before extensive deforestation began. Now it covers less than 6 percent of earth's land. Worldwide, the tropical forest estate shrank by about 142,000 square km. per year in the early nineties. Of that amount, almost 60 percent fell to slash-and-burn agriculture. Another 7 percent or 10,000 square km. were deforested by the search for fuelwood. Forest clearing for cattle ranching, mostly in Brazil and Central America, took another 15,000 square km. per year.

It is important to note that the role of poverty-fueled shifting cultivation in deforestation has been steadily increasing, while the relative roles of logging and cattle ranching have been declining. Nearly 1.5 billion people in the world live in absolute poverty, at least a third of these are landless poor engaged in destructive forms of shifting cultivation. The number of these poor is growing, so we should expect growing damages from shifting cultivation.

The point: so called "solutions" to tropical deforestation that do not take into account the needs of the poor and landless are no solutions at all; rather they are further cruel jokes on the poor.

In forestry, or in fishing, or in agriculture, or natural resource extraction, poverty is, of course, far from the only culprit in national resource degradation. Two other shortcomings have undercut sustainable development: market failure and policy failure. We have long known that market failure has been instrumental. Market failure arises when valuable services provided by an ecosystem are not traded in markets. For

example, intact tropical forests provide a wide range of vital, but non-traded ecological services as control of runoff, soil protection, microclimate control, and protection of animal habitat. Because these vital services are not priced, they are over-used (wasted). There is no market for them.

But market failures, whether due to monopoly, externalities, free riders or transaction costs, now involve few mysteries. They have been studied for many decades by economists, at mind-numbing length. While it has long been recognized that market failure accounts for an important part of the story, it is now much more widely appreciated that policy failures, or government failures, have also loomed quite large in environmental degradation.

One of the prime causes of policy failure leading to needless ecological and economic damage has been a widespread tendency of policy-makers to overlook the environmental consequences of non-environmental policies. Even today it is still not widely recognized that policies intended primarily to attain non-environmental goals can have very large impacts upon the environment. Non-environmental policies include tax policy, exchange rate policy, industrialization policies, credit, and agriculture and food price policies. In much of Africa, Latin America, and Asia a by-product of pursuit of agricultural, energy, urbanization, and industrial objectives has been significant corrosive effects upon soil endowments, watershed management, water quality, coastal fishing, and survival of coastal reefs. From this experience, we should have learned that it is not enough that nations follow

sensible environmental policies. Greater attention to the environmental impact of non-environmental policies and development projects is required as well, not only for more efficient resource use, but also for more equitably distributed growth. Ecological disasters are almost always economic disasters too; in low-income countries the reverse is often true as well, illustrated by the experiences of Rumania, Bulgaria, and Albania over the past five decades. Little imagination is required to see that measures that reduce the environmental damages of non-environmental policies are both good ecology and good economics, while policies that help to overcome poverty are also both good economics and good ecology.

A second, not unrelated, reason for policy failures that damage ecological and environmental values has been a persistent lack of understanding of the role of the market and the role of prices in resource conservation, and in ecological protection. An unusually high proportion of such policy failures is traceable to short-sighted government subsidy programs that deeply underprice water, soils, forest, and energy resources. Perfect example – on public lands out West, U.S. Government charges extremely low prices for grazing leases—cow-burnt pastures from over-grazing.

Everywhere, societies persist in under-estimating the role of market prices in resource conservation or in resource allocation generally. Consider, for example, another very recent United States example outside of the environmental area: pricing of Internet access. A few years back, a major company adopted a pricing mechanism that

involves a flat fee for Internet service: this amounted to a zero price for overuse of scarce Internet access. So, the price of incremental use of the service became unrelated to intensity of use by the subscriber. And the managers were actually surprised when the scheme results in catastrophic collapse from overuse.

Virtually all of the policy failures I am about to depict have resulted primarily from deep underpricing of vital natural and environmental resources, leading to unsustainable, wasteful development.

Quite apart from the effects of poverty, policy failures in forestry have been especially destructive to ecological and economic goals in dozens of tropical countries. Brazil's government long provided heavy subsidies to ranching and other activities that encroached heavily on the Amazon rainforest. Three to four thousand square miles of the Amazon was deforested each year throughout the 1970s. When pastureland replaced the rainforest, it destroyed rainforest occupations that provided more jobs than the subsidized ranching operation. Nevertheless, the government made deforestation as cheap as possible. Government policies provided new ranchers with fifteen-year tax holidays, investment tax credits, exemptions from export taxes and import duties, and loans with interest substantially below market rates. Although a typical subsidized investment yielded a loss to the economy equivalent to 55 percent of the initial investment, heavy subsidies allowed private ranchers to earn a positive return equivalent to 250 percent of their investment, while the forest was relentlessly destroyed.

