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EXTRACTIVE RESERVES: A SUSTAINABLE DEVELOPMENT
ALTERNATIVE FOR AMAZONIA

Report to World Wildlife Fund US
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Summary

The concept of "extractive reserves" - protected areas to be managed by rubber tappers, Brazil nut gatherers, and other communities practicing sustainable uses of Amazonian forest resources - has attracted increasing attention in Brazil and internationally. Proposals for the creation of reserves have been formulated by Brazil's National Institute for Colonization and Agrarian Reform (INCRA), and by the State Forestry Institute of Rondonia. The idea has received support from the Brazilian Special Secretariat for Environment (SEMA) and the institute for social and economic planning of the Secretariat for Planning (IPEA, within SEPLAN). With continued interest in and attention to the idea at the local, national and international levels, one or more pilot reserves could be established within the next few years.

The following report discusses three issues central to the success of reserves and their potential for replication: the emergence of "free" (independent, not indentured) rubber tappers and the role of producers' and consumers' cooperatives in increasing incomes and strengthening self-sufficiency in rubber tapper communities; legal mechanisms suitable for the creation of reserves; and the economic value of extractive production as a development alternative. These issues arise from the needs expressed by the grassroots constituency for extractive reserves: the rubber tappers' organizations. As organizations largely representing posseiros, or occupants of land without title, the rubber tappers' groups are concerned with gaining legal guarantees for extractive uses of forest lands, and with improving incomes and standards of living. From their perspective, the protection of tropical forest is a question of survival.

We have found that while extractive production has declined in terms of share of the total dollar value generated in Acre, Amazonas and Rondonia from 1970-1980, it is still of substantial economic importance. In Acre, while the area occupied for extraction decreases from 1970-1980, and the areas of cattle ranching and agriculture increase dramatically, the per hectare value of extraction increases much more than either meat production or agriculture. At the same time rubber increases its share of overall exports from the state. An increasing export value with a decreasing area of exploitation, and an increasing per hectare cash value, suggest that **extraction is a very attractive development alternative, compared to cattle or agriculture.** The sustainability of extraction, and the fact that it does not destroy forest, makes it an even more attractive alternative.

Legal means for the creation of reserves exist under present Brazilian environmental and land reform legislation. Of the alternatives that have been discussed, a combination of the Environmentally Protected Area (APA), administered by SEMA, and granting of land title by INCRA under land reform legislation, seems most promising.

Cooperatives have the potential to increase incomes considerably for extractive producers by eliminating middlemen, particularly if existing technologies to increase productivity and process rubber for direct sale to industry are made available to rubber tappers. While attempts to found self-sustaining coops to date have encountered problems, there are now intermediary organizations in Acre with valuable experience in this area that can be called on, if support can be found to ensure that coops are adequately capitalized. Major problems appear to be administrative and social, rather than reflecting the economic viability of extractive production.

I. Introduction

The proposal for "extractive reserves" which surfaced at the first national meeting of rubber tappers in Brasilia in October 1985, (see report, First National Meeting of Rubber Tappers) and has since been pursued by the National Council of Rubber Tappers, is among the most promising new conservation proposals for tropical forests. Because the proposal comes from representatives of Amazonian communities, and aims not only at forest preservation but at improving standards of living as well, it offers a development as well as a conservation alternative.

The need for such alternatives in Amazonia is manifest. Deforestation is increasing at an alarming rate in the Amazon (Fearnside 1985). Recent remote-sensing data show that the state of Rondonia, site of the World Bank financed Polonoreste project and intensive migration, had 4% of its area deforested in 1982 and 11% in 1985. (C.J. Tucker, personal communication) At present rates of increase in deforestation, the entire state will be deforested by the mid-1990's. While rubber tappers and other local communities have been displaced for colonization projects, and indigenous reserves and other protected areas are invaded or threatened, the rate of turnover on settlers' lots has been very high, and the poorest colonists only rarely improve their

situation by migrating. (Lopes 198 ; Wilson 1985) Migrants have begun to move on to Acre and Amazonas, and this trend will increase with the paving of the BR-364 from Porto Velho to Rio Branco. Internationally financed projects such as Polonoreste have received considerable publicity, but unfortunately these are only part of the problem - state and private colonization projects, fiscal incentives for cattle ranching, and land speculation have increased dramatically all over Amazonia.

Extractive reserves would, at least in key areas where rubber tappers are organizing on their own behalf, offer a sound alternative to the kind of costly and destructive resettlement plans of which Polonoroeste is unfortunately only one example.¹ They would capitalize on, rather than ignoring, the knowledge that local Amazonian communities have of their resources and means to exploit them sustainably.

II. Extractive Reserves: A Sustainable Development

Alternative for Amazonia

The proposal for extractive reserves responds to three urgent necessities. The first is the need for forest conservation in the parts of Amazonia undergoing rapid transformation. The states of Rondonia and Acre, where conversion of forest to cattle pasture or for annual cropping is proceeding rapidly, are the two

most likely candidates for initial implementation of extractive reserves, and this is in part because the rubber tappers of these regions have made a strong appeal for forest protection. Particularly in the case of Acre, the rubber tappers' organizations have become most visible, and are generating the most attention for the idea of extractive reserves where the immediate need for conservation is the greatest. Since the idea is supported by local groups that live from the forest sustainably - rubber tappers, Brazil nut gatherers, and other extractive producers - and approximately 500,000 people live from rubber tapping alone in Amazonia, there is a real possibility of preserving large areas of forest in the long term, with a local constituency directly interested in conservation.

The second need that extractive reserves address is rubber tappers' need for secure land rights. The proposal originated, and the rubber tappers organizations are in general strongest among the autonomous or free rubber tappers, that is, rubber tappers not completely beholden to a single patron (seringalista) who advances tools and merchandise on credit, and who receives rubber in return. Free rubber tappers are central to the success of the proposal, since they have an investment of their own in their rubber production, as well as the organizational capacity to protect reserves. In traditional rubber producing regions, especially in Amazonas, many rubber tappers still work in the same relation of debt peonage to patrons that existed 100 years

ago. Free rubber tappers have only emerged in the last 20 years, and their legal claim to land is almost exclusively as posseiros, or occupants without title, but with certain rights under Brazilian law. Legally protected areas under local control appeal very strongly to communities facing expulsion by cattle ranchers, large landowners, or colonization projects. Further, legal protection of forest lands, which provides a certain security, could be an incentive to increase production, making the proposal more attractive economically.

As rubber tappers' organizations have discussed the proposal, reserves are the basis of locally controlled development, which includes legal protection of land rights, education, health care, and improved marketing of rubber production through producers' and consumers' coops. In Acre in particular, many of the elements for such an approach already exist in the education projects and coops established in rubber tapper (and Indian rubber tapper) communities by intermediary organizations (see section B, below). Extractive reserves, in this light, are a means for free rubber tappers to stay on the land permanently with reasonable prospects for the future. From the rubber tappers' standpoint, extractive reserves are more than a conservation initiative. This in fact is a major strength of the proposal as a conservation initiative, since it demonstrates that an organized constituency that knows how to use the forest sustainably is actively pursuing the means to continue occupying

areas at immediate risk from cattle ranching, colonization, logging, and other unsustainable, often speculative land uses.

