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A wild west frontier on Sumatra's east coast The Pekanbaru-Dumai Road

I made my first, casual visit to the Indonesian province of Riau in 1990, taking the bus from Pekanbaru to Siak Sri Indrapura.¹ By then, I had already seen hundreds of kilometres of Sumatra's roads, but what I saw in Riau left me shocked. For almost as far as the eye could see, the forest was gone from both sides of the road, with only a thin line of trees visible on the horizon. Closer to the road there was nothing left but grassland and shrubs, while here and there an isolated blackened trunk without leaves, the remains of a forest giant, pointed into the air like the gibbet on a gallows-field. The road was edged by a pipeline, with a few basic wooden sheds by the roadside. This forsaken country alternated with an equally desolate landscape of oil palms, stretching for many monotonous kilometres on end. The land, seemingly destroyed without purpose, captivated me. Nine years later I returned to do fieldwork.

The coastal area of mainland Riau, on the east coast of Sumatra, has experienced intriguingly rapid economic development, bringing in its wake social and environmental strains. This formerly remote corner of Sumatra quickly gained economic importance with the start of the exploitation of its mineral oil reserves, shortly after Independence. Later, logging, agricultural estates cultivating rubber trees and oil palms, and a pulp-and-paper industry also became major economic activities. Analyses of the boom tend to discuss the economy sector by sector and ignore the way in which an emerging road network connected the various sectors. The connection of sectors by roads suggests a causal link between the development of one sector and that of another sector, not only spatially but also, or even especially, temporally.

¹ This article forms part of a long-term research project on 'Access to natural resources along the transport axes of Riau Daratan (Indonesia), 1870-2000'. I am very grateful to the International Institute for Asian Studies (IIAS) in Leiden, the Netherlands Foundation for the Advancement of Tropical Research (WOTRO), and Leiden University, which financed three three-week fieldwork trips in 1999, 2000, and 2001. I am also very grateful to Rivke Jaffe, who checked the language.

The coastal area between the inland provincial capital of Riau, Pekanbaru, and the sea, is characteristic of a frontier society. It is, or was, rich in natural resources, but reaching the natural resources in the inaccessible lowland tropical rainforest was difficult. Population density was low in the forest. The importance of rivers in this uninviting area can hardly be overestimated: for centuries they formed routes of transport (of people, goods, and ideas) and the major determinant of human settlement patterns. Only against this background can the enormous impact of a new road from Pekanbaru to the seaport of Dumai be understood. This road was constructed in 1958 by the Caltex oil company and has been upgraded and extended since then. In this article I examine the social, economic, and environmental impacts of the road.

The question of what the impact of the Pekanbaru-Dumai road has been can be answered at both a macro and a micro level of analysis. My analysis starts at the macro level of historical geography. I shall argue that the Caltex roads opened up the area to successive waves of newcomers. In order to make this point, the economic activities will be approached not as sectors, but as the deeds of actors, who observe the situation, assess the economic opportunities, and calculate the risks offered by new roads.

Once economic development is approached in terms of actors instead of sectors, the analysis provides room for different perceptions, looking at unequal resources and conflicting interests of entrepreneurs, both big and small. The run for virgin natural resources, the succession of different kinds of entrepreneurs, the rapid immigration into an area of low population density, and the lack of a sense of social responsibility on the part of the various actors (a sense that might have mitigated social conflicts between various actors) are all indicative of a frontier society. I believe that the frontier conditions help explain why the ecosystem is being devastated so recklessly. The frontier concept helps us make the step from the macro to the micro level of analysis, from the frontier conditions of the historical geography to the behaviour of individuals, families, and companies.

The micro-level analysis of the socio-economic impact of road construction focuses on how the various actors interact when a new road is being built. The interaction between different actors is based on the goals, expectations, and means of each respective group. The groups can cooperate to build or maintain a road, ignore each other, or contest a road. The past Reformasi in Indonesia released the pent-up frustrations of the ordinary people, with the result that conflicts over roads have increased. The third issue addressed in this article is how different groups try to bend the use of a projected or completed road to their own benefit. In extreme cases some actors obstruct the construction of roads or restrict the use of them, and I therefore conclude that we must let go of the notion that roads are inherently good.

A historical geography of Riau

A cross-section of Riau would show the following from west to east, or from the interior to the coast: the foothills of the Barisan mountain range, which lies farther west; peneplain; a wide, alluvial coastal zone of peat-swamp; and, off the coast in the Strait of Malacca, hundreds of islands (Map 1). Four large rivers traverse mainland Riau, flowing down from the Barisan: the Rokan, the Siak, the Kampar, and the Indragiri. The predominant vegetation in Riau, before the human impact made itself felt on a massive scale, was tropical peat-swamp forest (Heeres 1921:185-98; Scholz 1988:31-5; Whitten et al. 1987:219-37). The provincial capital, Pekanbaru, lies a hundred km from the east coast, at a point where peneplain becomes marshland, and yet the lowest parts of the city are only about ten metres above sea level (Bappeda Pekanbaru 1989:2).

The swampland, which is inundated during part of the year, and the dense vegetation form an effective barrier preventing overland access from the coast to the forest. In this country, rich in potential but poor in accessibility, transport axes are more important than anywhere else. For generations, rivers formed the easiest, and in fact quite convenient, transport routes. Human settlements were concentrated alongside the rivers. Main markets developed where tributaries branched off, or beyond where ships of a certain draught could not pass and had to transfer their goods to smaller vessels. Beyond the confines of the rivers, footpaths were the only transportation routes and population density was very low (Collet 1925:31-8; Oki 1986).

The pre-colonial economy consisted of subsistence production in the form of slash-and-burn cultivation, tidal swamp rice, and fishing (Furukawa 1994:91-142). People also collected non-timber forest products (like resins, wax, rattan, and ivory) for trade. The end of the nineteenth century saw the first large-scale exploitation of natural resources, namely timber. So-called *panglong* (lumber camps) multiplied quickly to supply Singapore with timber and charcoal. At the time, the absence of roads confined logging to the vicinity of waterways: *panglong* were found only along the coast and in the estuaries (Erman 1994).

