

SOCIAL-SPATIAL SEGREGATION IN THE METROPOLITAN AREA OF
CAMPINAS, BRAZIL: 1980-2000

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ABSTRACT

In this paper we evaluate the changes in the pattern of social-spatial segregation in the metropolitan region of Campinas. Using census tract data from 1980, 1991, and 2000, we examine the socioeconomic changes not only in Campinas and its surrounding municipalities, but also in the urban sprawl of the area, which surpasses municipality boundaries and contains roughly 80 percent of the region's population. The demographic and economic dynamism of the region over the past twenty years has brought two noticeable changes. First, the peripheralization of Campinas' surrounding municipalities has increased over time. Second, the increasing spatial segregation between upper and lower classes resulted in the creation of a corridor of poverty and a corridor of wealth traversing municipal boundaries, with one of Campinas' major highways as the border between them. As such, Campinas appears to have witnessed an increasing segregation of space, with the region's major highways as the dividing lines.

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EXTENDED ABSTRACT

INTRODUCTION

The metropolitan area of Campinas, with 19 municipalities and about 2.4 million inhabitants, is a large and important economic center in the state of São Paulo (see Figure 1 for a map of the region). Its growth rate has been among one of the highest in the state, and in 2000 6.32 percent of the state's population lived within the region. However, Campinas can be classified as an "emergent metropolis", in that the majority of its growth occurred within the last 30 years. As such, the processes and consequences of urban expansion within the region have been largely unexplored.

Our hypothesis is that as a result of the economic restructuring that began with the economic crisis in the early 1980's, urban populations are exposed to new risks and vulnerabilities. In a context of economic crisis, unequal economic development, high income and landownership inequality and a gradual impoverishment of the population, the expansion of Brazilian metropolises implicate a deterioration of living conditions, housing conditions, and access to public services. Indeed, rising levels of urban poverty has proved to be a general characteristic of Brazilian urbanization (Rocha 1991).

Social-spatial segregation is one facet of the vulnerabilities faced by residents in new metropolises (Caiado 2004). Additionally, as Ribeiro (2000) and others note, a more recent characteristic of social-spatial segregation is that well-off citizens in Brazil are agents of segregation. In Rio de Janeiro and other Brazilian cities the elite are increasingly moving into gated communities in response to rises in urban violence. Socio-spatial segregation is key to understanding urban poverty and the risks that the urban poor face. Although the metropolitan area of Campinas is economically dynamic, the socio-economic consequences of the urbanization process in the region during the past 20 years are unknown.

In this paper we evaluate the changes in the pattern of social-spatial segregation in the metropolitan region of Campinas. Using census tract data from 1980, 1991, and 2000, we examine the socioeconomic changes not only in Campinas and its surrounding municipalities, but also in the urban sprawl of the area, which surpasses municipality boundaries and contains roughly 80 percent of the region's population. Our results illustrate that the region's demographic and economic dynamism over the past twenty years has brought two noticeable changes. First,

the peripheralization of Campinas' surrounding municipalities has increased over time. Second, the increasing spatial segregation between upper and lower classes resulted in the creation of a corridor of poverty and a corridor of wealth traversing municipal boundaries, with one of Campinas' major highways as the border between them. As such, Campinas appears to have witnessed an increasing segregation of space, with the region's major highways as the dividing lines.

CAMPINAS: A BRIEF HISTORY

Campinas first rose to prominence as a center of commerce during the Brazilian coffee boom in the 19th century. However, it was soon overshadowed by its neighbor to the east, São Paulo. Yet, during the 1970's Campinas witnessed an intense growth in industrial activities, as did its surrounding municipalities, including Americana, Paulínia, Valinhos, Sumaré, Indaiatuba and Vinhedo. The metropolitan area of Campinas was the focal point for the movement of economic development to the interior of the state of São Paulo; it was accompanied not only by an increase in industrialization, but also by the modernization of agricultural production and its related industrial and tertiary sectors. During this process the Anhanguera highway served as the principle axis for the placement of new industries in the region. However, the growth of industrialization also expanded along other highways that cross the region. The increased investment in industrial activities sparked a process of urban expansion in Campinas and its surrounding municipalities that followed the region's major highways. As such, during the 1970's and 1980's the concentration of industry, commerce and services along these highways strongly propelled the unification of the metropolitan area's labor market, as well as sustained a continuous flux of people and products between municipalities (Semeghini 1991).