Most tropical countries including Indonesia, Philippines, and many African nations have charged very low fees for timber concessions and virtually all impose inadequate timber royalties too low to encourage conservation. Thailand's forestry policies were so wanton that its rainforest has all but disappeared. The same can be said for the Ivory Coast, and Gabon and the Philippines are on the same path.

Water Resource Policy

Underpricing of water resources has long been common all over the world. It is safe to say that where one finds acute crisis in water availability, heavy subsidies for water use are usually the prime suspect, except for regions with extended drought.

Subsidies apply both to agricultural water and potable water. Public irrigation systems operated by government owned enterprises and by governmental departments in developing countries had already absorbed \$300 billion in public funds by 1990. It has been estimated that over half of all investments in agriculture in LDC's in the 1980's went into water resource development; in Mexico fully 80 percent of all public investment in agriculture from 1940 to 1990 was in irrigation projects. There, charges for irrigation water averages only 11 percent of total costs. And in a sample of World Bank irrigation projects in LDC's, revenues covered only 7 percent of project costs, on average, while in most other countries revenue from farmers cover less than 20 percent of capital and operating costs. When a resource is underpriced, it will be overused, and wasted.

Very cheap prices for irrigation water have, of course, resulted in very high rates of water waste, whether from the Colorado River, the Indus River, or the Aral Sea of the former Soviet Union, straddling Uzbekistan and Kazakhstan.

Markets also have other roles to play in the sustainable use of drinking water. In most of the world, provision of drinking water is dominated by government departments or government-owned enterprises. But in dozens of countries, infant mortality from unsafe water remains very high. What can happen when reliance is placed on market mechanisms instead of government enterprises to provide water? Here is one example.

In the 1990s Argentina embarked on one of the largest privatization campaigns in the world including the privatization of local water companies covering approximately 30 percent of the country's municipalities. American and Argentinean researchers found child mortality fell 8 percent in areas that privatized their water services overall; the effect was largest (26 percent) in the poorest areas. Privatization is associated with significant reductions in deaths from infectious and parasitic diseases.

Energy pricing provides an altogether frightful history of policy failure leading to unsustainable development. In such oil-rich countries such as Nigeria, Indonesia, and Venezuela, domestic use of energy has been kept artificially cheap as a stimulus to industrialization and diversification. This has had multiple adverse effects on ecology and on the economy. First, these subsidies

encouraged wasteful domestic consumption, thereby reducing the country's petroleum and gas reserves and its export earning potential. Second, underpricing of energy artificially promoted the use of auto transport, adding to urban congestion and air pollution. Third, artificially cheap energy promoted industry that was ill suited to the country's endowments: with very cheap energy firms and consumers have little incentive to adopt energy-saving technologies. Thus, on several counts, underpricing contributed to environmental degradation, as well as very sizable economic losses.

Indonesia's kerosene policy furnishes another instructive example. For fifteen years the government of Indonesia heavily subsidized the consumption of kerosene and other fuels. The kerosene subsidy was thought to be justified as a way of *reducing* environmental degradation, and to aid poor rural dwellers, who were thought to use kerosene for cooking. Heavily subsidized kerosene prices were seen as a disincentive to the cutting of fuelwood which was denuding mountain slopes and causing major soil erosion on Java, Indonesia's most densely populated island. This was a totally misplaced subsidy. Research clearly showed that rural families used kerosene predominantly for *lighting*, not for cooking. In any case, only 50,000 acres of forestland was protected each year by the subsidy, at a cost of almost U.S. \$200,000 a year per acre. Replanting programs, in contrast, cost only \$1,000 per acre. Moreover, 80 percent of kerosene turned out to be consumed by the relatively wealthy, not the poor. And the low price of kerosene made it necessary to subsidize diesel fuel as well, because the two fuels could be substituted in truck

engines, causing greater environmental damage. The multiple costs of this policy finally led the government to sharply reduce its subsidy on kerosene. Indeed, Indonesia now tries to price most fuels at world market levels.

Some of my colleagues have studied commercial energy use per unit of GDP for almost ninety countries. The variance in utilization of commercial energy, even among poor countries, is notable. Mistaken energy policies are principally, but not wholly, to blame for very high rates of domestic energy consumption in countries like Colombia, Bolivia, and Venezuela. Even recently, Venezuela has priced gasoline at less than 30 U.S. cents a gallon. The environmental consequences of underpricing of energy was particularly notable in such formerly communist command and control countries, Poland, Bulgaria, Hungary, Czechoslovakia, and Romania where markets played very little role in resource allocation until quite recently. Consequently, air and water pollution in these nations were among the worst in the world.