The rise of the motorcar provided the impetus for a Sumatra road scheme, planned by the central colonial government. A road from Pekanbaru to the highlands of the Barisan range, and on to the west coast, was completed in 1929. Dutch companies in Padang, situated on the west coast at the same latitude as Pekanbaru, feared that trade to and from the highlands would shift from Padang to Pekanbaru. The *resident* (highest civil administrator) of West Sumatra is said to have deliberately delayed road construction in 1926 for the benefit of the Dutch trade houses in his *residentie*. He denied having malicious intentions, but it is not too far-fetched to view this as an early example of

Map 1. Riau

an interest group obstructing road construction (Colombijn 1996:391-3).

The road from Pekanbaru to Padang greatly reduced travelling time, but, as it followed the rivers, did not alter the direction of transport routes. Nevertheless, its impact was more than the reduction of travelling time. This road, along with feeder roads, opened forestland to new settlers. During the rubber boom of the late colonial period, in which Riau had its share, small-holder rubber plantations lined not only the waterways, but the roads as well (*Sumatra Bode* 15-4-1929). The mushrooming of rubber gardens along the road foreshadowed the development of oil-palm plantations in the last quarter of the twentieth century.

Riau's economy entered a completely new phase with the exploitation of oil. The California Texas Oil Company (Caltex), a joint daughter company of Standard Oil Company of California (now Chevron) and Texaco, discovered the first oil field in Riau in 1940, and hit the Duri Field a year later. The Second World War interrupted further operations. In 1944, a Japanese geologist in army service discovered the very rich Minas Field, which, like the previously discovered oil fields, could not be exploited because of wartime conditions. In 1952, Caltex was finally able to start production. From then on, oil mining in Riau has been a success story, with regular discoveries of new fields, extensions of concessions, and rising production. After a first peak in the 1970s, production reached a new high in the 1990s due to the new technology of injecting steam under high pressure into the oil deposits (CPI 1983: 41-5; CPI 1986; CPI 2000; Table 1). In 1971, oil accounted for about 67 per cent of GDP in Riau, increasing to 87 per cent in 1983 (Esmara 1975:29; Rice 1989: 130). A little-known fact is that at its height in 1970, Dumai handled 84 per cent of all of Indonesia's oil export (Esmara 1975:37); by that time Indonesia was becoming totally dependent on oil exports for its foreign currency. It is not an exaggeration to say that Riau oil was the single most important factor supporting the New Order government's early economic success.

Oil, a bulk good, posed new transport problems. At first it was collected in barges and brought down the Siak to Sungaipakning, a port at the estuary, where the oil was transferred to tankers. This was a laborious process. Caltex found a radical solution to the transportation problem through a whole new outlet, with the construction of a deep-sea port at Dumai and a 150-km pipeline (from Minas, via Duri, to Dumai). In order to bring in the equipment for the building and maintenance of the pipeline, Caltex built a small road along the pipeline. This road was extended from Minas to Pekanbaru to facilitate the passenger transport of Caltex employees living in Pekanbaru. In 1958 the whole road, from Pekanbaru to Dumai, was completed. Later, the discovery and development of the Zamrud Field necessitated another road and pipeline from Minas, via Perawang, in the direction of Siak Sri Indrapura (CPI 1983:34-40, 53-4).

Table 1. Oil production of PT Caltex Pacific Indonesia, 1959-1999

year	1,000 barrels/day
1959-1960	184
1961-1965	257
1966-1970	482
1971-1975	871
1976-1980	797
1981-1985	634
1986-1990	626
1991-1995	704
1996-1999	757

Sources: 1959-1990 Soetrisno and Dewanta (1993:115); 1991-1999 CPI (2000:15-8).

Caltex is not the only oil company in Riau, but it is by far the most important.² Caltex is omnipresent and has made significant contributions to schools, mosques, Universitas Riau (UNRI), the sports stadium and airport at Pekanbaru, as well as telephone lines, piped water, and electricity facilities (CPI 1983:47-64). But, arguably, the most influential of Caltex's contributions to Riau society is the road between Pekanbaru and Dumai. Caltex is well aware of this fact. For instance, a company history book displays, immediately after the title page, a two-page aerial photograph bearing the caption: 'A road cutting through thick jungle, with a gleaming pipeline, a canal and power lines running alongside – this is a typical scene in CPI's operational areas' (CPI 1983:9).

Before the road was opened, the only form of overland transport between Pekanbaru and Dumai was footpaths (*jalan setapak*) winding between a few hamlets and smallholder rubber gardens. The road opened the forest to other users. The first to enter the forest on the new roads was the timber industry, which, unlike the *panglong* of the late nineteenth and early twentieth century, was no longer tied to waterways. The big logging companies also profited from the greatly expanded port facilities. Production of timber rose from 632,000 m³ in 1970 to 1,662,000 m³ in 1974 (Esmara 1975:34-5). Today, the potentially renewable timber resource has been depleted through mismanagement (Rice 1989:147-9). Currently, the process of loggers following a major road can be observed again west of Pekanbaru, along a new road replacing a section of the 1929 road to West Sumatra. This new route was constructed as it became necessary to make a detour around a lake formed behind the Kotopanjang Dam on the river Kampar. There is frantic logging on both sides of the new road.

² Total oil production in Riau in the period 1996-1999 was 855 thousand barrels per day (BPS Riau 2000:217), one hundred thousand barrels more than Caltex production.

The national ban on the export of logs has stimulated a wood-processing industry in Riau, as in other timber-rich provinces of Indonesia. Initially, this industry was focused on plywood production, but recently it has become dominated by the pulp-and-paper industry. Plywood production dropped from 819,000 m³ in 1994/1995 to 443,000 m³ in 1998/1999, while pulp production jumped from 170,000 m³ to 1,872,000 m³ in the same period (BPS Riau 2000:192). By far the biggest company in this field is the PT IKPP (PT Indah Kiat Pulp-and-Paper), with a factory at Perawang. Its daughter company, the logger PT Arara Abadi, provides 65 per cent of the wood. The rest of the material necessary to feed this wood-devouring giant is supplied by middlemen, who obtain wood from irregular chain gangs. PT IKPP buys up any wood, even twigs and stems, so that forestland previously depleted of its big trees can now be clear-cut. PT RAPP (PT Riau Andalan Pulp-and-Paper) is the second largest pulp-and-paper company in Riau.