Beginning in the 1990's, economic restructuring changed the Brazilian industrial profile and its location needs. In the state of São Paulo there has been a diversification and modernization of industrial production, solidifying its place as the country's economic center. Industrial production in Campinas has continued to grow with the introduction of factories producing complex technological goods. This more recent increase in industrial production has concentrated along the Dom Pedro I and SP-340 highways.

As a result, the region's pattern of urbanization resulted in a complex territory which reflects the contradictory character of economic growth that has occurred in other Brazilian cities. This growth created a selective process of urbanization that favored the increase of gated communities for middle and high incomes. It simultaneously stimulated the concentration of the poor in periphery neighborhoods characterized by precarious urban infrastructure, as well as the creation of *favelas* in almost all of the region's cities.

DATA AND METHODS

Our analysis proceeds in two parts. First, we examine socio-demographic characteristics of the Campinas metropolitan area at the municipal level in 1980, 1991 and 2000. Second, we use images from the satellite *Landsat* in order to delimitate the urban sprawl of the region. It was possible to identify the areas which had the highest concentration of urbanization within the metropolitan area of Campinas for 1991 and 2000. These images were then superimposed on a map of census tracts for the region to identify the census tracts that compose the urban sprawl. For the 2000 map the delimitation of the urban sprawl included census tract data only for neighboring municipalities that corresponded with the urbanized area identified by the satellite images. Examining the urban sprawl of Campinas allows for the identification of *intra*-municipal areas of segregation, which is not possible when only utilizing municipality-level data.

We consider the following three dimensions of characteristics within the metropolitan area: demographic characteristics, socio-economic characteristics, and housing infrastructure.

The largest drawback of using data at the census tract level is the limited number of variables available for analysis. The small amount of information available from IBGE for census tracts resulted in the necessity to use less robust indicators when compared to the gamut of indicators used in the literature.

RESULTS

Metropolitan Area of Campinas

While in general population growth within the region has slowed, rates of growth are higher in peripheral municipalities than in Campinas (see Figure 2). Higher growth rates in these areas are principally due to migration, with increasing importance to intra-metropolitan migration—a process of internal redistribution in which movement is from Campinas to its surrounding municipalities.

The growth of Campinas' periphery can not be attributed to just one specific socio-economic group. Instead, it is the movement of households of various different socio-economic levels that contributed to the size to which the metropolitan area grew. While socio-economically heterogeneous, these households tend to share the same demographic characteristics—young households at the earlier stages of the life course (although the fertility of low income households tend to be slightly higher). As Figure 3 illustrates, from 1980-2000 Campinas' municipalities became highly homogeneous in terms of its dependency ratios (the population aged 0-14 and 60 and older relative to the population aged 15-59 years old), in that they decrease over time for all municipalities. This is one result of the gradual aging of the population in the metropolitan area. However, the peripheral municipalities of Hortolândia, Monte Mor have a higher dependency ratio because of the weight of their 0-14 population.

The income differential between municipalities is large (see Figure 4). Within the 19 municipalities, the percentage of households with a median monthly income per capita of 1 minimum salary or less varies from slightly less than 25 percent to almost 70 percent. Hotolândia and Monte Mor, truly part of Campinas' "periphery", have the highest percentage (more than 48 percent), as do the small municipalities of Engenheiro Coelho and Santo Antonio de Posse. Conversely, between 1980 and 2000 there was an increase in the proportion of households with a per capita income greater than 10 minimum salaries in all of the metropolitan area's municipalities (see Figure 5). However, clearly wealth within the region is concentrated in the municipalities of Campinas, Valinhos and Vinhedo.

Figures 6 and 7 show the percentage of persons 15 years or older with 0 to 4 years of schooling and the percentage of persons 15 years or older with more than 12 years of schooling, respectively. Figure 6 illustrates that the greater precariousness in terms of education is concentrated within Campinas' periphery. Here again, in Figure 7 Campinas, Valinhos, Vinhedo (as well as Americana and Engenheiro Coelho) exhibit the largest percentages of those with a high school education or more.

Although housing conditions have improved considerably during the past 20 years throughout the metropolitan area of Campinas (most notably that with the percentage of households with running water—Figure 8), differences between municipalities persist. While there has also been a significant increase in coverage of waste water system, in Campinas and its surrounding areas up to 15 percent of households still were not connected to the waste water system (see Figure 9). Additionally in 2000 some peripheral municipalities had up to 50 percent of households with no connection to the waste water system.

