

# Frontier Urbanization in the Brazilian Amazon: A Theoretical Framework for Urban Transition

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## **Abstract**

Urbanization of the Amazonian frontier has been little studied, despite its important role in contemporary regional change. Our historical-geographical model of urban transition in the Brazilian Amazon postulates a generalized pattern of stages in the occupation of the region. These stages reflect the changing social relations of production in an extractive peripheral economy. This theoretical framework provides a useful point of departure for future investigations of frontier urban networks, their functions within the national economy, and their impacts on rural land-use.

Key words: *frontier, settlement, urbanization, Brazil, Amazon*

## **INTRODUCTION**

The rapid growth of urban areas has become one of the most distinctive attributes of developing countries since the Second World War. Justifiably, it has generated a voluminous scholarly literature (Gugler 1988; Hamer 1985; Hooshang and Goldsmith 1987; McGee 1971; Renaud 1981). Latin America leads the Third World in urbanization. As recently as 1960 Latin America was predominately rural; only 32.6 percent of the region's population lived in urban areas larger than 20,000 inhabitants (ECLA 1985). By 1984, 69.4 percent of Latin America's 377 million inhabitants dwelled in towns and cities (World Bank 1986).

Brazil exemplifies the rapid urbanization of Latin America. Since World War II, the national population has grown from about 47 million to more than 150 million, about three-quarters of which now lives in centers of more than 2,000 people. At the present time, 100 percent of Brazil's net population growth is absorbed by urban areas (IEGE various years; World Bank 1986). The nation's city system has become increasingly extensive and regionally integrated in a complex urban hierarchy. Twelve metropolitan areas now exceed one million inhabitants. Metropolitan São Paulo, with a human mass of over 17 million, now ranks as one of the world's largest cities (IEGE 1990; Godfrey 1991).

In addition to its massive metropolitan growth, Brazil has extensive frontiers in the Amazon Basin. Here, paradoxically, given the Brazilian government's massive investment in rural development programs—such as agricultural settlement, cattle ranching, and timber extraction, the region's population has become increasingly urbanized. In fact, officially directed colonization projects, hydroelectric dams, and mining projects have favored small nucleations and ultimately have encouraged urban growth on the frontier. Boom towns have sprung up in the inland rain forest seemingly overnight. Despite important social and environmental implications, the phenomenon of frontier urbanization in Amazonia has been little studied. In this article we review the literature on this subject and propose a model of urban transition in the Amazon Basin.

## **THE REGIONAL CONTEXT: URBANIZATION IN THE BRAZILIAN AMAZON**

The Amazon region of Brazil is commonly defined in two ways. The "North Region," as used by the Brazilian census agency (IEGE), includes the states of Pará, Amazonas, Acre, Rondonia, Amapá, and Roraima and encompasses an area of nearly 3.6 million square kilometers. The "Legal Amazon," as defined by the region's development agency (SUDAM), includes the North Region plus Mato Grosso, Tocantins (formerly northern Goiás), and western Maranhão. Legal Amazon" constitutes 58.8 percent of Brazil's national territory (Fig. 1).



Fig. 1. The Brazilian Amazon.

However one delimits this vast region, predominantly covered by tropical rain forest, it long remained marginal to national life. A history of extractive "boom and bust" cycles gave rise to a scattered network of riverine settlements, dominated by a few regional capitals, as a whole weakly integrated into the national city system (Correa 1987; Godfrey 1990). The Amazon's long isolation from land-based transportation ended abruptly in the years following the opening of the Belem-Brasilia Highway in the early 1960s, and efforts at regional integration intensified after the military took power in 1964. Since then, the region has become a national object of geopolitical integration, economic expansion, and environmental change. As a result, rapid deforestation of the Amazon rainforest has become a subject of international controversy (Browder 1988a; 1988b; Buschbacher 1986; Guppy 1984; Hemming 1985; Myers 1980; and Tangley 1986).