Figures about the forest cover are unreliable, but the trend is unmistakable. The loss of forest cover in Riau between 1985 and 1997 was 15 per cent. Of the 9.9 million hectares of Riau's land area (including agricultural and urban land), 2.7 million hectares was given out in logging concessions and 0.7 million to timber estates (to be logged and reforested with fast-growing species) (World Bank 2001:9-10). Forest outside the concessions is also being felled.

Once the loggers had cleared the jungle, there was room for plantations. Until the 1980s, tree-crop cultivation was dominated by rubber gardens, owned by smallholders and plantations. By the 1990s the oil palm (*kelapa sawit*) had conquered the scene and some rubber gardens had been converted to oil-palm gardens. Although the total area planted in rubber has increased, rubber has been outstripped by oil palm, both in area and production (Table 2). Oil palm is cultivated by both big plantations and smallholders.

Another group that has profited from the roads and the timber industry's clearings is formed by transmigrants. Transmigrants are people taking part in the state-sponsored programme of transferring people from overpopulated islands (Java foremost) to sparsely populated islands, such as Sumatra. By 1999 518,000 transmigrants had come to Riau since 1970 (BPS Riau 2000: 62).

The latest economic change along the Caltex road is the emergence of some commercial activity along approximately five km of road near Pekanbaru. This commercial activity consists of the storage and redistribution of small durable consumer goods, such as Indomie, Bir Bintang, and pharmaceutical products. A logging company also owns a lot on this section of the road where it parks its heavy equipment.

In 1999 Riau's exports amounted to US\$ 8,821 million, of which 36 per cent consisted of mineral oil products, 11 per cent of pulp and plywood, 6 per cent of palm oil, 0.3 per cent of rubber, and at least 30 per cent of transit

Table 2. Area and production of rubber and oil-palm estates

Year	Rubber		Oil palm	
	area (hectare)	production (ton)	area (hectare)	production (ton)
1973	n.d.	62,000	n.d.	≈ 0
1983/1984	279,000	62,000	40,000	n.d.
1990	n.d.	n.d.	238,000	n.d.
1994	451,029	190,464	403,048	653,264
1998	509,089	273,414	769,750	1,559,924

Sources: rubber and palm oil 1973: Esmara (1975:33); rubber 1983: rice (1989:144-5); oil palm 1984, 1990: Lubis (1992:23); rubber and oil palm 1994, 1998: BPS Riau (2000: 177, 181).

trade, which, I assume, goes via the islands off the coast and does not enter mainland Riau (BPS 2000:1772). Caltex is a state-within-a-state, with probably more power over the provincial government than vice versa. When entering one of the three main Caltex camps, one has the feeling of leaving Indonesia behind and entering the United States. PT IKPP is much smaller than Caltex (in turnover, size of the plant, and immunity to local government policy), but stands head and shoulders above the dozen big agricultural estates in Riau and also seems to have more leverage than the provincial and local government.

In summary, the oil, timber, and estate sectors in Riau did not develop independently of each other, despite the fact that there are almost no backward or forward linkages between the sectors. Each economic actor cleared the field for the next. Caltex opened the region with its network of pipelines and roads; loggers opened the region further by felling the forest; agricultural estates and transmigration projects occupied and cultivated the land cleared by the loggers, and companies storing goods and equipment have begun to occupy the lots closest to Pekanbaru. Of course, the various sectors' development overlapped more than is suggested here, and various entrepreneurs operated side by side in the same area.

The frontier in Riau

At a theoretical level, the historical geography of Riau can be understood in terms of a frontier society. The relevance of transport axes, the successive waves of new users, and the expansion into supposedly empty land are all strongly reminiscent of the picture of a frontier society Frederick Jackson Turner (1920) drew of the American West in 1893. The frontier consisted of settlers who entered land thought of as virgin and free. In fact, there were a number of successive frontiers, each involving a different economic acti-

vity, each preparing the ground for the next frontier: first the trader and the trapper, then the rancher, the farmer, and finally the townsman. As moving on was an essential feature of the frontier, the importance of roads did not escape Turner. The roads were extended and at the same time had to be developed in order to accommodate the emerging needs of each wave of settlers. Turner depicted the route to the west in vivid colours: 'The buffalo trail became the Indian trail, and this became the trader's "trace"; the trails widened into roads, and the roads into turnpikes, and these in turn were transformed into railroads' (Turner 1920:14).

Extension and improvement of the road network also took place in Riau and are the key to the succession of entrepreneurs noted in the previous section. The closing of the last gap in the Pekanbaru-Dumai road on 19 March 1958 was not the end of road construction. The main road was widened, upgraded, and supplemented with side roads. Bridges replaced ferry crossings on the rivers. The pontoon bridge at Pekanbaru, which at first was presented as a showcase of Caltex engineering, was found troublesome. Cars were not able to pass each other on the bridge and the middle section had to be taken out every evening to let the ships that sailed up and down the Siak pass through. In the 1980s the pontoon bridge was replaced by a permanent, high two-lane bridge, which has become Pekanbaru's landmark. It is popularly known as *Jembatan Lekton*, presumably because it was built by an Australian company called Leighton. *Jembatan Lekton* was financed by the national government.