Urban Sprawl of Campinas

Between 1970 and 1980, the metropolitan area's urban population doubled, only to double again between 1980 and 2000. This population growth has been strongly concentrated in the urban centers of the municipalities situated along the Anhanguera highway, creating a continuous area of urbanization from Vinhedo to Santa Bárbara d'Oeste. More recently this area has extended south in the direction of Iduatuba. In 1991 79.8 percent of the region's population resided in this area; in 2000 this percentage rose to 85.6 percent (see Figure 10). While the life cycle stage is roughly similar across the metropolitan area, the urban sprawl east to the Anhanguera highway exhibits higher dependency ratios, here again due to the large population of those aged 0 to 14 in that area (see Figure 11).

During the 1990's the proportion of heads of household with no income generally increased (see Figure 12). In spatial terms, a form of "corridor" of poverty developed along an axis that runs from the southeast to northeast of the metropolitan area. The reasons for this increase, amongst other causes, can be related to the increase in the precariousness of the labor market and the

elimination of jobs due to the tertiarization of services. The largest concentration of heads of household without income forms a continuous area that covers part of Campinas, Hortolândia, Sumaré and the dividing region between Nova Odessa and Paulínia. During this same period the area of concentration of heads of households with incomes of more than 10 minimum salaries amplified, particularly in the midwest and north regions of Campinas (see Figure 13). In 2000, apart from this large expansion in Campinas, there is a marked concentration of this category of income especially in Valinhos and Vinhedo, delineating a “corridor” of wealth within the metropolitan area, contrasting with the corridor of poverty mentioned above.

In general schooling has increased across the metropolitan area, a tendency observed in Brazil as a whole (see Figure 14). Regardless, areas with high proportions of heads of households with no schooling or very little schooling (up to 4 years) persist, particularly within Campinas, Hortolândia and Sumaré. In point of fact, in these latter two of the municipalities also witnessed a small relative increase in the proportion of heads of households who in 2000 were illiterate. It is interesting to note that these areas also experienced a higher proportion of heads of household without income. On the other hand, the presence of a significant proportion of heads of households with 12 years of schooling or more are found in the same areas with a high concentration of household heads with incomes greater than 10 minimum salaries (see Figure 15).

Here again, there has been a general improvement in housing conditions in the urban sprawl from 1991 to 2000. However, those households without running water continue to be concentrated in the area southwest of the Anhanguera highway (see Figure 16). Additionally, the percentages of those household without connection to the waste water system is high throughout the urban sprawl, perhaps suggesting that urban growth in this area proceeded at a pace at which public services were not able to follow (see Figure 17).

DISCUSSION

The importance of Campinas’ highway system in establishing its economy is reflected in the spatial organization of the metropolitan area. While the Anhanguera highway was home to the most intense urbanization in the region, it also served as the demarcation between those areas “reserved” for the wealthy and those areas “reserved” for the poor. Indeed, social-spatial segregation along highways is not unique to Campinas. Preliminary analyses indicate that in Austin, TX, I-35 serves as the primary marker dividing social classes in the city (Wilson 2004). In the case of Campinas, these corridors of poverty and wealth are masked by analysis at the municipal level, highlighting the importance of using census tract data as a method for mapping socio-spatial segregation.

CONCLUSIONS

While our results indicate an increasing peripheralization of Campinas' surrounding municipalities and of intra-municipality social-spatial segregation, we do not intend to paint a black and white portrait. Even areas that appear highly homogenous in our analysis are heterogeneous when examined at the micro level. Indeed, this spatial heterogeneity marks the urban fabric of most Brazilian cities, most obviously evidenced by the persistence of *favelas* throughout urban areas.

Yet as with any project, there are several limitations with the research at hand. Although the use of census tract data allows for a detailed analysis, unfortunately many additional socioeconomic variables of interest, for instance occupation, are unavailable at this unit of analysis. Yet, this paper is part of an ongoing research project examining intra-metropolitan dynamism and socio-demographic vulnerability in Campinas and other metropolises in the state of São Paulo¹. As our work on this topic advances, we plan to examine further aspects of social-spatial segregation using "weighting areas" (*areas de ponderação*) as the unit of analysis. Although weighting areas do not allow for the same geographic specificity of census tracts, they do permit the use of a wider range of sociodemographic variables.