A series of ambitious regional development initiatives followed the 1964 military coup. The first was "Operation Amazonia" (1966-1970), which sought to lure private investment to the region through various fiscal incentives to corporations (Cavalcanti 1967; Hecht 1985; Mahar 1979; Nascimento 1985; SUDAM 1982). This policy was followed by the National Integration Program (1970-1974), for which the Transamazon Highway colonization scheme became the region's developmental showpiece (Fearnside 1980; Moran 1976; 1984; 1985; Smith 1977; 1981). Under the First Amazon Development Plan (1975-1979), lands earmarked for "men without land" reverted to large-scale enterprise in a "big-man's frontier" and corporate cattle ranching became the region's privileged investment sector (Browder 1988a; Hecht 1982; 1985). At the same time, a new frontier of settlement was opened in Rondônia and western Mato Grosso, the Brazilian "Northwest." The Northwest Region Development Program (POLONOROESTE), with the support of the World Bank, featured the construction of a major national highway link from Cuiabá to Porto Velho, which opened the floodgates of the western Amazon to Brazil's landless peasant diaspora (Browder 1988c).

The demographic consequences of Brazil's ambitious efforts to open up Amazonia have been dramatic. Total population in the North Region increased from roughly 2.6 million in 1960, just 38 percent urbanized, to more than 9.5 million in 1990, 60 percent urbanized (Table 1). Projections of recent growth rates indicate that this six-state region will increase to a total population of more than 15 million by 2010, of which nearly 70 percent will live in urban centers (Sawyer et al. 1990). Urban growth rates in the Amazon have been about twice that of the nation as a whole (IBGE various years; Godfrey 1988b; 1990).

Table 1. Urbanization of the Brazilian Amazon.

State	Total Population (Percent Urban)	
	1960	1990
Acre	160,208 (21.2%)	434,708 (55.0%)
Amapà	68,889 (51.3%)	267,576 (67.0%)
Amazonas	721,215 (33.2%)	2,213,966 (76.3%)
Parà	1,550,935 (40.6%)	5,391,864 (56.0%)
Rondônia	70,783 (43.5%)	1,125,118 (53.5%)
Roraima	29,489 (43.1%)	135,956 (70.0%)
North Region	2,601,519 (37.7%)	9,569,188 (60.8%)

Sources: Total populations for 1990 are estimated by the IBGE (1990), and 1990 urban percentages are projected by Sawyer et al. (1990); all 1960 figures are official, as found in IBGE (1977).

Much of Amazonia's recent urban growth has occurred in pre-existing metropolitan centers, like Belém and Manaus, largely through the expansion of peripheral shantytowns (Mitschein et al. 1989). But the rates of urban growth have been highest in the interior. While about 52 percent of the Amazon's 1980 urban population resided in the region's four major metropolitan areas with populations of over 100,000--Belém, Manaus, Santarém, and Porto Velho--the dominance of these cities has been declining since 1960, when they accounted for 58 percent of the region's urban population. Indeed throughout Latin America the rate of population growth in towns and cities of less than 100,000 inhabitants has been 50 percent greater than in the larger cities (Ingram and Carroll 1981).

Particularly significant in Amazonia is the rapid growth of new inland settlements. The number of urban places in the Brazilian North Region increased from 98 in 1950 to 143 in 1970 (IBGE 1977, 2444245). While more recent data are not available for all Amazon states, the experience of several areas suggests that frontier urbanization is a widespread regional trend. In Rondônia, state transportation maps indicate that the number of urban places with populations larger than 2,000 increased from 79 in 1979 to 286 in 1989. In the southern portion of Pará, another area of massive in-migration and urbanization, the number of cities serving as municipal seats more than doubled between 1980 and 1990 (IBGE 1990). New towns have sprung up in diffuse locations throughout the Amazon, in areas of new agricultural expansion as well as in older, stagnant frontier zones. As Sawyer (1987, 46) notes: "The growth of the rural population is localized, but urban growth in

frontier regions is generalized .... In other words, the agricultural frontier has become an urban frontier."

