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Scholz, Imme

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Protection and Sustainable Use of Tropical Forests
Points of Departure in the Brazilian Timber Industry

- *Protection of tropical forests is essential, for reasons bound up with the need to protect endangered species and the climate. The earth's largest uninterrupted tropical forest is to be found in Brazil's Amazon region. While the dynamics of deforestation has decelerated as compared with the 1970s and 1980s, there is nevertheless no reason to sound the all-clear. The main reasons for the deforestation continue to be cattle-ranching, soybean cultivation, and the logging engaged in by the timber industry.*
- *Out of concern about climate change and in the interest of protecting biodiversity, the G7 countries, led by Germany, have, since 1993, made available a total of US $ 320 million for a pilot program aimed at protecting Brazil's tropical forests (PPG-7). PPG-7 provides for a mixed concept consisting of conservation and environmentally sound agriculture and forestry that is geared to checking the process of deforestation.*
- *What this means for the Amazon tropical-timber industry is that it is going to have to convert to sustainable forest management. The industry is in any case under strong pressure to adjust: on the one hand its share of the world timber market is declining because new timber materials are on the advance that offer better technical properties than tropical timber and, since these wood panels are manufactured from timber grown on plantations, are also cheaper. On the other hand the environmentally sensitized sales markets in Europe are demanding more and more certified timber verifiably coming from sustainably managed forests. In this case a reorientation to the more exacting segments of the world market can encourage Brazil's timber industry to adopt production patterns that are more compatible in environmental terms.*
- *Development cooperation can contribute to the ecological modernization of the timber industry by supporting Brazil's environmental administration at the regional and municipal levels and providing the firms concerned with assistance in converting to a sustainable forest management. This can take the form of industry-specific consulting programs as well as the development of new intercompany cooperative ventures abroad. Another important approach is to support the marketing of certified timber in Brazil and in Europe alike.*

Significance of the Amazon forests

The tropical forests are some of the world's oldest, most species-rich, and most complex ecosystems. Many conservationists see these characteristics as reason enough to place the tropical forests under protection. But protection of the tropical forests also serves to safeguard the overall foundations of human life:

– The animal and plant species found in the tropics constitute a reservoir for medical research and the cultivation of various useful plants.
– The tropical forests provide an important contribution to stabilizing the climate in the tropics. Tropical forests use their high rates of energy exchange to hold regional hydrological cycles and temperatures stable.
– Finally, the tropical forests store large amounts of carbon in their biomass; should this carbon be released through slashing and burning, it would add to the greenhouse effect and be likely to accelerate climate change.

The Amazon forests cover an area of the size of western Europe; they today form the world's largest continuous uninterrupted forest area.

Dynamics of deforestation

At the end of the 1980s, 325,000 forest fires were registered in the Amazon region, a fact which is taken to indicate that roughly 80,000 km^2 of forest were cleared between 1987 and 1988 - a record figure. A widely known World Bank study predicted that the deforested area would increase twentyfold between 1975 and 1988. In 1992 the highly reputed World Resources Institute reported that the CO_2 emissions stemming from land clearance in the Amazon region were exceeding the emissions from the combustion of fossil energies in the US. In the media some claimed that the "the world's green lung" was being destroyed to make hamburgers and that this was having far-reaching consequences for the world climate.

Though there is as yet no reason to lean back and relax, there are at present more data available that can be used to sketch a more exact picture:

Deforestation is advancing at a slower pace than was feared in the 1980s. Between 1977 and 1988 the deforestation rates averaged 12,130 km^2 per year. In 1990/1991 the figure declined to 11,130 km^2. In 1994/95 it reached a peak of 29,059 km^2, in order then, by 1998, to fall to an average value of roughly 16,000 km^2. The overall wooded area that has thus far been deforested is 548,924 km^2. This amounts to some 10 % of the area of the Amazon region and is lower than the figure predicted by the World Bank for 1988.

What is chiefly responsible for the greenhouse effect is less deforestation than the emissions that have been generated since the onset of industrialization by the combustion of fossil energies, subsequently accumulating in the earth's atmosphere. The figures for CO_2 emissions due to slash-and-burn clearance have had to be drastically corrected downward. Still, in 1992 Brazil's agriculture-related CO_2 emissions accounted, for all that, for 4.1 % of the world's emissions from industry, transportation, and agriculture. It must at the same time be

noted that the US alone was responsible for 18.5 % of these same emissions.

The Amazon forests are not the world's only "green lung." For years the part played by the forests in producing oxygen and absorbing carbon was overestimated. Today we know that the role of the oceans is far more significant in this respect. It is above all for the regional metabolic cycle that the Amazon forests are important.