Finally, extractive reserves may represent a more economically productive use of forest land than the alternatives that are now displacing native rubber and other forms of extractive production. Our research suggests that this is unequivocally true for the substantial areas of tropical forest unsuited for cattle pasture or annual cropping. We had expected that when viewed over the long term (beyond 10 years) native rubber production would compare favorably to alternative land uses. But in Acre, the per hectare value of extraction is more than twice that of cattle ranching, even without taking sustainability into consideration. The per hectare value of extraction has increased more than either agriculture or ranching since 1970. (see IV, below) Further, the rubber tappers organizations strongly support cooperatives and the use of "mini-usinas", small, locally managed processing plants which remove impurities in rubber so that it can be marketed to industrial users rather than processors, which would improve incomes and increase productivity. Further research is necessary to compare native rubber and Brazil nut production with alternative land uses more clearly. The remainder of this report examines some of the factors that have led up to the proposal for extractive reserves and necessary steps for the proposal to be implemented.

A. Autonomous Rubber Tappers and Cooperatives

The organizations and individuals in the forefront of the initiative for extractive reserves are based among autonomous rubber tappers. In Acre in particular, a relatively large proportion of the regional population, formerly involved in traditional labor relations in extractive production, through a combination of changes in the market, and the entry of new agribusiness and ranching interests, has become autonomous.

Under traditional conditions, rubber tappers were obliged to deliver all of their production to a single patron, who usually provided tools on credit and who controlled all access to the market, providing merchandise (sugar, salt, kerosene, dry goods, canned milk, liquor, coffee, rice, beans, manioc flour) in advance and collecting in rubber at the end of the season. Debt peonage was the common result, since patrons controlled prices of both rubber and merchandise, or could simply cheat the illiterate rubber tappers. The minimal precondition for autonomy is that rubber tappers have some choice in where they sell their production and from whom they buy their merchandise.

Since the mid-sixties, land values have increased, fiscal incentives for investment in Amazonia have been offered to firms from outside the region, and for a period, government price

supports for native rubber lapsed. These factors combined to stimulate a withdrawal of traditional patrons (seringalistas) from some regions. This left rubber tappers occupying rubber producing areas free to sell their production as they chose. This typically meant that they sold to marreteiros or regatoes, independent middlemen who travelled from one settlement to another bringing merchandise in exchange for rubber and Brazil nuts. Only rarely did this result in putting the marketing of rubber on a cash basis, since the middlemen would also advance supplies at a high price and collect in rubber. But since middlemen were infrequently in a position to collect rent from rubber tappers for the land they used (a common practice in traditional labor relations) and rubber tappers could choose to deal with one middleman rather than another, the change was significant.

The emergence of the autonomous rubber tappers is reflected clearly in census data from Acre, in particular data on changes in type of land use and the size of holdings between 1960 and 1970. In 1960, 97.12% of the land was predominantly devoted to extractive production. At the same time 6.8% of the holdings accounted for 87.85% of the total area surveyed, while 70.91% of the holdings were under 50 ha. and occupied .42% of the total area. Between 1960 and 1970, the area predominantly devoted to extraction falls by 65.38%, while the area devoted to agriculture increases by 410%, and to ranching 132.71%. In this period, the

number of holdings devoted to extraction increases by 1,232.42%. (GT Planacre 1985) That is, traditional rubber producing estates are fragmented as rubber barons withdraw or sell out, and rubber production is taken over by small holders, or free rubber tappers, who have many more holdings but on a reduced area.

The category of the legal claim of producers on the land they answer for also shows significant changes. While the number of holdings held by renters increases greatly (1,306.19%), the total area under renters' control falls by 57.61%. At the same time, holdings occupied by "ocupantes", or people who occupy land without legal title and without paying rent, increase by 1,024.97%, while the area of these last holdings increases by 4,168%. (Ibid) (see annex 6)

There is in the same period also an increase in the number of smaller holdings (those between 100 and 500 ha). In 1970 these represent 57% of the total number of holdings and 59% of the total area surveyed, while in 1960 these were only 9.5% of the holdings and .82% of the total area. In 1960, holdings of over 10,000 ha. accounted for 87% of the total area and by 1970 represented only 16%. (Ibid)

The total area exploited in this period declines markedly (56%), while the number of holdings increases. What these data reflect is the breakup of traditional extractive estates, which concentrated very large areas in the hands of a few rubber

barons, and which included the renting of land to "captive" rubber tappers. Small holders, particularly renters and occupants increase, and this reflects the emergence of autonomous rubber tappers, who are largely occupants and in some cases renters, as well as an increase in renters and occupants practicing a mixed economy (agriculture, fishing, hunting, and extraction) on the lands formerly held as large rubber producing estates.

Autonomy for rubber tappers of itself signifies neither prosperity nor security on the land. Autonomous rubber tappers may in fact be in debt to the middlemen who buy their rubber and sell them merchandise, and they are subject to expulsion from lands they occupy without title. According to estimates by rubber tapper leaders, since the mid-sixties some 40,000 to 50,000 rubber tappers have crossed the border to Bolivia, expelled in land conflicts. In 1980 only 9.17% of the area worked by titled owners was devoted to extraction, while 81.94% of the area worked by renters was extractive, and 68.5% of the area under the control of occupants was devoted to extraction.

The fact that rubber tappers' organizations have put themselves at considerable risk to demonstrate against deforestation by large landholders and companies, in some cases initiating legal actions and halting deforestation, shows that rubber tappers see maintaining their claim to possession of the land and their form

of use of forest resources as in their interest. But securing land rights and improving incomes are major priorities for rubber tappers, and are in the long term crucial to the success of the proposal for extractive reserves. The organization of producers and consumers cooperatives, both among Indian rubber tapping and Brazil nut collecting communities and among Brazilian extractive communities, can make a substantial contribution to the both of these goals.

B.Cooperatives and Self-Sufficiency

Two intermediary organizations have helped to organize cooperatives in Acre, the Acre Pro-Indian Commission (CPI/Acre), working with indigenous groups, and Projeto Seringueiro, working in regional rubber tapper communities. Both have succeeded, at least temporarily, in helping extractive communities to mount functioning producers' and consumers' coops, and both have gained experience on the problems associated with making cooperatives work in the region. While there are distinct differences between indigenous and non-indigenous extractive communities certain points in common emerge from a comparison of the two types of experience.