The high rate of urbanization and the dramatic growth in the number of urban centers are among the most significant and under-studied geographic trends in the Brazilian Amazon. Although there has been no comprehensive study of urban location and development in Amazonia, two general trends already are clear. First and foremost is the role of public sector planning and social overhead investment. The majority of new towns emerged within the sphere of influence of the three major highways built by the Brazilian government organization and land reform institute (INCRA) as part of a "rural urbanism" scheme for the Transamazon during the early 1970s. Many town sites in Rondônia were selected (often arbitrarily) by INCRA planners as well. Public policy and planning decisions have been important factors influencing new town site location.

Second, many new towns emerged spontaneously, especially at the intersections of national and state highways and local feeder roads. Many such nodes provide a limited range of functions associated with their strategic locations, such as auto repair, restaurants, hotels, and other services, and they often support only a small resident population with, presumably, limited potential for growth or structural development. However, other nodes at network junctions have "taken-off" and become important locations for extractive forest industries, crop processing, regional commerce, banking, and government services.

The rapid urbanization of the Amazonian frontier appears paradoxical in a vast, still scantily populated region. It raises important questions for those concerned with regional development, with the role of frontier cities in national development, and with the links between new settlements and the global capital accumulation. Several questions stand out:

1. Under what political and economic circumstances do new settlements originate?
2. What functions are provided by the rapidly growing frontier settlements and how have these functions changed over time in response to regional production in mining, timber, agricultural sectors?
3. To what extent do frontier towns provide services, employment and consumer opportunities necessary for the social reproduction of the local population? How do such opportunities as exist differentiate by gender? Or, is the population indiscriminately "piling up" due to land consolidation in the rural sector, as a legacy of public policies cultivating corporate support for an authoritarian-bureaucratic regime between 1964 and 1985?
4. What industries emerge in the new Amazon towns and how are these linked in capital composition to national and transnational enterprises? To what extent is local industrialization an autonomous as opposed to dependent process?
5. Finally, is the apparent decentralization of the Amazonian population a viable, long-term phenomenon? Or are new forms of urban primacy and regional polarization emerging on the Amazon frontier as a result of the expansion of capitalist relations?

**DISCUSSION AND REVIEW** Forces of economic agglomeration normally favor some degree of polarization in national urban systems, especially in developing countries, where urban primacy is often pronounced (Johnson 1970; Wheaton and Shisido 1981). In the Amazon periphery, however, a reversal in polarization patterns appears to be taking place as increasing numbers of new towns emerge and grow at rates that exceed those of the large regional and national metropolitan centers. Although peripheral urbanization in developing countries has been examined by geographers, an integrating framework that places this phenomenon in a regional, national, and global context is lacking (Meyer 1986).

An understanding of the complex dynamics of Amazonian frontier urbanization requires a comprehensive analysis of both the region's rural-urban linkages and the inter-urban connections within the larger national city system. These two concerns are represented by distinct approaches to frontier settlement studies: the historical geography of land-use and landscape evolution; and the spatial diffusion of economic activity through an organized urban system. In addition, the "historical materialist" tradition, while not specifically focusing on frontier urbanization, provides an important analytical framework that encompasses this subject. Our conceptual framework for urban transition in Amazonia draws from and attempts to synthesize these distinctive analytical traditions.

The historical-geographical interpretation of settlement frontiers is represented by an extensive literature which traces its roots to Frederick Jackson Turner's "Frontier Hypothesis" (Gulley 1959; Turner 1920; Webb 1964) and to Carl Sauer's "Berkeley School" of landscape studies (Mikesell 1960; Sauer 1975). Reacting to Turner's deterministic vision of frontier influences on national culture, geographers have tended to follow Sauer's lead and avoid broad generalizations about the frontier, concentrating instead on case studies of specific settlement zones. Although not all associated with the Berkeley School, some contemporary landmarks in geographic studies of land settlement in Latin America include Bromley (1972) on the Ecuadorean Oriente, Brucher (1974) on eastern Colombia, Crossley (1961) on Santa Cruz, Bolivia, Parsons (1968) on Antioquia, Colombia, and Sternberg (1956) on the Amazon island of Careiro, Brazil. Parsons (1971, 1973) also provides a useful guide to geographic work on land settlement in Latin America.