Another arena for environmental policy failure has been agricultural subsidies. These have yielded notable economic and ecological damage everywhere, but especially in poor nations. Governments around the globe have adopted policies resulting in severely underpriced chemicals, especially fertilizer made from natural gas.

Attempts have also been made to justify heavy fertilizer subsidies not only on grounds of their effects on agricultural production, but also on

grounds that the subsidies serve soil enrichment and conservation purposes. These arguments do not stand up to close analysis, particularly in semi-arid tropical countries where what is most needed is better adapted, but rarely subsidized, organic fertilizers and the use of moisture-retaining methods. Indeed, there is evidence that sustained use of chemical fertilizers can actually reduce soil fertility long-term. Moreover, overuse of subsidized fertilizer and other chemicals such as pesticides and herbicides has often led to significant environmental damages, rather than environmental protection.

Further, very high subsidies on fertilizer have led to substantial waste. In Indonesia, for example, fertilizer use increased by 77 percent from 1980-85 alone. As a result, rice cultivation in that nation involved triple the allocation of fertilizer (per hectare) relative to Thailand and Philippines (World Bank, 1987, p. 102).

Finally, many agricultural subsidies have not only been expensive, but strongly, and strangely, counterproductive. This was the case for very heavy pesticide subsidies also in Indonesia. Not only were overused pesticides damaging the environment, but also they were ineffective. Therefore, heavily subsidized pesticides actually increased infestations of agricultural pests because of the greater effects of the pesticides on the natural predators of pests.

In the face of persistent market failures and ubiquitous policy failures, is sustainable development in poor nations even possible? The answer is, I believe a qualified yes, at least for any

one country, provided attention is strongly focused upon rectifying both market failures and policy failures that corrode sustainability, and upon measures to reduce rural poverty.

The Malaysian case is instructive. This is a country that contains plenty of contemporaneous examples of both sustainable and non-sustainable development. West Malaysia is separated from East Malaysia by nearly 400 miles of ocean, in the South China Sea. West Malaysia consists primarily of the Malaysian Peninsula, while East Malaysia includes the two states of Sabah and Sarawak, on the island of Borneo.

After an inauspicious, largely wasteful start earlier this century, West Malaysia has enjoyed mostly sustainable development for nearly three decades, because it finally successfully capitalized upon its initial natural resource base. Real economic growth was in excess of 3 percent from 1965-1990 and nearly 5 percent since. This rapid growth has virtually banished rural poverty as a cause of deforestation and other environmental degradation. Moreover, the environment in Peninsular Malaysia has suffered only lightly from policy failures.

Sabah and Sarawak in East Malaysia had, if anything, a more difficult time than Peninsular Malaysia. But for Sarawak since the mid-eighties and Sabah since 1970, development has been unsustainable. Sustainable development in Sarawak continues to be plagued by the scourge of rural poverty, while in both Sarawak and Sabah, natural forest endowments have been consumed by unsustainable practices, largely as a result of very serious policy failure,

particularly through grossly misguided forestry policy involving subsidies to timber firms.

In any case, the answer to the question: *Can Economic Development Be Sustainable?* is yes, for any given country that pays appropriate attention to resource scarcity, avoiding artificially cheap prices for natural resources and environmental services.

But the answer becomes much less certain when we consider global sustainability, for the entire planet. The Malthusians are still with us, insisting that growth cannot be sustainable.

Some argue that what sustainable growth means is that the rich have to sharply curtail their living standards to make room for more consumption by the poor. The implicit assumption is that the reason poor people are poor is because rich people are rich. Is that so? Jeff Sachs, my former colleague, now at Columbia, says that rich people in rich countries are rich because they have developed technology to successfully deal with challenges, and because of geographical advantage.

Mainstream economics offers hope. In the short term we can make incremental progress in rectifying *market* failures leading to environmental degradation. And in the short and long term we can do a great deal to reduce damages from *policy* failures. If so, one major feature of a strategy for global sustainability would be to move quickly towards more effective markets, so that real resource scarcities will be reflected in the prices people pay for all commodities and services. An

end to underpricing and heavy subsidies on fuels, fertilizers, pesticides, water, timber, land clearing, and other destructive uses of resources would be a major step towards sustainability. Most countries are far from this ideal market environment. They could easily reduce resource wastage *without* jeopardizing economic growth, through better policies, better pricing of scarce natural resources,

in some cases judicious reliance on privatization, and above all, measures to reduce poverty especially in rural areas.



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