1. The CPI Cooperatives

The Acre Pro-Indian Commission was founded in the mid-1970s by anthropologist Terri Vale de Aquino. Until 1975, the Brazilian Indian agency, the National Indian Foundation (FUNAI) did not recognize any indigenous territory in the state, and maintained the position that the indigenous groups had assimilated to the regional society and were in effect not Indians. Both because of the CPI's effective advocacy, and because of the increasing organization of the Indian communities themselves, there are now 32 indigenous areas recognized in the state, covering 14,918 square kilometers, or 9.77% of the total area of the state. FUNAI created a regional office in the state in 1975, but has to date only demarcated six areas out of the 37 under its responsibility, and most of these under pressure from the Inter American Development Bank. However, the indigenous areas of Acre and southern Amazonas state represent significant potential for forest conservation. Given the Indians' legal guarantee to land rights under the present Brazilian constitution, and the explicit will of the groups in Acre and southern Amazonas to preserve the mixed economy that they practice (small-scale agriculture, hunting, fishing, and rubber and Brazil nut gathering for cash income) the indigenous communities of Acre are as important a constituency in support of forest protection as are the rubber tappers. The CPI's coops have promoted the self-sufficiency of these communities, and their ability to control their land in

several ways.

The 12 cooperatives established through the CPI since 1980 have had mixed success, and there has been controversy surrounding them. Largely funded by Oxfam UK, the coops originally intended to allow indigenous rubber tapping and Brazil nut gathering communities to market their products directly and buy trade goods as a group and directly, rather than dealing with patrons and middlemen on an individual basis. The projects aimed to free communities of exploitative middlemen by fostering economic independence. The basic principle is that by financing the advance purchase of the trade goods the community will consume in a year, and establishing a canteen run by someone with bookkeeping skills, the community can sell its products for a higher price and buy goods at a lower price and eliminate cheating on the books. This would allow community members to break the cycle of debt peonage.

The canteen and its administrator in effect occupy the position formerly occupied by the patron and his barracao, (company store), with each producer delivering his produce to the canteen, and receiving consumption goods that are charged to his account. Ideally the harvest is accumulated and sold all at once, allowing the community more bargaining power with merchants. This involves keeping accurate records of credits and deficits for each coop member, as well as controlling consumption.

In fact, Indians have gotten out of debt peonage, and removed patrons from their areas in several instances, but except in a few cases, the coops have not proved self-sustaining. External funds have permitted Indians in the areas with coops to cut out the middlemen, but various factors intervene to prevent the coops from becoming adequately capitalized. Terri Vale and other CPI members point out that since the federal government is deficient in providing the services it by law is obligated to provide, the coops often fill the gap and decapitalize themselves in the process. For example, if someone is seriously ill in an area with no medical assistance and no radio, the coop often pays the the cost of evacuating the person to the nearest town, as well as the cost of treatment. Last year one Kaxinawa group did not produce rubber, but used the dry season to demarcate their own reserve - also a task that should fall to FUNAI - relying on material in the canteen for market needs, and decapitalizing the coop. CPI's overall evaluation of the coops is that economic losses have subsidized political gains. The projects have largely not been economically self-sustaining, but, the CPI argues, have given the communities leeway to get patrons out the areas, and secure at least de facto control over the land. Obviously this kind of success depends on the continued availability of outside funds.

Other factors leading to the decapitalization of coops include: poor or insufficiently trained administrators (cantineiros),

manipulation of the coop's capital by certain chiefs, initial undercapitalization, and high transport costs. In some cases, (as became clear in discussions at the conference) chiefs have reproduced the exploitative position of patron or middleman, or have appropriated the capital for their own uses. In others, poor record keeping has impeded the functioning of the coops. Some very remote areas find that high transport costs consume unexpected amounts of resources. Some CPI members argue that when the chief is also the cantineiro problems invariably arise as the chief's political and kinship obligations conflict with the egalitarian economic goals of the coop. Catholic Church-linked Indigenist Missionary Council (CIMI) members (who have worked with many fewer coops than CPI), say that direct consumption of the capital has also been a problem, and that the coops run the risk of reproducing dependence of the Indians on patrons. (cf (CEDI, 1985), "Fogo nos Arraiais do Indigenismo").

Oxfam UK representatives with experience in the area argue that even where coops fail to become self-sustaining and have not definitively broken patron-client relations, local communities benefit economically from the experience. Communities (or individuals) have learned that accumulating the rubber or Brazil nut harvest and selling it once a year, rather than piecemeal throughout the year, offers a more advantageous negotiating position. They have also learned that they are better off selling their harvest for cash and buying the goods they want,

rather than accepting goods on credit to be paid off with the rubber or Brazil nut harvest.

An evaluation focusing on the collection of basic economic data is an urgent necessity for these projects. CPI has kept reasonably good records of the 12 projects it has funded, and can show, for example, how much was granted to each area, what the rubber, Brazil nut and agricultural production has been, and what infrastructural improvements have been made. But basic calculations that could suggest where coops are most likely to encounter problems, and could assist in marketing decisions, need to be made. For example, given the fuel costs of transporting rubber, if a given village can sell in a nearby town and get a given price for its rubber and pay a given price for the goods it buys, or sell for a higher price and buy more cheaply in a somewhat more distant town, which is more profitable? Given the controlled price of rubber and Brazil nuts, are there areas where based on past production coops are not economically viable? What level of capitalization is really necessary to get a cooperative going? Given the imminent paving of the 364 highway and the increased pressure on indigenous lands and forest resources it will bring, research in support of the cooperatives is necessary.

B. Projeto Seringueiro

Projeto Seringueiro, like the CPI/Acre grew out of an initial research interest, on the part of a few individuals, starting in 1978. Initially funded by Oxfam³ UK, the project later received support from the Ministry of Education and Culture. Also like the CPI, Projeto Seringueiro arrived at the conclusion that the standard of living in rubber tapper communities could be considerably improved by eliminating middlemen from the marketing of rubber, through the creation of cooperatives to sell rubber and buy merchandise. This was envisioned as part of a broader strategy including community health and education projects. Education was seen as particularly crucial for improving living standards insofar as literacy is necessary to run a coop.

Between 1981 and 1985 Projeto Seringueiro mounted six schools and two producers' and consumers' cooperatives, as well as organizing a program for the training and support of community health monitors through the Acre state Secretariat of Health. By 1983 Projeto Seringueiro held its first teachers' training course and the schools were turned over to the communities, with literate community members teaching. The cooperatives set up maintenance funds for the schools to pay monitors and defray the costs of operation. The cooperatives initially functioned well, and for the first harvests the capital was maintained and consumption goods were bought out of the profit on rubber. In 1984, however, with hyperinflation, the coops failed. This

coincided with the attempt to turn the coops over to strictly local control. The education projects continued and discussions are underway with the state Secretariat of Education to take on the financial responsibility for the schools while maintaining their socioculturally distinct character and their emphasis on community control. At the same time, Projeto Seringueiro gained the support of the Ministry of Education and Culture. The experience of rubber tappers with Projeto Seringueiro, as well as in local unions and other similar initiatives in other parts of Amazonia was one important impetus behind the first national meeting in Brasilia in October 1985. This meeting catalyzed the nascent rubber tappers movement, as well as burgeoning support groups, and regional organizing initiatives have followed in Acre, Amazonas and Rondonia.