A second approach to the understanding of frontier settlement derives from diffusion studies in sociology and economic geography. Diffusion analysts have explained the emergence of new urban areas in the national hinterland as a consequence of growth impulses transmitted from the metropolis. In general terms, the application of concepts of spatial diffusion to urbanization in the hinterland focuses on the growth and movement of firms and entrepreneurs as agents of innovation. Certain types of (low-wage, low-income) firms relocate to smaller urban centers to obtain production efficiencies, such as lower wage rates, reduced transport costs, and so on (Hoover 1948; Richardson 1972).

One approach to diffusion postulates waves expanding outward from the highest growth center in the national space economy and dissipating as distance from the center increases (Morrill 1968). This "urban-industrial impact hypothesis" (Schultz 1953) has been the object of several empirical studies (Hathaway 1964; Nicholls 1961, 1969; Ruttan 1959; Sisler 1959). It encounters various conceptual problems when applied to regions lacking a stable locational configuration of economic activity, or where market structure is poorly articulated. In addition, application of the concept is difficult where public policy intrudes upon the normal market mechanisms determining the spatial and sectoral allocation of investment, the direction of population movement, or the accumulation of capital in the hinterland. All of these qualifications apply, in varying degrees, to the Brazilian context of frontier expansion in Amazonia. Nevertheless, these central place concepts have clearly influenced regional development programs in the Brazilian hinterland, which have emphasized locational growth-center strategies (IBGE 1987).

The historical materialist analysis of urbanization, represented in an extensive and diverse literature, generally places urban growth in the political-economic context of capitalist development (Castells 1978; Gordon 1978; Harvey 1976, 1978, 1985; Lefebvre 1970; Roberts 1978; Smith 1980). Contradictions inherent in the process of capitalist development in the Third World are reflected in the dualistic physical organization and socioeconomic characteristics of cities and in a dichotomous structure of peripheral urban systems. Cities serve as centers for the accumulation of locally derived surplus; as reserves of idle, exploitable labor and as theaters of diffusion of western materialist consumer values--all necessary for the global expansion of capitalist relations of production (Armstrong and McGee 1985).

Over the last 20 years there has been much rancor among structuralists over the causes of underdevelopment. One camp emphasizes global forces of dependency (Frank 1969, 1978; Roberts 1976; Wallerstein 1974a, 1974b, 1981). Another focuses on internal forces of class exploitation (Brenner 1977; Mandel 1975; Weeks and Dore 1979). Neither perspective has explicitly treated contemporary frontier urbanization as a particular aspect of economic expansion; rather, their treatments have largely derived from historical paradigms based on agrarian transition. In this context, frontier urbanization might be seen as a strategy for proletarianizing farmers and enhancing the consumption (not production) of manufactured goods on the periphery by concentrating consumers at convenient supply centers (Becker 1982; Janvry 1981; Sawyer 1984). Given the complexities of urbanization in the Brazilian Amazon, researchers would be well-advised to take the broad view suggested by Bunker (1985), and consider regional production as particular and international exchange as systemic, and both as dynamic and volatile over time.

### **A MODEL OF AMAZONIAN LANDSCAPE CHANGE AND URBAN TRANSITION**

In an attempt to move beyond the non-comparative case study approach for the description of frontier settlement, Godfrey (1988a, 1988b, and 1990) has presented a regional model of landscape change and urbanization in the Brazilian Amazon. This model, based on research in southern Pará, posits that Amazonian settlement typically occurs in a progressive sequence reflecting the ways in which a dependent peripheral region becomes incorporated into the larger national economy. The precise historical-geography of the area will depend upon local conditions, but on a regional scale, there is a long-term tendency to follow a general sequence of rural-to-urban change.