Finally, it is true that it is big landed property, and here in particular cattle-ranching, the most extensive agricultural production system, that can be made responsible for the land clearance. The beef produced in the Amazon is, however, consumed in the domestic market and not exported.

Causes of deforestation

For the phase between 1964 and 1985 there is some clarity as to the causes of deforestation. The Brazilian federal government resolved in this period to use a huge development program to connect the Amazon region to the country's road network and open it up for agricultural production and mining. The consequences of these measures included a major, largely uncontrolled influx of settlers and the clearance of large forest areas, in particular to create cattle ranches. Agriculture accounted for some 91 % of deforestation: some 40 % of this figure for rangeland, 32 % for cropland, and 15 % for shifting cultivation. Small farmers (< 100 ha) are responsible for only some 30 % of agriculture-related deforestation. The important factor is that the cultivation systems used by small and medium-size farms (< 200 ha) include fallow periods and tree cultures that require a permanent or only briefly interrupted vegetation cover and utilize the secondary forest as a carbon and nutrient store, in this way safeguarding the soil's humus content and fertility. Larger farms are dominated by cattle-ranching, which leads to a permanent conversion of forest systems into savanna systems.

The causes of deforestation are more difficult to ascertain unambiguously for the 1990s. Satellite-based data on advancing deforestation do not concur with the data from the agrarian census, which between 1985 and 1995 noted on the whole a *decline* in the number of farms and a *contraction* of the area of farmland in use in the Amazon region. Only in the federal state of Mato Grosso has the area used as farmland increased sharply due to the large-scale cultivation of soybeans there. At the same time the data of the 1995 population census indicated that the influx of landless persons from other parts of Brazil has largely come to an end.

Responses in the industrialized countries

Persistent deforestation and its possible consequences for the regional and global climate were the cause of considerable concern on the part of the G7. Since 1993 the latter has therefore made available some US $ 320 million for a **pilot program for the protection of Brazil's tropical forests** (PPG-7); roughly half of these funds stem from Germany. The program is designed to support the Brazilian partners in implementing an environmental policy as well as in formulating price relations and designing industry-specific structural measures. This involves, among other factors, strengthening the Amazon environmental authorities, demarcating protected Indian areas, encouraging sustainable land-use initiatives of the rural population, and promoting the adoption of a sustainable forest management.

This places the Amazon timber industry in the focus of development cooperation. Up until the 1980s the proliferation of agriculture was closely linked with the timber industry's search for raw materials; in the areas connected to the road network the timber industry financed the land-clearance costs of farmers, both big and small. On the lookout for valuable mahogany reserves, the industry has in recent years cut some 3000 km of illegal roads into the forest, and these in turn have attracted farming settlements. Moreover, logging leads to forest damage that is not registered by satellite: the excessive use of heavy machinery compacts the soil and tears down adjacent vegetation, which then dies out. Damaged, the forest is slower to regenerate and is more susceptible to forest fire. This means that the timber industry's indirect contribution to deforestation is probably greater than has been assumed.

With an eye to counteracting these processes, NGOs in the industrialized countries called for boycott campaigns in the 1980s. In the meantime, however, it has become clear that boycotts of tropical timber tend to miss their mark: since boycotts lower the value of timber reserves, they can contribute to an increased conversion of forests into farm- and rangeland. This is why it is now important to find ways and means to promote a sustainable utilization of the renewable resources of the tropics; this goes for both different forest products (timber, resins, and oils) and agriculture. To reach this goal it is on the one hand necessary to alter the industry's logging, processing, and marketing methods and on the other hand it is imperative to go new ways in agricultural land use and to encourage the development of diversified cultivation systems. This implies taking leave of the model of the "rational large-scale farm" (cattle-ranching, mechanized soybean and corn cultivation) and instead to start promoting smaller and medium-size farms. Sustainable forest management must become a permanent component of agricultural production systems, instead of merely functioning as a means of financing the conversion of forest into farmland.

New framework conditions for the tropical-timber industry

The guiding model of the Amazon timber industry will have to change, not only for ecological reasons but also from an economic point of view. On the one hand, with real prices falling in the world timber market, the shares of tropical timber are on the decline; on the other hand environmentally sensitized consumers in the industrialized countries are increasingly demanding that the tropical timber traded be certified as having been produced using the methods of sustainable forest management.

The declining competitiveness of tropical timber is mainly a result of substitution pressure. Increasingly, for instance, materials like PVC and aluminium are being used to manufacture windows. In addition, the process of technical change has given rise to new materials whose properties are in no way inferior to those of tropical timber and may sometimes even be superior to them. These new technology-intensive reconstituted wood panels are manufactured from homogeneous fiber and particles that are won in plantations. One of the reasons why the costs of producing timber in these plantations (in southern Brazil, Chile, Portugal) are lower than production of tropical timber is that it is in the former case possible to achieve economies of scale. This entails a shift in the crucial competitive advantages of timber-producing countries from inherited, natural resources endowments in the form of natural forest stands to an endowment with created resources. The latter are, however, not without the risks typical of monocultures, e.g. overstrained soil and water resources, diminished biodiversity, and economic dependence on a single product.