In the cases of both indigenous and non-indigenous cooperatives, the experience of the communities with coops is part of a larger process of local organizing. Coops have helped Indians defend their lands and press for demarcation more effectively, and the experience of rubber tapper communities with coops was important in organizing the first national meeting in Brasilia. The meeting in turn resulted in increased organizing initiatives at the local level, and it is to be expected that further, more sophisticated efforts toward economic self-sufficiency will emerge from these.

III. Legal Mechanisms for the Creation of

Extractive Reserves

Four federal agencies and one state agency have discussed the proposal for extractive reserves to date: SUDHEVEA, SEMA, IBDF, INCRA (MIRAD), and the State Forestry Institute of Rondonia. There is no lack of legal means to establish such reserves. Problems could arise in coordinating the rubber tappers' concern with having effective control over land and the institutions' criteria for environmentally protected areas, with inter-institutional jurisdiction, and perhaps more seriously, in the institutional will to implement the proposal.

Discussion at the federal level was stimulated by the Plan to Protect the Environment and Indigenous Communities in the Area of Influence of the Porto Velho-Rio Branco Road (PMACI). This plan was formulated in response to the Inter-American Development Bank's requirement that the Brazilian government present an environmental and indigenous protection plan as a condition for financing the paving of the 364 road from Porto Velho to Rio Branco. The \$10 million plan seeks to coordinate the activities of INCRA, IBDF, SEMA, EMBRAPA and FUNAI in mitigating negative effects, in particular increased migration, of the project on the

environment and the indigenous communities. The PMACI working group is coordinated by IPEA, (Insitute de Planejamento Economico e Social), within SEPLAN. The PMACI has created an institutional mechanism to coordinate the activities of the agencies involved and allocate resources for the plan.

While the preliminary action plan (PAP), which is to lead to the formulation of a definitive action plan through a series of surveys and research aiming at environmental-economic zoning of the area of influence of the project, makes no specific mention of extractive reserves, IPEA has expressed interest in the proposal and an environmental consultant has done some preliminary work on the subject. The IDB has publicly stated that the needs of the rubber tappers must be taken into account in the project.

After discussions with IBDF, SEMA and IPEA staff, the most promising legal instruments for the creation of extractive reserves seem to be either SEMA's APA (Area de Protecao Ambiental) or disappropriation under land reform, under the Land Statute and the PNRA (Plano Nacional de Reforma Agraria), which is the institutional responsibility of MIRAD/INCRA. Expropriation for land reform and the imposition of the APA are not legally incompatible, and if interinstitutional cooperation were achieved, they would be complementary. This is in fact the conclusion also reached by a report prepared for the National

Council of Rubber Tappers (Simonian: 1986).

Implementation of the proposal will depend on close cooperation between federal agencies and the local communities and the organizations that represent them. If for example, "concession for use" ² rather than granting full land title is adopted by INCRA without prior consultation of the rubber tappers' organizations, they are very likely to view the entire process as having been imposed by government - whether as a benefit that has been granted them or as a manoeuvre of the government to deprive them of their due rights to the land. In neither case are the local organizations strengthened, and since the value of extractive reserves is precisely in the local constituency that supports them, this would be counterproductive.

The creation of an APA in conjunction with granting full property rights is perhaps the best way to ensure that reserves are used sustainably over time. The APA specifies what uses are permitted, and also specifies that the ecosystem cannot be degraded. Rights to the land would give rubber tapper communities an investment in the land, and could stimulate efforts to increase productivity. In any case, the most important guarantee that reserves are defended will be creation of conditions for extractive production to compete effectively on the market, through improved marketing of extractive products, increased productivity, removal of subsidies for unsustainable

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land uses such as cattle ranching, access to credit for extractive producers, and improvement of health services and education. These are all goals of the rubber tappers' organizations, and are noted, if summarily, in the INCRA proposal.

The PMACI working group provides an opportune institutional framework for the creation of extractive reserves. The relevant agencies are included (SEMA, INCRA, IPEA), and both the IDB and the World Bank support the proposal. The area of influence of the Porto Velho-Rio Branco road, including the state of Acre and parts of Amazonas and Rondonia, accounts for 41% of natural rubber production nationally (SUDHEVEA 1986) and contains some 33,702 families engaged in extractive production, or 202,212 people. The PMACI area should therefore be a high priority for the creation of reserves.

The state government of Rondonia, through the State Forestry Institute (affiliated with the Secretariat of Agriculture), has initiated a pilot study of an extractive reserve in the Vale do Guapore, the last relatively pristine, uncolonized region of the state. Given the state government's plan to pave the 429 road, which connects Presidente Medici on the 364 highway, with Costa Marques on the Bolivian border, the proposal is timely, since uncontrolled colonization and invasion of protected areas in the Vale do Guapore has already begun and can be expected to increase

with the paving of the road.

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IV. The Economic Value of Extractive Production

The clearest illustration of the value of extractive production as a development alternative emerges from data on extraction, cattle ranching, and agriculture in Acre from 1970 to 1980. While the land area devoted to both agriculture and cattle ranching increases, and the area devoted to extraction declines, the dollar value per hectare of extraction increases more than either of the other alternatives. Further, the value of rubber as an export from the state increases over the decade, while the area exploited declines. This suggests that even without considering the relative sustainability of the alternatives, extraction has been seriously undervalued as an option.

Growth in cattle and agricultural production, however, is directly related to deforestation - these are the major causes of deforestation in the region. Deforestation increases very rapidly in the decade - in 1975 only 0.764% of the state is deforested, increasing to 3.032% by 1980. (Fearnside 1984) Whatever cost is assigned to the forest lost, decreases the relative value of cattle and agriculture accordingly. Extraction is completely sustainable.

The remainder of this section examines in more detail the

relative cash values of extraction, cattle, and agriculture in Amazonas, Rondonia, and particularly Acre, and suggests possible explanations for the trends observed in Acre. A calculation of the value for the forest lost is also suggested.

General Trends - Acre, Amazonas, and Rondonia

Despite rapid transformation of large parts of Amazonia, and massive incentives offered to cattle ranching and agriculture, extractive production has continued to be economically significant.

In 1970, total vegetal production (extraction, agriculture, and wood) for the states of Acre, Amazonas, and Rondonia was worth approximately \$72,439,780 (see annex 5). Rubber (Hevea) alone accounted for 17.91% of this value, and extractive products (rubber, Brazil nuts, and a few other nuts oil, and fibers) as a whole for 22.96%. Manioc is the single most valuable crop, accounting for about 28% of the total value in the three states. As annex 5 shows, the bulk of manioc production is for consumption where it is grown, that is, manioc is a subsistence crop and barely enters commerce.

By 1980, the percentage of extraction falls to about 14.92%. If wood production, insignificant in the three states in 1970, is counted, wood and extraction account for 21.5% of the total

value. (see annex 5) This change is because of the change in production in Rondonia, as is clear in annex 5, which is in turn related to migration to Rondonia in the decade (where population increased from 111,064 to 491,069, or 342%), owing to government sponsored migration starting in the early 1970's. (IBGE Anuario Estatístico do Brasil, 1984) In the same time period manioc falls to 18.6% of the total value. Rubber and manioc still account for about a third of the total production of vegetable products, and manioc remains basically a subsistence crop. In Acre and Amazonas, rubber actually increases as a share of the total value of vegetal production over the decade.