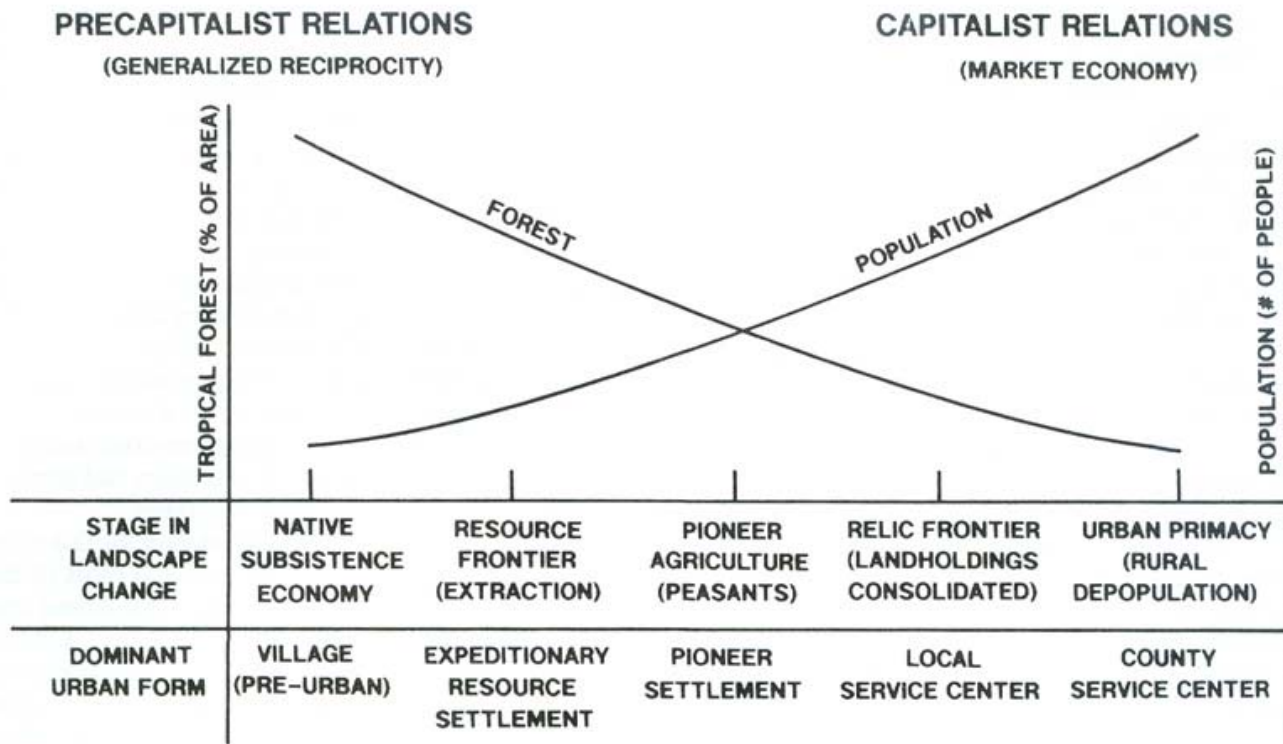


Fig. 2. Typology of settlements in Amazonia.