The most important improvement of the road was a new surface. A dirt road sprinkled with oil or oil residue sufficed for Caltex's needs. Oil was a resource of which Caltex was not in short supply. The oil mixed with the top layer of sand, producing a hard surface, which had four advantages: cars did not sink into the mud, the road was better protected against erosion by tropical rains, and dust clouds were reduced. The last, but not least, point is that, compared to an asphalt road that would have had the same three benefits mentioned above, the construction of such an oil-sprinkled dirt road cost only one-fifth as much. The surface was fine in dry weather, but became, as I myself have learnt the hard way, very slippery when wet. Caltex trucks coped by using spiked tyres, producing a *kereke-kereke-kerek* sound, or tyres with chains, but other vehicles did not have such devices and the road was notorious for its many accidents. In 1981 Caltex transferred both the ownership and the responsibility for maintenance of the road plus a dowry to the Riau government, which then asphalted the road. However, when the Riau government lacks funds to repair the road, for instance after unexpected landslides caused by heavy rain, Caltex still helps out with maintenance.

The last major change affecting the Pekanbaru-Dumai road took place in the 1980s, when the road was included as a section of the *Jalan Lintas Timur*

('Eastern Highway'), a new, short route from Medan (Sumatra's biggest city, north of Riau) to Jakarta, the national capital on Java. Before the construction of this route, traffic from Medan to Java had to make a detour via Bukittinggi in West Sumatra. This direct connection of Riau with Medan and Java has fundamentally changed the character of the Pekanbaru-Dumai road. While the Pekanbaru-Dumai road was initially used mainly by trucks and local transport, it is now also used by many long-distance buses.

Building a road is one thing, maintaining it well is a different matter. The roads wear out quickly and in 1998, according to official statistics, 47 per cent of the roads were damaged or badly damaged (BPS Riau 2000:257). The government blames the trucks, especially those loaded with wood, for the damage to the roads.³ When standing on the side while a truck loaded with wood passes, one can feel the road vibrate. Large holes and deep tyre tracks mark the roads. On all roads with through traffic, a truck carrying wood passes every few minutes on its way to PT IKPP. At the PT IKPP plant itself, trucks drive to and fro. The asphalt surface is meant to carry vehicles of eight to twelve tons, but in practice the trucks and cargo weigh 25-35 tons. A provincial decree restricting the maximum weight to eight tons was not brought into force, because of protests by truck drivers (*Riau Pos* 1-9-2000). PT IKPP does not deny the administration's accusations and makes funds available for road maintenance, usually in kind. However, it lacks expertise in road construction and delivers sloppy work when repairing or building roads. In 1995 or 1996, Caltex and PT IKPP jointly asphalted the Minas-Perawang road (the road connecting the Pekanbaru-Dumai road with the PT IKPP plant). Occasionally other companies than Caltex and PT IKPP construct small roads. In all these public-private partnerships, the local government tries to persuade the companies to help with maintenance, but is dependent on their benevolence (see for instance *Riau Pos* 2-2-2000, 9-2-2000; 31-3-2000, 22-4-2000, 6-11-2000, 27-11-2000, 27-1-2001).

Recapitulating this section so far, the development of the road network is determined by Caltex's needs. The main roads connect oil fields (Minas Field, Duri Field, Zamrud Field) rather than the nuclei of economic activity, such as villages, towns, and areas of plantations. Side roads are planned as access roads to isolated oil rigs (to bring Caltex crews from the trunk road into the forest) and not as feeder roads (to transport people and goods from the forest to the trunk road). On rough terrain Caltex chose a route that either simply followed the oil pipeline up and down the hills, or, where the gradient was too steep for cars, followed the contour of the land, winding through the hills. Both solutions required some extra travelling time for the Caltex

³ Trucks make up the biggest share of registered vehicles. In 1996 there were 32,000 trucks, 26,000 passenger cars, and 15,000 buses (BPS Riau 2000:262).

teams maintaining the pipeline, but were relatively cheap to construct. The administration, thinking of buses and passenger cars, would have preferred a cut-and-fill road through the hills, which is more expensive to build, but facilitates passenger transport. As with the surface of oil and sand noted earlier, this is an example of how the roads suit Caltex's needs foremost.

Once a road exists, however, it sets the train of frontier development in motion. The succession of entrepreneurs described in the previous section follows the construction of the road. This can be seen in the whole region, and is repeated in detail after the opening of each side road. One road I drove up and down repeatedly is an example of a typical side road, where one sees the development of the frontier in reverse order. First one passes spontaneous migrants occupying vacant plots in between land used by more powerful entrepreneurs. Then one passes on a straight road, sprinkled with oil, through oil-palm and rubber plantations. After that the remnants of primary forest in the process of being felled can be seen. Somewhere on this section of the road, one or more oil rigs will be found. Beyond the oil rig the road becomes a winding dirt road with potholes, heavily eroded by run-off water. After some twenty km the road ends at a settlement of the Sakai, a tribal group that prefers to stay in the forest. The development of roads as the motor of the frontier in Riau closely resembles the development of the western frontier in the United States. One important difference is that in America the road was pioneered by the smallest entrepreneur, the trapper, and in Sumatra by the biggest company, Caltex. Interestingly, this difference, which appears so important at first sight, does not seem to matter for the dynamics of the frontier society.

The appeal of the frontier to all who followed Caltex was not so much the empty land as the big windfall profits, due to the fact that the costs of replacing natural resources went unpaid. When a resource was exhausted or degraded by pollution one simply moved on; this is the main reason frontiers moved across the land (Colombijn 1997:314-316; Webb 1953:180-202).

In Riau, economic growth has also brought about ecological stress due to frontier exploitation. Subsidence in oil-pumping areas has created unusual sights, such as pile-supported pipelines that stand 3.5 metres above the current road level (CPI 1983:80). Commercial logging has extracted all the valuable timber, leaving wide open stands of heavily degraded forest; these damaged forests are much more prone to forest fires. The remains of the forest are cleared of all woody vegetation in order to supply the pulp-and-paper industry. This industry is much more damaging to the environment than the selective logging that preceded it, because when large tracts are stripped totally bare, natural reforestation is highly retarded, if not impossible. The careless manner in which all woody vegetation is cut is demonstrated by the fact that in government statistics most wood to be processed is no

longer known by its species but is simply indicated as 'chips' (BPS Riau 2000: 193). Cleared forest land and abandoned transmigration schemes are covered with monotonous fern vegetation and fields of useless *alang-alang* grass. Biodiversity is low and forest regeneration is hampered by recurrent fires. In a later phase, a secondary shrub vegetation, characterized by dense stands of *Macaranga* (a typical pioneer tree) and ferns, returns. In the soil of this region, acid sulphate builds up rapidly with the digging of drainage canals. Acidity in a recently drained area can drop to pH 2.5 within four months; this cannot be reversed easily. The high acidity greatly limits the number of plant species able to thrive (Asian Wetland Bureau 1993:43-6, 67).