¹ *Dinâmica Intrametropolitana e Vulnerabilidade Sócio-demográfica nas Metrôpoles do Interior Paulista*, jointly undertaken by the Center for Population Studies (NEPO) and NESUR at the State University of Campinas (UNICAMP).

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Figure 1. Metropolitan Area of Campinas, São Paulo state, Brazil.



Figure 2. Total Growth Rates in the Metropolitan Area of Campinas, 1980-1991 and 1991-2000.

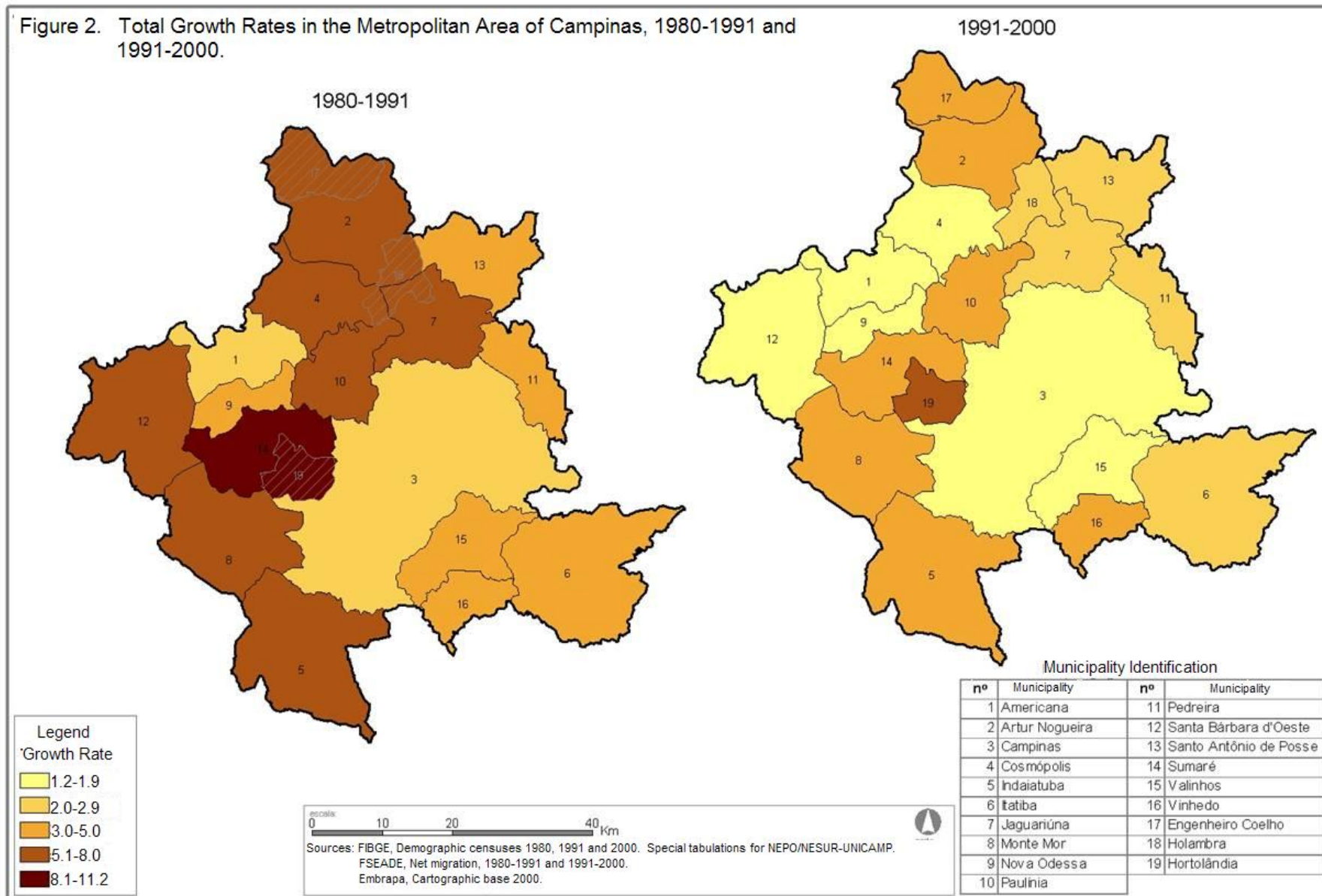


Figure 3. Dependency Ratios in the Metropolitan Area of Campinas, 1980, 1990 and 2000.