Based on observations in 1983 through 1985 in Rondônia, Browder proposes a typology of urban transition corresponding with Godfrey's model of landscape change. The region's urban system is comprised of five types of settlements, which constitute the dominant urban forms at different stages in the landscape model. The combined model and typology, presented in Figure 2 does not imply a unilinear progression, but rather a generalized regional matrix for the impacts of the expansion of a market economy on Amazonian settlement. Thus, the graph of forest removal and population growth indicates a correlation, not a causal relationship. Frontiers in the Amazon tend to evolve as follows:

### 1) Native subsistence economy

: Groups of detribalized Amerindians and mestizo communities maintain a relatively stable and closed "natural" economy, basically in equilibrium with the natural environment. Hunting, gathering, slash-and-burn agriculture, and agroforestry are practiced on a small scale under conditions of low human density, such that the tropical forest ecosystems regenerate with minimal permanent damage. Unfortunately these traditional populations are the first to be displaced in frontier expansion; sadly, their lands are often taken, and they are put into restricted reserves, pushed farther into the tropical forest, or simply overwhelmed by the incoming groups.

*Dominant settlement form:* In this pre-capitalist formation, the nucleated village is the typical form of settlement. A famous example is the cohesive village of Charles Wagley (1953), "Itá," meant to portray the prototypical Amazon town. Here a long-standing continuity of social ties and customs created an insular, traditional settlement, largely isolated from market forces and external influences on a bank of the lower Amazon.

2) **Resource-extractive frontier:** The discovery of valuable natural resources in the region--such as commercial timber, minerals, or rubber--stimulates the penetration of extractive industries. Typically, these firms will pay the local population and in-migrants for the commodities in a primitive, labor-intensive process of resource expropriation. If the resources are valuable enough or if credit policies provide sufficient incentive, firms may step in from the outside and eventually dominate the local extractive process (Browder 1987). This resource-extractive frontier is proto-capitalist in nature and can last a long time, even generations, as a series of boom-and-bust commodities is exploited in succession. During the bust periods, the population declines and drifts to towns created as points of transportation and trade during the boom periods. The infrastructure created for transportation and communication--river transport facilities, penetration roads, sometimes isolated air landing strips for especially valuable commodities--tends to attract agriculturalists and ranchers to the area.

*Dominant urban form: the expeditionary resource settlement.* Such an outpost serves a small local population, usually

extracting a single resource, such as timber, mining, or forest products. Urban functions are limited to services of extraction - the fuel depot, mechanical equipment repair shop, canteen, rudimentary lodging--and there are virtually no amenities. Such places are highly mobile, pre-urban communities that do not necessarily evolve into permanent settlements, although they may facilitate subsequent occupation by pioneer farmers. Browder (1986) observed several illegal resource settlements engaged in mahogany logging in the Guaporé Biological Reserve of southern Rondônia, 150 kilometers south of Rolim de Moura. In this case, the logging teams encouraged pioneer farmers to settle in front of their logging areas so as to legitimize their illegal activity in the Reserve, to provide additional labor to logging operations, and to serve as a defensive buffer against periodic Indian attacks.

3) **Pioneer agricultural frontier:** The in-migration of small peasant farmers occurs at this critical initial phase of capitalist conjuncture with the predominately pre-capitalist frontier. These settlers primarily employ family labor to cut down the forest and to develop a mixed subsistence and surplus agriculture. Roads and communications are improved, allowing transport of staple crops to local and regional markets, but isolation, lack of capitalization, soil deterioration and land conflict begin to cause a rapid succession to a "big-man's frontier." Improved roads permit access to external markets, population swells, and a reserve of landless peasant workers accumulates in local towns; continued population growth depends upon finding new sectors to absorb the reserve labor army.

*Dominant urban form: the pioneer settlement.* The opening of the frontier to permanent settlement is a group endeavor, often initiated by an extended family, and begins the process of clearing forest and planting annual food crops. A congregation of small homesteads locate near a river or a stream, at the terminus of a spur road, or along a logging trail. Most of these pioneers previously resided elsewhere in the frontier, often in urban areas with which they maintain contact, and they often encourage the arrival of other family members, friends, and acquaintances. Meanwhile, word of unoccupied land travels fast, and the numbers of unrelated settlers also increase. The settlement becomes a "landing," serving recent migrants on a short-term basis as they prepare to occupy the surrounding forest.