In the Amazon region forestry experiments have shown that the best way to ensure continuous timber production

is to stimulate the natural regeneration of the tropical forest and reduce as far as possible any damage to forest and soils during logging and transportation operations. Creating plantations of domestic or exotic species (eucalyptus, pine) entails high costs and risks associated with pests, pressure on biodiversity, and impairment of soils and the hydrological cycle. This can therefore not be recommended.

Conversion to nature-oriented forest utilization requires that the companies concerned learn to gear their logging and production operations to the forest's sustainable timber supply, and not - as usual - primarily to demand. Marketing the timber with an eye to securing yields and profits is faced with the problem of having to sell a far greater number of species in smaller quantities than is usually the case. Today, most of these species can be sold only in local markets at low prices. They are unknown in the industrialized countries; it as a rule takes several years to introduce them to new markets.

Bearing in mind these additional costs of sustainable forest management, and setting them against local timber prices, we find that sustainable forest management would not be profitable at current price levels. Nature-oriented forest management has an economic future only if it succeeds in increasing its efficiency in logging, transportation, and processing as well as in widening and diversifying its sales markets.

An incentive for converting to sustainability is the voluntary company certification with an eye to ecological, economic, and social criteria. In Europe timber from a certified company can command prices 10 - 15 % higher than usual.

Certification by the Forest Stewardship Council

The Forest Stewardship Council (FSC), an international federation of environmental groups and other NGOs, research institutes, and associations of the timber industry, has developed a procedure for an internationally uniform and yet locally adapted certification of forest management. It includes ten universal principles of economically efficient, ecologically sustainable, and socially compatible forest management, with national FSC working groups elaborating locally adapted criteria and indicators. The certification itself is performed by independent institutions accredited with and supervised by the FSC.

Certification as a control instrument has a chance only if it is credible. Abuses are as a rule quickly discovered by environmental groups and the media and fuel the mistrust of consumers, who are in any case already disconcerted. Timber firms interested in certification will have to substantially expand their administrative structures, on the one hand to document their logging, transportation, and processing activities, on the other hand to plan logging operations over a period of at least 35 years.

This ambitious program geared to an ecological modernization of the timber industry will succeed only if it is shored up by environmental- and structural-policy measures, since the market incentives are weak due to the low level of profitability of primary timber processing.

The innovativeness of Pará's timber industry

In the medium term the Amazon timber industry will be unable to compete in the world market for mass-produced wood products and will instead have to switch to the production of high-quality wood products for niche markets in which there is demand for timber with specific properties, e.g. for furniture, music instruments, and artists' needs. Though this may entail a decline in the physical volume of the tropical timber traded throughout the world, it may mean an increase in the monetary value of such timber.

Beside the timber industry of the federal state of Mato Grosso, Pará's timber industry - the state covers roughly half of Brazil's Amazon region - accounts for the lion's share of the timber produced in the Amazon region; Pará has also always been the region's foremost timber exporter. This state is therefore particularly important to determining what relevance changes in the world market have for the industry's practical action patterns and perception of the problem.

The problems facing Pará's timber industry become evident in the following structural characteristics:

– The "typical sawmill" is a small family-operated company with fewer than 20 workers and in possession of one band saw that is used to produce roughly 4,200 m^3 of sawnwood; the machinery used is as a rule old (may even have been taken over used) and in a poor state of maintenance; the workers have no formal training, and are instead given whatever training they need on the job.
– Logging operations are conducted using power saws, tractors, bulldozers, and trucks; the conventional selective felling is oriented to the marketability of species and not to safeguarding a sustainable timber supply.
– Logging and processing are seen as activities that are engaged in for a limited period of time, until the timber reserves in the accessible vicinity of a sawmill have been exhausted. Since the forest is regarded as a free good that will in any case have to make room for farming and ranching, investments are geared either to using mechanization to increase logging productivity or to tracking down valuable stands of precious timber, above all mahogany.

These characteristics emerged in the 1960s and have remained stable since then. The industry's growth followed an expansive pattern that offered almost no approaches toward any general intensification. True, the industry used incremental innovations - mechanization of logging as a means of reducing the relatively high wage costs and widening the spectrum of the species exploited - to achieve an increase in the physical volume of output, though it largely failed to raise productivity in the process. The growth of the industry has thus mainly rested on a spatial expansion which entailed no dynamic effects for local or regional economic development.