The run for windfall profits and the unwillingness to invest in sustainable resource exploitation is a corollary of the mobility of frontiers. After a resource has been exploited to the full, entrepreneurs move on. Eventually, when the resource is used up, the frontier is closed and the entrepreneurs leave the region. Most of the companies operating in Riau have a short-term interest in making money and have no intention of staying forever. Although mineral oil is by definition a non-renewable resource, Caltex forms a positive and important exception in this respect. However, PT IKPP, the second biggest company, is a clear example of an outsider coming in for quick profits. PT IKPP is a joint venture of the Indonesian company PT Berkat Indah Agung⁴ and the Taiwanese companies Chung Hwa Pulp Corporation and Yuen Foong Yu Paper Manufacturing Company. The joint venture was established in 1976 and the first pulp machine started operations in Riau in 1984, at Perawang. The fifth point of the corporate philosophy – printed on environmentally friendly paper – is: 'Preservation of the environment is an integral part of the company's work order'. The company claims that forest plantations of acacia will supply all raw wood materials by 2004 (IKPP 1997), but in reality in Riau the annual demand for pulpwood is eight times the sustainable supply (World Bank 2001:23). If the deforestation were not so dramatic, the fifth point of the corporate philosophy and the claim that all materials will be obtained from industrial forests would be hilarious.

In theory, wood is a renewable resource, but in Riau nobody cares enough to invest in the future of the forest. The policy of industrial forest for sustainable wood production looks good, but exists only on paper. One should not think too much of these supposedly sustainable timber estates: in Riau the difference in forest cover between protection forest (not to be logged at all), production forest (to be logged without reforestation), and timber estates (to be reforested with acacia, which still means an enormous reduction in biodiversity) is only 3 per cent (World Bank 2001:11). In other words, all

⁴ PT Berkat Indah Agung is part of the Sinar Mas Group, owned by the Eka Tjipta Widjaja family, known as former President Suharto's cronies, who were notorious for their greedy, short-term self-interest.

forest, regardless of its official status, is being felled at the same speed. The majority of cutting is done illegally. In 1998, the demand for wood from the timber, plywood, and pulp-and-paper industry in the whole of Indonesia was exactly 100 million m³; approved supply was 43 million m³, so the shortfall was 57 million m³; in other words, 57 per cent of the wood supply was felled illegally in protected areas, national parks, and areas where a concessionaire's permit had expired (World Bank 2001:19, 22). The extent of illegal logging in Riau is unknown to me, but anecdotal evidence suggests that the figures for Riau will be close to those for Indonesia as a whole (*Riau Pos* 22-4-2000, 5-6-2000, 8-8-2000, 18-1-2001, 23-7-2001; *Riau Mandiri* 16-1-2001). Illegal loggers, whether with a company or a village chainsaw gang, cannot make legal claims on patches of forest land and are even less inclined to harvest wood in a sustainable manner than a timberland concessionaire is.

The reap-and-run mentality of the frontier is exemplified not only by loggers. Evidence from satellite images shows that during the big forest fires in 1997, the large plantation companies, forestry conglomerates, and transmigration contractors profited from the unusually dry weather by clearing the forest in a careless way, thus throwing away millions and millions of dollars of valuable timber (World Bank 2001:13). The 1997 monetary crisis, which resulted in an exchange rate of the rupiah that facilitated export, offered new opportunities. It was better-off farmers, immigrants, and urban dwellers who quickly converted forests into high profitability crops; indigenous peasants, who might have had a higher stake in sustainable resource use, sold their land and moved on (Potter and Babcock 2001:17; World Bank 2001: 15). Villagers, who felt robbed of their ancestral forest by companies, rushed in again as soon as the Reformasi gave them a chance to reoccupy their land. Instead of striving for conservation, they laid out gardens in the forest in order to reinforce their claim on the land (Potter and Babcock 2001:16).

In all of the above examples of ecological degradation at the frontier, roads have contributed indirectly but significantly to this degradation by opening up forestland. The following examples demonstrate the link between roads and illegal felling. A forest road inevitably means the destruction of the forest. A 17-km road was laid through protected forest in order to reach a government logging company's concession. The 17-km corridor road nicely opened up the protected forest to illegal loggers, so that the forest ended up severely damaged (*Riau Pos* 8-5-2001). Another protected forest was criss-crossed by roads made by illegal loggers; there were so many roads that it was possible to lose one's way. For fifty metres on both sides of the roads, every tree had been felled (*Riau Pos* 25-7-2000). In a third protected forest, where trees were being felled illegally along a corridor road (leading through the forest but without intended stops in the forest), the government broke up a bridge to close off the whole road. But still wood was stolen (*Riau*

Pos 23-12-2000). Not surprisingly, the logging company near the Indomie storage mentioned above resembled a road-building company rather than a logger. Its most visible machinery did not consist of chainsaws, as one would assume, but was made up of bulldozers, excavators, draglines, and other heavy equipment for road construction.

Roads have a direct negative environmental effect too. The monthly run-off from a recent forest access road in Indonesia is 189 m³ per hectare, compared to 2 m³ per hectare from primary forestland (Durand 1993:249). People told me that when the Pekanbaru-Dumai road was still sprinkled with oil, some of the oil was washed off during heavy rains, entering the rubber gardens or natural forests by the roadside. In the wet season, a film of oil on top of water might be carried into the inundated forests for many kilometres. In the dry season the vegetation on the roadside died from the oil pollution, dried out, and caught fire easily.