Urban functions in the pioneer settlement are generally limited to service activities: rudimentary hotels; canteens with petty groceries and a billiard table, often operated by middlemen merchants extending informal credit; auto repair shops; perhaps a small schoolhouse and an evangelical church. These pioneer settlements either evolve into local service centers, or pre-existing towns overwhelm them and they disappear under a variety of circumstances. Pioneer settlements could be depopulated by land conflict and consolidation, or abandoned for more remote pioneer fronts. The destiny of surviving settlements depends largely on their location relative to natural resource endowments, government infrastructure projects, and transport facilities. For example, Xinguara emerged in 1976 at a vital road junction leading to the Xingu region of southern Pará; the town grew explosively in the late 1970s as the center of local land rush (Godfrey 1982). In Rondônia, Rolim de Moura was initially settled by 12 pioneers (2 families) in 1977. Its population grew to 200 in 1978 and it became a recognized local service center with a population of over 5,000 by 1980 (Browder 1986).

4) **Relict frontier:** This phase of frontier evolution is characterized by the consolidation of the capitalist market economy. It witnesses a concentration of landholdings and investments in the hands of large ranchers and companies--often based outside of the region and the demise of the small farmer. As larger-scale agricultural and ranching projects are implanted and the forest is cut down, a renewed out-migration commences from the local countryside; peasant farmers and landless workers move farther on to new active frontier areas, or they remain in the growing local towns.

For example, Xinguara became the center of a relict frontier by the late 1980s. By this point, the urban population reached about 25,000, most timber mills had moved farther into the Xingu region's active resource frontier, local cattle ranches had monopolized most land nearby, and the town's economy stabilized as a local service center (Godfrey 1990). Similarly, by the late 1980s the resource-extractive economy of Rolim de Moura began to decompose as the timber mills closed, agriculture stagnated, and many migrants moved on to more active frontiers.

*Dominant urban form: the local service center* Homesteaders take up permanent residence in the nearest pioneer town. The phase of frontier retraction begins. Most of the surrounding countryside has been occupied by small farmers. Extractive industries, especially lumber mills, move in to capitalize upon the growing urban peasantry, often with government subsidy (Browder 1987). The number and range of functions increase in the settlement. For example, private grain merchants establish trading and storage operations, buying cash crops from farmers at harvest. The town is recognized as a legitimate "urban zone" by the state government; selected state agencies establish operations and the conventional political process is extended. A post office eventually appears and commercial bank branches open; additional shops and services emerge and population growth continues.

5) **Urban primacy and rural depopulation:** By this point the local forests have been removed and most of the natural resources extracted; lands are consolidated into large speculative holdings and occasionally into capital-intensive agribusiness estates. The accumulation of a roving peasantry, gradually but unevenly converted to wage laborers, explains

why "rural cities" or "cities of peasants" are popping up throughout the vast Amazon Basin. These boom towns serve largely as labor depots for the extraction of natural resources in the mining, timber, and other sectors, as well as for the implantation of agricultural and ranching operations, where there is a high initial labor demand; but this demand tends to fall off within several years, and labor then becomes ephemeral and moves on. The more successful boom towns, favored by locational advantages of transportation, commerce, and industry, evolve into regional urban centers. Those less favored decline in importance or even disappear entirely. An asymmetrical urban hierarchy develops, with primate cities and rural depopulation.

*Dominant urban form: the county service center* The growing local service center becomes the seat of the surrounding rural sector, and is the seat of agribusiness producing perennial cash crops (e.g., coffee or cacao), cattle ranching, or profitable farms. The state's grain agency (Cibrazem) establishes trading and storage operations in town, but rural land surrounding the city tends to be consolidated into large livestock estates or plantations. Settlers still come looking for farm land, but they end up residing in the town. Small farmers often have moved into the city or on to more remote pioneer fronts.