From 1970-1980 extractive production is worth more than cattle production in all three states. Beef production for Rondonia, Acre and Amazonas amounts to about 33.45% of the dollar value of extractive production (about \$5 million for the former and about \$17 million for the latter. See annexes 1 and 2). In 1980, beef is worth some 72.5% of extractive production, if only rubber, Brazil nuts and nuts, oils, and fibers are considered. If the value of wood (logs, charcoal, and firewood), under \$1 million in 1970, is added in 1980, beef comes to little more than 50% of the value of forest resources. While logging as practiced in the region is generally unsustainable, including the value of wood gives a somewhat better account of resources that cattle ranching displaces. The 1980 value for beef is undoubtedly high, since it is calculated multiplying the retail price for beef by the weight

of the carcasses of cattle slaughtered, and not all of the carcass is sold as meat.

3

Extraction in Acre

Looking at the case of Acre, the transformation of land use, and the significance of extraction in the regional economy may be seen more clearly. From 1970 through 1982, (the last year for which we have data), rubber is the largest export from the state, followed by Brazil nuts. (Anuario Estatístico do Acre 1975, 1982) Cattle or beef do not appear, and agricultural products in the year of most significance in export, 1975, come to 4.2% of the total value of exports. In 1980, rubber accounts for 96% of the total exports, up from 84% in 1970. (Ibid) In terms of the state revenue, rubber is consistently the largest single source of revenue, from the ICM, a tax on merchandise, between 1974 and 1983 ranging between 65% and 93% of the total ICM from the primary sector (agriculture and ranching, rubber and Brazil nuts) and between 24% and 87% of the total ICM for the state (the primary sector plus industry and commerce). (Ibid)

Calculating per hectare values for cattle, agriculture, and extraction for the state yields the following results. Taking the area occupied by ranching, agriculture, and extraction and the respective dollar values of the three land uses for 1970

yields a value of about \$3.24 per hectare for beef, \$14.25 for agriculture, and \$2.49 for extraction. (IBGE Anuario Estatístico do Brasil 1971, 1977, 1984, Anuario Estatístico do Acre 1976, 1982) In 1980 the per hectare values increase to about \$3.72 for beef, \$19.42 for agriculture, and \$8.99 for extraction, increases of 14.8%, 36.28%, and 261% respectively. At the same time the area devoted to extraction declines 7.6% while the area devoted to agriculture increases 57%, and the area declared for cattle ranching increases 413%. (see annex 4) The enormous increase in the area devoted to cattle ranching is definitively not matched by proportionate increases either in production by volume (up 66%), or in productivity. Extraction, however, increases greatly in productivity per hectare with the breakup of large estates and increased participation of free rubber tappers in the sector. The volume of rubber production increases modestly (11%) (Anuario Estatístico do Acre 1971, 1982) while the area exploited decreases, such that the per hectare increase in value of extraction is much greater than that of either ranching or agriculture.

Perhaps the most important consideration in such a comparison is the issue of sustainability. Cattle ranching is notoriously unsustainable on tropical forest soils (Goodland 1980; Hecht 1985), as is annual agriculture, while native rubber trees as tapped by rubber tappers will produce for up to 50 years, leaving ample time for natural replacement or for replanting in the

forest. Other extractive resources are equally sustainable.

Assuming that a hectare of land held for cattle ranching in Acre in 1980 lasts 10 years and yields the same output throughout, then becomes unusable, after twenty years a hectare of this land will yield \$37.20, while a hectare in extractive production will yield \$179.80 This formulation might appear to be exaggerated, since the area of land actually given as pasture is much less than that held for cattle ranching. Taking the amount of land listed as in pasture, as opposed to land held for purposes of cattle ranching, as the base yields a figure of \$24.42 for the value of meat production per hectare in 1980. (IBGE Anuario Estatístico do Brasil, 1984) But it is also true that the data do not show how much of land claimed as held for extractive production is actually exploited as such. Moreover, using the land held for cattle ranching is a fair measure of the value produced by the sector, or the relative productivity of cattle ranching in relation to extraction. The actual production of meat per hectare may be closer to the higher figure, but this is not the best measure of the productivity of the sector to the extent that land held for cattle raising is a speculative investment (cf Hecht 1986). Having more land than is actually in pasture may be necessary if herds are to increase given the extensive nature of cattle ranching in Acre as elsewhere in Amazonia (under 15 head per square kilometer) and the instability of pasture.

Assuming that cattle ranching actually produced \$24.42 worth of meat per hectare in 1980, it is still the case that extraction will over time yield more. How long it takes for extractive production to overtake cattle depends on how long the pasture lasts. If half the hectare in pasture lasts for ten years and is exhausted, and half lasts five years, the hectare producing rubber, Brazil nuts, and so on will produce an equivalent value in just over 20 years. If the hectare in pasture lasts only five years, extraction will produce an equivalent value after a little more than 13 years. At the same time, of course, extractive production does not damage the forest, while it is destroyed for cattle pasture. These estimates assume no increases or declines in productivity, and the real situation depends on the management of pasture, the soil type, intensity of exploitation. However, the productivity of extractive production can also be increased.

Agriculture has a higher value per hectare than either cattle ranching or extraction, at \$19.41 per hectare in 1980, when comparing land holdings by category of economic activity. If this ideal hectare produces for five years and is exhausted, it will produce \$97.10 worth of produce. A hectare of rubber and Brazil nut producing forest will take under 11 years to produce the same value, while maintaining the forest and continuing to produce indefinitely. The situation is more complex than this, since part of the agricultural product in question is from

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permanent culture (avacado, papaya, oil palm, coffee, and other tree crops), which are a better use of the land than annual cropping. However, more than twice as much land was planted in annuals such as rice, beans, and corn, as in tree crops in Acre in 1980. (Anuario Estatístico do Acre 1982)

The value of forest lost to agriculture and cattle ranching is typically held to be a qualitative externality when it is considered at all in development planning, and so does not appear in cost-benefit calculations. While the general problem is complex, in the case of Acre there is a simple way of suggesting a minimal price-tag for the forest destroyed for agriculture and cattle ranching. Assuming that the forest lost between 1975 and 1980 (3,461 square kilometers, (Fearnside 1984)) was producing rubber and Brazil nuts, a single year's production at 1980 values per hectare was worth more than twice as much as the entire increase in the value of beef produced in Acre between 1970 and 1975, and almost as much as the increase in the value of beef from 1975 to 1980. (The area deforested would have produced \$3,111,439 in rubber and Brazil nuts in a year while beef in the state increased \$3,559,579 from 1975 to 1980. see annex 2) Given the very wide distribution of rubber and Brazil nut producing areas in Acre, and the large-scale displacement of rubber tappers and Brazil nut gatherers by cattle ranching in particular, the assumption that the whole area deforested could have produced rubber and Brazil nuts is not frivolous. Obviously this is a

crude, insufficient estimate of the value of the forest, but it at least suggests a minimum for the benefits foregone in deforestation.