The road that opened up mainland Riau has had not only economic and ecological, but also social and demographic consequences. One social problem is the large sums of money earned in a short time by outsiders, many of whom cannot control their lust and indulge in alcoholic excesses and escapades with prostitutes. Outlaws form another negative side-effect of the frontier. At one point, banditry along the Pekanbaru-Dumai road reached such a magnitude that bus drivers went on strike (*Riau Pos* 29-8-2000). The dividing line between traffic checks by police and a hold-up by robbers is rather thin. Traffic department officials occasionally set up wooden tollgates (*ampang* or *portal*), officially to enforce load restrictions on trucks. In practice, the tollgates are staffed only now and then – to extort money from car drivers (*Riau Pos* 24-6-2000, 14-10-2000, 31-10-2000, 12-1-2001, 24-1-2001). The same trick was reportedly pulled by an NGO (*Riau Pos* 26-7-2000). Villagers demand Rp. 10,000-30,000 from each truck with a load of wood; eighty drivers stopped driving because they were unable to pay eleven tollgates in eleven different villages on one single route (*Riau Pos* 20-1-2001). Banditry is typical of a weak state; a weak state is typical of a frontier.⁵

Economic expansion into land presumed empty draws many migrants to a frontier, and Riau is no exception. The roads have facilitated immigration and urbanization to an enormous extent. At the two ends of the main road, Pekanbaru swelled from 28,000 in 1954 to nearly 400,000 in 1990 (Abdullah et al. 1982:34; Yohandarwati, Mulyatinah and Purwadi 1993:12), and Dumai grew from 200 before 1957 to 105,000 by 1990 (CPI 1983:40-1; Sjujono, Butar-Butar and Syahbuddin 1994:82).

⁵ Scholars who like to blame the government for everything that went wrong during the New Order may be surprised to read that the state is weak. Yet I believe it is correct to call the government in Riau weak. It certainly lost out to Caltex and PT IKPP, and many plantations and spontaneous immigrants also more or less go their own way.

This massive immigration has resulted in ethnic tensions. The outsiders' reap-and-run behaviour, which is typical of a frontier, annoys the original population, as they are becoming a minority in their own area. Because of its accessible rivers, Riau has always been open to migrants from various ethnic backgrounds. The major 'original' ethnic group is felt to be the Malays, living along the rivers and the coast. A number of tribal groups, of which the Sakai are the best known (Nathan Porath, this volume), live, or lived, in the forests. Their presence in the supposedly empty land was overlooked just as the rights of native Americans were ignored in the United States. Large numbers of Minangkabau, originating in the highlands of West Sumatra, came drifting down the rivers. Other migrants came from overseas; in order of appearance they are: Buginese, Chinese, Banjarese, and Javanese (Kato 1984; Yohandarwati, Mulyatinah and Purwadi 1993). Respondents' ethnic background is no longer recorded in the national census, so that today the ethnic composition of Riau's population cannot be established quantitatively.⁶ Table 3, however, shows how many residents of Riau were born within the province and how many elsewhere. This table excludes all second- or higher-generation immigrants, who often persist in the ethnic identity of the area their parents came from; therefore the real share of immigrants in Riau is underestimated. The popular view, supported by circumstantial evidence, is that nowadays the ethnic map is dominated by the Minangkabau from West Sumatra and the Karo Batak from North Sumatra. Mochtar Naim (1973:151) estimates that in 1971 two-thirds of the population of Pekanbaru was Minangkabau. The language spoken in the Pekanbaru market is Minangkabau and not Malay. On long sections of the Pekanbaru-Dumai road, churches, indicating a Karo Batak or Toba Batak presence, outnumber mosques. Whereas in the past newcomers used to assimilate to Malay culture, this seems to be less the case today (Effendy 2000). Malay ethnic consciousness has been growing in reaction to this immigration (Derks 1995), culminating in 1999 in an abortive attempt to found an independent Riau state.

The growing Malay annoyance with the many migrants must, I believe, be partly attributable to the fact that poverty has not been alleviated despite economic development. Although in 1971 Riau had the highest per capita GDP in Sumatra (and Indonesia as a whole), it also had the third lowest life expectancy for both men and women, and the second highest percentage of people living below the poverty line of all eight provinces of Sumatra (Hill and Weidemann 1989:6-7, 40-3; Rice 1989:127, 134). This discrepancy is explained by the weak linkages between the gigantic oil industry and other sectors of the economy. Riau has been characterized as a typical 'dual eco-

⁶ In 2000, however, I saw census forms where the ethnic background was added outside the boxes for formal answer categories.

Table 3. Population size of Riau and province of birth

Year	Population	Born in other province	Percentage
1971	1,641,074	217,134	13.2
1980	2,163,896	356,272	16.5
1990	3,278,807	689,036	21.0
2000	4,700,000		

Sources: 1971-1990: Alatas (1993); 2000: *Riau Pos* 17-10-2000.

nomy', where Caltex is an enclave (Mubyarto 1993:4; Rice 1989:128) and oil dollars go to Jakarta and the American companies whose holding Caltex is. The dual economy is also visible in the field: the Caltex compounds are real company towns, a world of their own.

Still, this characterization of Riau as a typical dual economy should not disguise the fact that the economic actors do operate within the same geographical region. They may even be contenders for the same plot of land: one particular patch of forest land might be seen by Malays as a place to collect rattan, by a government official as a potential *sawah* site for Javanese transmigrants, or by Caltex as a section of a new road to an isolated rig. This example is far from hypothetical and could be expanded by imagining a Sakai *ladang*, an oil-palm plantation, a logging company, an army training area, and a nature reserve all competing for the same space (Awang 1993: 53, 65; *Setiakawan* July-September 1992:57-62). There are different systems for defining usufruct rights, and this is complicated by the fact that, within each system, individual rights may be poorly defined (Awang 1993). The selfish exploit-and-move-on mentality on the frontier is reminiscent of J.S. Furnivall's (1944) concept of a plural economy: a society where each constituent considers only its own interests and does not interact with other components of society. We can expect that in a frontier society there will be intense social conflicts. In the next section the clashes between different actors will be studied in detail.