The enormous increase in demand in the 1970s led to a situation in which the producers always found buyers for their wares; the domestic market was unexacting as far as quality is concerned, demanding instead only the ability to deliver large quantities, which was made possible by the mechanization of logging. The high domestic demand also compensated for the loss of the world market caused by the 1974 export ban on logs. Exports declined from 60 % to roughly 10 % of output; yet the industry continued to grow.

The trend was reversed in the recession of the 1980s: sawnwood exports began to grow. The export-oriented firms could grow by cashing in on the high external demand for mahogany, which persisted until the beginning of the 1990s. Moreover, many entrepreneurs used the subsidized export loans available to them for speculative investments, in this way making additional profits.

In this period the forest law of 1965 was just about void of practical relevance. Neither was there any pronounced political interest in translating the law - which contained strict regulations on forest management - into practice

nor were there any economic reasons to deal sparingly with forest resources.

It was in this way that entrepreneurs were able to cling unwaveringly to their routines. The new quality of the difficulties confronting these companies in the 1990s has not yet been fully recognized; their ability to come up with problem-solving innovations must be termed low. Entrepreneurs who break out of the conventional action patterns by adopting methods of nature-oriented forest management or specializing in a given market segment as a means of improving product quality and company productivity are and remain exceptions.

Chances for a reorientation in the Amazon timber industry

The adjustment pressure to which the Amazon timber industry is exposed has been growing in recent years:

– The established locations of sawmills have been experiencing supply bottlenecks in marketable tree species.
– The plantations in the south of Brazil, which already account for 60 % of the country's roundwood output, are increasing the competitive pressure. At the same time there is more and more investment in the production of new wood panels that compete with tropical plywood.
– The environmental authorities are increasing the pressure to comply with the stipulations of the forest law. Brazilian environmental groups and the leading firms in the pulp industry have already begun having the plantation economy certified as per FSC criteria; indicators for tropical forestry are currently in the test phase.

This should mean improved chances to overcome existing routines. The majority of owners of sawmills and plywood factories as well as timber exporters from the Amazon region assume that companies will have to look either to plantations or to sustainable forest management for sources of timber and at the same time improve their processing methods: on the one hand because timber exports to the industrialized countries are more and more being conditioned on an ecological certification; on the other hand because production costs will have to be reduced and productivity and quality raised if these companies are to survive in competition. One circumstance that demonstrates the industry's productivity deficits is the fact that following the devaluation undertaken in January 1999 timber exports did not pick up as expected.

One threat is posed by the investments and projects of Asian and US timber corporations, which have been growing since 1997. In view of exhausted forest stands in Southeast Asia, these corporations are seeking new sources of raw materials or - thanks to the ban on log exports - are interested in the Amazon region as a location for the mass production of plywood and sawnwood. These financially powerful corporations must be obliged from the outset to comply with environmental regulations. Since it is questionable whether they will be able to produce profitably under these conditions, there is a great risk that the outcome may be destructive exploitation of the remaining tropical forests.

Points of departure for development cooperation

The donors and the Brazilian actors can shape the legal and economic framework conditions in such a way as to point the restructuring of the tropical-timber industry in the right direction and embed it in a more comprehensive strategy for an environmentally compatible development of the Amazon region. This is important as a means of preventing any mass switchover of sawmill owners to cattle-ranching and soybean-farming in freshly cleared forest areas. The framework conditions include above all

– development of a mixed concept for the region that consists of a demarcation of forest-conservation areas and rules for sustainable agriculture and forestry;
– strengthening environmental authorities at the regional and local levels (monitoring, control, sanctions);
– continuation of the export ban on logs from the Amazon region;
– introduction of mahogany contingents, even in the domestic market; and
– retention of a competition and export orientation in economic and trade policy, tempered by clear-cut resource-protection regulations as a means of keeping up the economic-ecological pressure on the timber industry.

If the supply of certified timber is to be increased, it will be necessary to offer the firms concerned support in effecting the transition to nature-oriented forest management, since their own innovative capacity is limited. In this connection it would make sense to set up a consulting program for the industry and to initiate cooperative ventures between suppliers from the Amazon region and customers in Europe.

As a complement to improvements on the supply side (sustainable forest management), it would be important to stimulate the demand for certified tropical timber both in Brazil and in Europe. The task of development cooperation would be to support joint initiatives of the environmental authorities and the timber trade, in this way contributing to increasing consumer information and expanding demand.

Imme Scholz

Additional Readings

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GERMAN DEVELOPMENT INSTITUTE · INSTITUT ALLEMAND DE DEVELOPPEMENT
HALLERSTRASSE 3 · D-10587 BERLIN · TELEFON (030) 390 73-0 · TELEFAX (030) 390 73-130
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