Extraction outperforms the alternatives in the market over the decade. Its importance as an export increases, it produces more income per hectare even in the short term than does cattle ranching, and the productivity of extraction increases while the area devoted to it declines. One possible explanation for the increase in productivity of extraction is the emergence of autonomous rubber tappers. As noted above, the period 1960-80 in Acre sees the breakup of large rubber-producing estates in favor of an increase in agriculture and cattle ranching and a large increase in the participation of posseiros, or untitled occupants, in the regional economy, notably as free rubber tappers. The increasing participation of free rubber tappers, either as renters or posseiros may result in more efficient exploitation of the existing resources. Access to more buyers and more sources of merchandise may stimulate the productivity of rubber tappers.

Subsidies and Cost of Production of Native Rubber

It is commonly argued that native rubber production depends on government subsidies for its continued existence, and native rubber production has been subsidized to a greater or lesser extent since the 1920's. It is undoubtedly the case that southeast Asian plantation rubber is cheaper than Brazilian native rubber: natural rubber on the world market is on the order of \$0.72 per kilogram, while the controlled price of natural rubber in Brazil is about \$1.95 per kilogram, (SUDHEVEA 1986) and the difference is said to represent the cost of production of native rubber. This cost of production is the crucial calculation for setting the controlled price of natural rubber. SUDHEVEA bases its calculation of the cost of production entirely on traditional patron-client relations in native rubber production, (FEALQ 1983), explicitly leaving free rubber tappers out of account. The most detailed recent study (Ibid) finds that the single greatest cost in the total is the cost of consumption by rubber tapper families, and that this is owing in large part to the fact that the patron's (seringalista) costs are passed on to his clients, the rubber tappers. The study further concludes

that the only possibility for lowering the cost of production of native rubber would be along the lines of free rubber tappers' organizations in Acre, since these can claim a higher price for their rubber and buy consumption goods at lower prices (FEALQ 1983). Eliminating middlemen is a crucial prerequisite to making native rubber more economically viable and improving the incomes of rubber tappers. The price of native rubber to industrial users includes the controlled price in theory paid by patrons to rubber tappers plus 20%. The price to industry could be lowered while increasing the price paid to rubber tappers by direct marketing. In any case, the cost of production to free rubber tappers has not been calculated, and in some respects differs qualitatively from that of the classic traditional rubber tapper. Their participation in the regional market depends, like that of the rubber and Brazil nut producing Indian communities, on a "subsidy from nature" (cf Hecht 1985a) in the form of hunting, fishing, and collecting of materials for housing, furniture, and tools and food and medicinal plants from the forest. Their standard of living, compared to rural wage earners, is better, and the difference results from the extractive producers' access to this subsidy.

A further point that complicates the calculation of the relative value of extractive production concerns the way in which production data are collected. State and federal agricultural census data are based on tax records, specifically the payment of

the ICM, levied on processed commodities. It is widely reported that significant portions of the rubber and Brazil nut harvests are illegally marketed in order to avoid this tax. This is no doubt also true for cattle and agricultural products, so that the data probably reflect relative shares in state or regional production accurately. But to the extent that extraction is an eminently sustainable land use and agriculture and cattle ranching are not, the greater the quantity of extractive production per hectare, the larger the value produced over time will be, and the greater the disproportion between the value produced by the sustainable and the unsustainable use will be.

Heavy subsidies for cattle ranching are a major attraction for investment in the sector in Amazonia (IPEA 1985) and should feature in comparison of cattle ranching with other land use alternatives. A detailed survey of projects in Amazonia receiving SUDAM incentives carried out by IPEA in 1985, while not treating any of the 20 agriculture/cattle and agro-industrial projects implemented in Acre in detail, draws certain interesting conclusions. The study concludes that projects receiving incentives (up to 25% tax return for investments in Amazonia, amounting to some \$600 million at the 1985 exchange rate for 947 projects between 1967 and 1985) have contributed little to increasing the economic productivity of the region. After surveying the 94 agriculture/cattle and agroindustry (largely cattle) projects actually implemented, IPEA notes that real

production and sales amount to 15.7% of projections, that only 3 out of 94 implemented projects have generated any income, and that the incentives themselves had become a speculative enterprise and a means of securing possession of land. (IPEA 1985) This suggests that the expansion of cattle ranching in Acre owes more to the valorization of the land as a commodity, and to the fiscal incentives, than to investment in the land for what it can produce. (GT-Planacre 1986)

The tendency of at least some elements in Brazilian planning circles is to do away with the price controls that have protected the national market for native rubber, and the recent demise of SUDHEVEA may be taken as a sign that those elements are in the ascendancy. The closing of SUDHEVEA does not itself mean the end of controlled rubber prices, since the price controls are set by the Conselho Interministerial de Precos (CIP) and the Conselho Nacional de Borracha. It may be sound fiscal policy to eliminate the price controls that subsidize native rubber, but it would be very unsound land use policy to do so without eliminating subsidies for cattle ranching and agriculture as well. Deregulating rubber prices suddenly, while allowing agricultural colonization and fiscal incentives for cattle ranching to continue would have the effect of driving rubber tappers off the land and into the cities, where, based on past experience, they join the ranks of the unproductive urban poor. Extractive reserves provide a framework for the kind of technical

assistance, extension, health and education that extractive producers want and that could make them more productive.

Directions for Future Research and Policy

The data for Acre show that despite substantial transformations in land use, extractive production continues to be the mainstay of the regional economy. The form of this production has altered radically since 1960, from traditional rubber estates exploited by traditional rubber tappers to much smaller holdings occupied by posseiros - free rubber tappers. This is clearly not a stable situation, as land values have increased, making title, or a claim to title itself of value, which was not the case before 1960. This has resulted in the expulsion of posseiros in the series of land conflicts ongoing in Acre (Cf Branford and Glock

1985

. In this context, the proposal for extractive reserves appears as a means for fixing sustainable users on the land.

Extractive reserves should not depend solely on rubber, or even solely on rubber and Brazil nuts. There are already a number of oils, nuts, fibers, and medicinal plants that are extracted and have markets in Brazil, and biological research could turn up other commercially valuable products. It is nonetheless true that rubber remains the largest source of revenue in the state of Acre, and Moreover, according to IDB consultants, the technology

exists to increase native rubber production up to 40% while diminishing labor time in tapping.

A detailed comparison of the relative values of extractive production, cattle, and agriculture would be of use to policy makers as well as to researchers concerned with land use in Amazonia. This requires the collection of data on productivity and prices from sites on comparable soils in cattle pasture, extractive production, and agriculture. The municipality of Xapuri where INCRA has identified an area for the implementation of an extractive reserve, and where a number of rubber and Brazil nut producing areas have been converted to cattle pasture in recent years, is a good possibility. Data on the cost of production of rubber for free rubber tappers should also be collected, including consumption goods, tools, amount of time spent on subsistence activities, and volume of rubber and other extractive production. This would also allow a detailed account of the present status of the rubber tappers organizing initiatives.