Social tension on roads

The Reformasi, the period of anticipated economic recovery, political democratization, and social reform after President Soeharto's fall in 1998, has created new problems. A widely supported movement for autonomy for Riau, if not full independence, demanded that Jakarta give Riau a larger share of oil revenues. The people have lost their fear of the government apparatus. People who in the past were forced by the state to sell their land cheap to big plantations, are now claiming their land back. People demand that big

companies provide work, underscoring their demand by occupying plants and equipment owned by Caltex and the big plantations.

The most important interface between different actors is not at the main road, but at the numerous feeder roads. Because a feeder road is, in the words of Turner, a palimpsest of the frontier in Riau, uniting all actors, it is an excellent site to study social tensions. Therefore this section focuses on the feeder roads of the Pekanbaru-Dumai road. In particular, it will deal with the way Caltex opens up new roads and with the interaction between Caltex and other potential users of the same land. The concessions held by Caltex concern substratum oil deposits, but the company also needs some surface land: for their hundreds of rigs, storage, and access roads to the rigs. There are roughly three situations in which Caltex may wish to build an access road: in virgin forest, in forest land with settlers, and in concessions belonging to logging companies and plantations.⁷

Figure 1. Caltex road in a virgin forest

When Caltex wants to build an access road in virgin forest, it needs only the permission of the Department of Forestry in Jakarta (Figure 1). Caltex pays for reforestation (*reboisasi*, notorious for the misuse of funds), but not

⁷ In terms of traffic science, these roads would be called feeder roads to the main road; seen from the perspective of Caltex, the roads give access to the isolated rigs. This section is based on interviews with four Caltex staff members in Rumbai and Duri, supplemented with interviews on the spot, interviews with plantation managers and informal leaders, and newspaper reports.

for the land itself. It does not take long before settlers start using the road to get entry into the forest. As soon as there is a road, people start logging, using the road to carry the wood away. The approximately two-metre wide drainage canal that follows the road is just as useful for carrying off the logs as the road itself is.

When Caltex wants to build an access road to a rig where there is already a village or hamlet in the vicinity, the situation becomes much more complicated (Figure 2). The two options are to widen the village road to the Caltex standard of seven metres, sprinkle it with oil, and extend it to the oil rig, or to build a completely new road. In the latter case, Caltex will also have to obtain the land belonging to villagers, who might, for instance, have planted an orchard in the forest. In general Caltex does not mind using the old road as the starting point, but the villagers often refuse to sell the land adjacent to the road (necessary to widen the road) on the pretext that this will harm their rights. In reality, the villagers prefer to have Caltex build a new road, because this enables them to sell Caltex more land. As soon as the new road is ready, however, several of the villagers move to the new road, while many spontaneous outside migrants also settle along the road. Quite soon, one or more hamlets develop on the Caltex road. In other cases, the villagers ask Caltex to improve the existing road, and Caltex sometimes does this, as a token of their goodwill.

In popular parlance, the compensation offered by Caltex is called *ganti rugi* ('compensation for loss'). In the past the price paid by Caltex was indeed *ganti rugi*, and the amount was determined unilaterally by a nine-member government commission (Peraturan Mendagri 15/1975 about the release of land). This compensation was below market price. With the introduction of Keputusan Presiden 55/1993, oil drilling is no longer defined as a common good for which people can be forced to give up land. Therefore, since 1993, Caltex no longer receives land through government mediation, and must negotiate the price directly with the owners.⁸ There is considerable room for haggling and the price varies from time to time, place to place, and sometimes neighbour to neighbour. The price paid is in the range of Rp. 500-5000/m² (1999-2000). This price is at, or above, the market price, and people are usually quite willing to sell to Caltex. The asking price has risen since the Reformasi. In contrast to the former situation with government mediation, when landowners were compelled to sell their land 'voluntarily', Caltex cannot force people to cooperate. Occasionally, a Caltex road must make a small detour around land belonging to a person who refused to sell. On top of the land price, Caltex pays for fruit trees and houses, according

⁸ Actually the state company Pertamina should buy the land, as Caltex is only a contractor of Pertamina, but Pertamina does not have the staff to purchase land.

Figure 2. Caltex road near a village

to standard prices set by the government. In contrast to how plantations are viewed by the public, people consider Caltex (or *Kaltèk*, as it is pronounced) a very reasonable buyer of land.

After the Caltex road has been made and access to forest resources has been improved, land prices soar. Therefore, plots of land along Caltex roads are popular objects for speculation. In order to rule out speculation as much as possible, Caltex tries to rush through the procedure, from the surveying of the land to buying it, as quickly as possible. However, as soon as the small yellow poles that mark the proposed route to the rig are hammered into the ground, the interest of speculators is aroused. In answer to my question whether surveyors might perhaps sell their knowledge to known speculators even before starting measurements in the field, one of the Caltex mediators who negotiate the price with villagers replied: *misschien* ('maybe'; the evasive answer, in Dutch, suggests tacit confirmation of my hypothesis).

Usually speculators do not have the time to buy land and have their purchase registered at the Land Registry before Caltex opens negotiations. Often they cooperate with the original landowners and share the profit of their speculative work. A popular method is to build houses and plant young oil palms on the plot Caltex wants overnight. This drives up the land price. After Caltex buys the land, the speculators dig up the oil palms, with the roots still in black agricultural plastic bags, and carry them to another plot being offered to Caltex. The houses, built of light wood on posts, are also simply carried away. One annoyed Caltex officer could not repress a smile

when he told me how he once had carried away the oil palms the same day he bought a particular plot (in order to brighten up the Caltex base camp). He also invited the local boy scouts (all children of Caltex employees, no doubt) to have a bonfire to burn the wooden houses on the night of the sale. The angry speculators filed a complaint with the police, but had no leg to stand on, since they had sold the land and everything on it to Caltex.

The third situation is when Caltex wants to build a road across a plantation (Figure 3). Under President Soeharto, oil interests always took precedence over the interests of agricultural estates. Caltex could simply demand the necessary land from the plantations. Nowadays, in the Reformasi era, the rule of oil taking precedence is no longer enforced. Caltex has to negotiate with the plantations on equal terms.