The urban population is employed in wage labor in the government, the service sector, extractive industries such as timber mills, or food processing activities. Commercial services increase in number and scale: several hotels and restaurants, a supermarket, an air field, furniture manufacturers, movie theaters, bakeries, schools, and churches of diverse denominations. Several commercial banks and different government agencies have established branch offices in the settlement. The Military Police set up a station. Land prices in both rural and urban sectors spiral upwards. The town expands outwards and farmers finish selling off their land to speculators and other commercial interests. The process of land consolidation reaches its peak. Hypothetically, the county service center is subordinate to two other higher levels in the regional urban hierarchy:

*The state metropolitan center:* The state may have several metropolitan centers, the largest of which is usually the capital. The population of such cities often grows to more than 100,000 and they become centers of political, commercial and social life for substantial portions of the state. Examples of state metropolitan centers in Rondônia include Porto Velho (state capital!), Ariquemes, and Ji-Parana; and in Pará, Santarém, Marabá, and Conceição de Araguaia.

*The regional metropolitan center:* At the top of the regional city system are two metropolitan centers with populations exceeding one million: Belém and Manaus. Historically important commercial centers, these cities are fully integrated with Brazil's national city system. Here are universities, a free trade zone, international airports, hotel chains, banks, foreign consulates, major manufacturing industries, etc..

Of central importance to this pattern of frontier urban transition and land-use succession is the period of "conjuncture" (Wood 1986). During the active pioneer agricultural and relic frontier phases, urban settlements undergo structural alterations in response to their progressive integration in the national and global economy. We hypothesize that in the conjuncture phase a differentiation becomes apparent amongst those settlements at the lower levels of the frontier urban hierarchy, below the state metropolitan centers, where population growth rates are the highest in the region. The successful pioneer settlements evolve into local and county-level service centers. To the extent this occurs in the Brazilian Amazon, it indicates that decentralization of the population is indeed but a short-term illusion, as new forms of urban primacy and regional polarization are emerging with the maturation of the settlement frontier.

## CONCLUSIONS

This historical-geographic model and settlement typology provide a useful point of departure for integration of case study material and for future field research on Amazonian frontier settlement. Application of the continuum outlined above can help evaluate the nature and degree of land-use transition and the spatial configuration of a regional urban network. Future research should investigate inter-urban and rural-urban linkages of the Amazon settlement system to indicate the nature and the direction of landscape change, as well as to examine the formation of urban systems. We suspect such research would support the hypothesis that decentralization in Amazonia is illusory; new forms of urban primacy and regional polarization are emerging on the Amazon frontier as a result of the expansion of capitalist relations. Confirmation of this hypothesis awaits further empirical case studies.

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**Resumo.** A urbanização da fronteira amazônica tem sido pouco estudada, apesar de seu papel importante na mudança regional. No nosso modelo geográfico-histórico da transição urbana na Amazonia brasileira, postula-se uma sequência de estágios na ocupação da região. Esta sequência reflete-se na evolução das relações sociais de produção numa economia periférica extrativista. Sendo assim, este modelo serve como ponto de partida para investigações futuras sobre a rede urbana da fronteira, suas interações no sistema econômico nacional, e seus possíveis impactos na utilização do solo rural. Palavras-chave: fronteira, assentamento, urbanização, Brasil, Amazonia.

**Resumen.** La urbanización de la frontera Amazónica ha sido poco estudiada, a pesar de su papel importante en el cambio regional. En nuestro modelo geográfico-histórico de transición urbana en la Amazonia Brasileña, se postula una secuencia de etapas en la ocupación de la región. Esta secuencia se refleja en la evolución de las relaciones sociales de producción en una economía periférica extractivista. Siendo así, este modelo sirve como punto de partida para investigaciones futuras sobre la red urbana de la frontera, sus interacciones en el sistema económico nacional, y sus posibles impactos en el uso de

la tierra rural.

Palabras clave: frontera, asentamiento, urbanización, Brasil, Amazonia.