A further requirement for the successful implementation of extractive reserves is regular and open communication between the government agencies now involved and the local communities. Informed intermediaries can play a useful role here, since there is no tradition of cooperation between government planners and local leaders in the region, and in fact a certain amount of

mutual incomprehension. At the same time the interministerial group responsible for the PMACI in particular and the rubber tappers and Indian organizations would both stand to benefit by cooperation and improved communication. Indeed with state of Acre on the verge of greatly increased migration, and increasing pressure from outside investors in land, it would seem that the PMACI cannot hope to fulfill its mandate without strong grassroots support. The Indian and rubber tapper communities of the state cannot hope to see their interests defended without effective action by the government. Any stimulus to stronger links between the local and federal levels would be helpful.

Footnotes

1. In March 1986, we visited the site of a resettlement project financed by the state government of Amazonas - Project Hope (Projeto Esperanca) -in the municipality of Novo Aripuana, Amazonas state. Interviews with colonists revealed that the state government had sent recruiters to Rondonia to attract settlers awaiting land from the federal land agency (INCRA), and had brought some 300 families to the project since 1984 with promises of cleared land, titles, infrastructure, and services. The colonists found instead virgin forest unsuited to the temperate zone agriculture they were familiar with, no infrastructure, no schools or health services and derisory extension services. Some 80 families of the original 300 remained. The project, in other words, was a total failure. Ironically, around 100 local families, largely rubber tappers, had been displaced for the project. So complete was the failure of the resettlement scheme that the government had sold some of the lots to local families. These, following local practice of mixed plantations in small clearings, use of a variety of fruit trees, including wild species, and reliance on fishing and hunting as well as agriculture, were apparently doing well.

2. INCRA's legislation takes environmental protection into account. The Land Statute of 1964 has provisions for the defense of the natural conditions of regional ecosystems. (Lei 4.504/64: arts. 3, 18-f, 20-III, 24-III, 57-III, cited in Simonian 1986) More specifically, the National Land Reform Plan (PNRA) of 85, as well as the Acre regional land reform plan (PRRA/Ac.) of 86 have provisions that address the needs of extractive producers. The PRRA/Ac. recognizes the specific character of extractive occupation of the land and in its first version, called for the regularization of two areas in benefit of rubber tapper communities. These are Gleba Remanso and Gleba Mario Lobao, in the municipalities of Xapuri and Rio Branco respectively. At the same time the regional plan calls for a gradual transistion from extractive production to agriculture and extraction from plantations, which is not supported by rubber tappers organizations.

One possibility, provided for in the PNRA, as well as PRRA/Ac and the PRRA of Rondonia, is the use of "property in condominium" (propriedade condominial) for the creation of reserves. This offers the advantage that title can be held jointly, with each member of the group having rights to an "ideal fraction" of the undivided land. There is no need in this case to divide the area into lots, as is INCRA's usual practice. Since extraction depends on the use of "roads" (estradas), or paths of rubber trees in the forest, used in rotation and not easily divided into individual lots, "property in condominium" is an appropriate

instrument. INCRA has in fact drawn up a proposal for extractive reserves as an alternative settlement model. (INCRA 1986) The document, which views extractive reserves as an exceptionally positive and useful approach to land distribution in tropical forest areas, raises one point which may be key to the implementation of the plan. This is that land held in condominium is alienable, and therefore groups or individuals with rights to a reserve could eventually sell or transfer the land to third parties who could convert it to other uses. INCRA's proposed solution is to grant a "concession for use" (Concessao de Uso) by ideal fraction. The area would not have to be divided into lots, and the inhabitants would have rights to use, but not full property rights to the land. (INCRA: 1986)

IBDF's interest in the proposal seems problematic, insofar as the National Forest excludes human habitation, while the Forest Reserve, compatible with economic uses, requires public bidding for the rights to exploit the area to be granted. (MA/IBDF/FBCN, 1982: 26; Decreto-Lei 200, 1967: art. 126) The APA, however, is legally defined as an area of "interest for environmental protection, in order to ensure the well-being of the human population and preserve or improve local ecological conditions." (Lei 6.902, 1981: art. 8, in Simonian 1986) The APA has no effect on land title or property relations; it is not an instrument for expropriation of land, and so the situation of rubber tappers as posseiros, without land title and with minimal guarantee to the land they use is not addressed by the APA. It does mandate the environmental protection of areas, and can be applied quickly, as a legal defense against, for example, deforestation. Since expropriation by INCRA is a more complex and time consuming process, the APA could be a useful first step in the creation of extractive reserves, with regularization of the land following.

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Annex 1

Doller Value of Extractive' Production - Rondonia, Acre, Amazonas
1970, 1975, 1980

1970

Rondonia

\$3,581, 211 (rubber, Brazil nuts, ipacec)
" wood

Acre

\$7,854,069 (rubber, Brazil nuts, acaci, wild meat)
\$189,389 (wood)

\$8,043,458

Amazonas

\$5,197,425 (rubber, Brazil nuts, resins, guarana,
oils, fibers)
\$502,164 (wood)

\$5,699,589

\$17,324,258

1975

Rondonia

\$2,935,545 (rubber, Brazil nuts, ipacec)
\$4,819,061 (wood)

\$7,754,606

Acre

\$9,861,894 (rubber, Brazil nuts)
\$2,823,529 (wood)

\$12,685,423

Amazonas

\$7,508,116 (rubber, Brazil nuts, resins, guarana,
oils, fibers)
\$1267,404

\$8,775,520

\$29,215,549

1980

Rondonia

\$5,066,507 (rubber, caucho, Brazil nuts)
\$5,597,828 (wood - logs, charcoal, firewood)

\$10,664,335

Acre

\$26,235,726 (rubber, Brazil nuts, ouricuri, copaiba,
scai, wild meat)
\$3,377,671 (wood- logs, charcoal, firewood)

\$29,613,397

Amazonas

\$16,427,858 (rubber, Brazil nuts, copaiba, resins, fibers)
\$12,372,149 (wood - logs, charcoal, firewood)

\$28,800,007

\$69,077,739

Sources: IBGE Anuario Estatístico 1984, 1977, 1971; Anuario Estatístico do Acre 1982,
1976, 1970; Anuario Estatístico da Amazonas 1978,

Annex 2

Dollar Value of Beef Production - 1970, 1975, 1980 -
Rondonia, Acre, and Amazonas

1

	<u>tons</u>	<u>\$</u>
<u>1970</u>		
Rondonia	1,562	1,052,505
Acre	1,382	1,094,335
Amazonas	7,798	3,648,583
	<u>10,742</u>	<u>5,795,423</u>
 <u>1975</u>		
Rondonia	* 3,918	4,257,437
Acre	2,225	2,417,763
Amazonas	7,938	<u>8,625,712</u>
	<u>14,081</u>	<u>15,301,238</u>
 <u>1980</u>		
Rondonia	5,901	15,332,357
(1982 data)		
Acre	2,300	5,977,342
Amazonas	5,124	<u>13,320,934</u>
(1978)		
	13,325	34,630,633

Sources: IBGE Anuario Estatístico 1970; Anuario Estatístico de Amazonas 1976, 1978; Anuario Estatístico do Acre 1982, 1975; Anuario Estatístico de Rondonia 1978, 1982.