In the case of a big plantation, Caltex just widens an existing road and gives it a hard surface, by sprinkling it with oil. Estate managers are often not pleased with the Caltex road, even though the new road is of far better quality. A manager at PT Adei, an oil-palm and rubber plantation owned by a Malaysian company based in Kuala Lumpur, explained why the plantation is not at all pleased with Caltex roads. He preferred his land to have only one entry-exit point. On the matter of Caltex he remarked: 'We coexist, that is all.' The money PT Adei saves on road construction due to the Caltex roads has to be spent on extra security costs. PT Adei has even protected its own roads, where they intersect with a Caltex road, with a guard (*hansip*) or a barrier in

Figure 3. Caltex road through a plantation

order to restrict entrance. Too many oil-palm kernels are stolen. Whenever a Caltex road crossing a plantation is opened, local people have easier access to the trees, and theft of oil-palm kernels and rubber increases. Moreover, local people are now able to reach the forest behind the plantation, often reserved for future extension of the plantation's cultivated area, and start logging. Since the improved roads are as much of a burden as a boon to them, plantations never contribute to construction costs.

For a small estate, a Caltex road can entail a considerable reduction of their productive area; for them a road can be really troublesome, even if they receive substantial compensation from Caltex. But there is little these plantations can do but consent, though with gnashing teeth.

A conflict can also arise due to bad maps. Different departments, each using their own inaccurate maps, approve the concessions held by Caltex and agricultural estates. It has happened more than once that Caltex bought land from a plantation, and later, when it actually wanted to construct a road, discovered that the plantation had just built on that plot in the belief (or the pretended belief) that it was a different part that Caltex had bought. For Caltex, the land price for a road is insignificant compared to the future revenues of the rig, and the company would not object to paying twice for the same land in the case of such a misunderstanding. The company's auditors, however, do not allow such a practical solution. In another case, PT Arara Abadi logged within the boundaries of the Caltex base camp at Duri, also due to inaccurate maps.

Of course, Caltex allows the plantations to make use of its roads through the plantations. And, although Caltex is annoyed when trucks loaded with wood destroy their roads, the company does not actively patrol its own roads. The damage is not important enough to Caltex.

Plantations also build roads, but their roads do not have the same impact as Caltex roads. Plantations only take the shortest route from their land to the nearest main road; they do not open up new vacant land as Caltex does.

Logging companies are much more active in road construction than plantations, albeit only dirt roads. They work, almost by definition, far away from villagers, in Riau's remaining forests. If there is a village in the vicinity, the logging company builds its operational road at some distance from the villages in order not to disturb residents with dust clouds. Villagers usually make their own connection to the operational road quickly.

Since roads are vital to loggers, they are a popular target to use as 'hostages' whenever a conflict arises between villagers and a company. Villagers closed a forest road belonging to PT Arara Abadi for several days, because they had not yet received compensation for *pohon sialang* (trees with valuable beehives) cut down by the logging company (*Riau Pos* 10-2-2000). Another village blocked a logger's operational road, because the villagers felt 'igno-

red' (the reporter was not more specific) (*Riau Pos* 1-8-2000). Residents from yet another village did the same, and demanded a fee for every cubic metre of wood passing through their village (*Riau Pos* 23-9-2000). Another village closed a road used by PT Arara Abadi, because the company had refused to buy wood offered for sale by villagers; the road was opened again after PT Arara Abadi promised to buy up their wood (*Riau Pos* 27-9-2000). Three hundred villagers destroyed a bridge in the road leading to the PT Musim Mas plantation, because the company had extended its operations into the people's forest (*Riau Pos* 24-1-2001). One village, finally, blocked the road leading through their village six times between 1995 and 2001; two hundred trucks with wood were stopped in January 2001. The villagers demanded that a 0.5 km village road be asphalted by the government in order to prevent dust clouds being thrown up by passing trucks (*Riau Pos* 20-1-2001). Caltex has also been the victim of blockades by political activists (for instance *Tempo Interaktif* 6-4-2001; *Riau Pos* 10-8-2001) and Sakai (*Riau Mandiri* 16-1-2001). As noted above, roads are sometimes closed by civil servants setting up a tollgate in order to extort money from drivers.

Roads can become a bone of contention in yet other ways. A Caltex road unintentionally sealed off a small swamp from floodwater. The swamp had been used by local villagers during the rainy season to catch fish. They now demanded either financial compensation or the demolition of the road (*Riau Pos* 17-5-2000).

Conclusion

The Pekanbaru-Dumai road was constructed by Caltex in 1958 and has since been upgraded and extended with feeder roads. The impact of this road is enormous. A frontier society has developed, with successive waves of entrepreneurs and settlers entering the forest: loggers, plantations, storage and industry, as well as numerous smallholders (spontaneous immigrants). The activities of the different groups overlap in time and space, but follow roughly the same order everywhere, as each wave of entrepreneurs clears the ground for the next type of activity. On every occasion, the train of developments is set in motion by a new road, usually one built by Caltex. This pattern can be observed along the Pekanbaru-Dumai road in general and is repeated over and over again on the access roads to oil rigs.

Riau's economic development has been tremendous, but at high ecological and social costs. Most entrepreneurs have a short-term perspective and make windfall profits by exploiting natural resources without investing in replacements. When a resource is exhausted, they move on. Roads are vital in this process, and a new road through protected forest inevitably leads to

illegal logging. Benefits are distributed unequally. Outsiders reaping wind-fall profits have invoked ethnic tension felt most keenly by the Malays, the earliest inhabitants of the province. Banditry thrives.

Not everybody thinks new roads are a good thing. A potential tension exists between Caltex, which needs land to build roads, and local people, who control the land. When Caltex builds a road that crosses a big plantation, the two parties coexist, but the plantation will block off some of its own roads that end at the Caltex road, in order to keep the riff-raff out of its land. Conversely, villagers (the riff-raff, in the view of company management) may block forest roads to back up their claims on logging and plantation companies. The roads in Riau have thus brought great profits as well as great ecological and social problems.

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