* (estimated values for Rondonia 1975)

Annex 3

Acre - 1970 Number of Holdings and Area of Holdings, by Category of Economic Activity

	<u>Holdings</u> (Establecimientos)	<u>Area</u> (hectares)
Total	23,102	4,122,085
Agriculture (Agricultura e Agropecuaria)	7,937	628,040
Ranching	575	337,756
Horticulture and Fruit	3	*
Aviculture	6	-
Extraction	14,617	3,156,525
1975		
Total	25,001	4,291,777
Agriculture	8,740	464,436
Ranching	1,173	1,116,641
Horticulture/ Fruit	37	152
Aviculture	38	2,604
Extraction	15,013	2,707,944
1980		
Total	27,371	5,679,533
Ag.	34,979	989,823
Ranching	2,665	1,733,040
Hort./ Floriculture	91	708
Forestry	-	-
Aviculture	336	39,176
Extraction	13,360	2,916,783

Sources: GT-Planacre 1985; Anuario Estadístico do Acre 1976; IBGE Anuario Estadístico 1984.

Annex 4
Acre - Changes in Land Use 1970-1980

% increase 1970-1975		
	Holdings	Area
Total	8.22%	4.12%
Ag.	10.12%	-26.05%
Ranching	104%	230.6%
Extraction	2.71%	-14.21%
%increase 1970-1980		
Total	18.48%	37.78%
Ag.	340.7%	57.6%
Ranching	363.5%	413.1%
Extraction	-8.6%	-7.6%

Sources: GT Planacre 1985; IBGE Anuario Estatístico do Brasil 1984

RELACÃO DA BORRACHA COM A PRODUÇÃO VEGETAL

ANEXO 5
(em 1.000 Cruzeiros)

ACRE

	1980		1975		1970	
Prod. Vegetal	2.395.274		213.518		77.790	
Borrachas	1.017.789	42,5%	69.793	32,7%	19.818	25,5%
Mandioca	393.749	16,4%	62.116	29,1%	26.619	34,2%
Outros	983.736	41,1%	81.609	38,2%	31.353	40,3%

AMAZONAS

	1980		1975		1970	
Prod. Vegetal	10.526.099		882.092		220.414	
Borrachas	1.936.987	18,4%	88.536	10,0%	31.250	14,2%
Mandioca	2.421.532	23,0%	321.014	36,4%	60.239	27,3%
Outros	6.167.580	58,6%	472.542	53,6%	128.925	58,5%

RONDÔNIA

	1980		1975		1970	
Prod. Vegetal	3.935.474		289.441		34.568	
Borrachas	418.783	10,6%	19.512	6,7%	8.455	24,5%
Mandioca	332.592	8,5%	25.971	9,0%	6.970	20,1%
Outros *	3.184.099	80,9%	243.958	84,3%	19.143	55,4%

* Obs.: Produtos mais significativos:

	café em coco	arroz em casca	feijão em grão	milho
80	12,2%	22,0%	16,7%	9,7%
75	2,9%	44,4%	14,2%	9,8%

MANIÓCA

(em 1.000 cruzeiros)

A C R E

	1980	1975
Total	393.794	62.116
Consumida no Estab.	351.254 89,2%	59.849 96,4%

A M A Z O N A S

	1980	1975
Total	2.421.532	321.014
Consumida no Estab.	2.323.345 96,0%	319.172 99,4%

R O N D Ô N I A

	1980	1975
Total	332.592	25.971
Consumida no Estab.	301.376 90,0%	22.388 86,2%

Source - IBGE Censo Agropecuária 1980, 1975, 1970

Annex G

Acre

TABELA 3

ATIVIDADE ECONÔMICA PREDOMINANTE - CRESCIMENTO PERCENTUAL

1960/70

	TOTAL		MENOS DE 1		1 A MENOS DE 2		2 A MENOS DE 5		5 A MENOS DE 10		10 A MENOS DE 20		20 A MENOS DE 50		50 A MENOS DE 100	
	EST.	ÁREA	EST.	ÁREA	EST.	ÁREA	EST.	ÁREA	EST.	ÁREA	EST.	ÁREA	EST.	ÁREA	EST.	ÁREA
TOTAL	529,55	-56,08	(0-27)	(0-14)	4.175,00	4.140,00	337,74	256,41	88,81	83,71	162,68	168,53	189,52	185,52	1.058,73	1.171,73
Agricultura e Agropecuária	267,47	410,78	(0-27)	(0-14)	5.400,00	6.700,00	504,17	378,76	122,12	117,51	226,79	233,23	357,11	307,10	725,84	641,31
Pecuária	41,38	132,16	-	-	(0-3)	(0-4)	11,11	- 12,12	-46,67	-48,37	-21,21	-19,75	82,80	86,88	141,03	154,50
Horticultura e Floricultura	-66,67	-71,93	-	-	-	-	-60,00	- 62,50	(2-0)	(11-0)	0	0	(1-0)	(20-0)	-	-
Avicultura	100,00	530,00	-	-	(0-1)	(0-2)	-50,00	- 40,00	(0-2)	(0-15)	-	-	(1-0)	(25-0)	(0-1)	(0-70)
Extração Vegetal	1.232,42	-65,38	-	-	100,00	0	-40,00	- 35,44	- 22,41	- 29,02	-57,76	-56,23	-19,00	-12,70	2.129,51	2.590,61

	100 A		200 A		500 A		1000 A		2000 A		5000 A		10.000 A		100.000 E	
	MENOS DE 200		MENOS DE 500		MENOS DE 1000		MENOS DE 2000		MENOS DE 5000		MENOS DE 10000		MENOS DE 100000		MAIS	
	EST.	ÁREA	EST.	ÁREA	EST.	ÁREA	EST.	ÁREA	EST.	ÁREA	EST.	ÁREA	EST.	ÁREA	EST.	ÁREA
TOTAL	4.488,40	4.343,16	2.863,03	2.464,67	794,59	790,63	14,89	24,43	- 7,69	-6,14	-73,26	-73,39	-92,68	-92,16	-83,33	-90,64
Agricultura e Agropecuária	274,14	225,77	123,81	92,16	160,00	145,38	175,00	193,00	150,00	121,43	-66,67	-69,07	900,00	1.841,67	-	-
Pecuária	384,61	367,55	164,28	172,88	200,00	246,94	-25,00	-43,50	33,33	12,90	(1-0)	(6500-0)	25,00	68,54	(0-1)	(0-100.000)
Horticultura e Floricultura	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Avicultura	(0-1)	(0-100)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Extração Vegetal	14.913,46	14.055,97	5.253,41	4.387,24	1.366,67	1.253,86	2,56	15,68	-3,03	- 1,18	-73,17	-73,23	-98,75	- 99,53	(6-0)	(1068940-0)

Source: GT Planacre 1985