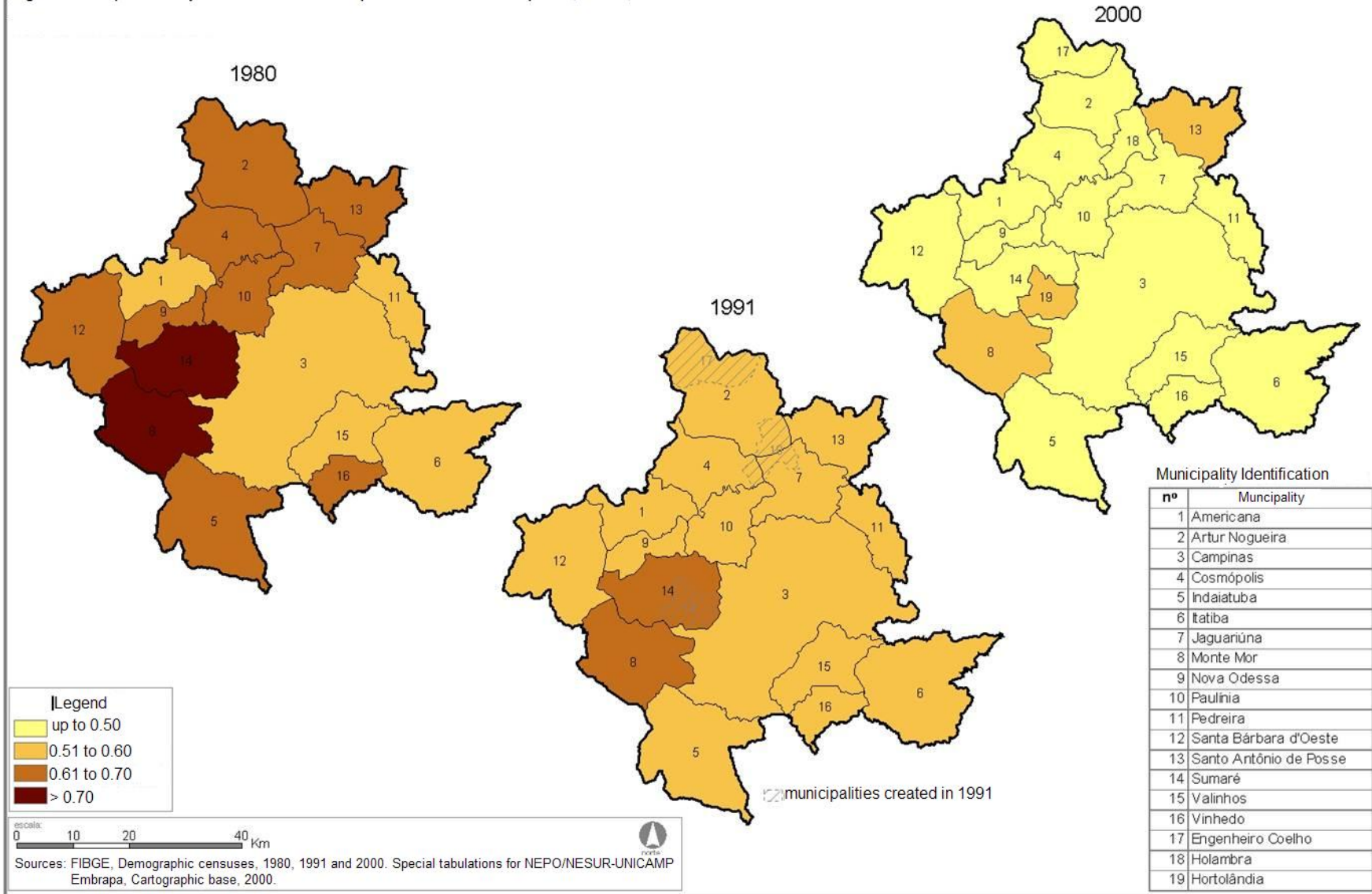


Figure 4. Percentage of Households with Per Capita Income of 1 Minimum Salary* or Less, Metropolitan Area of Campinas, 1980, 1991 and 2000

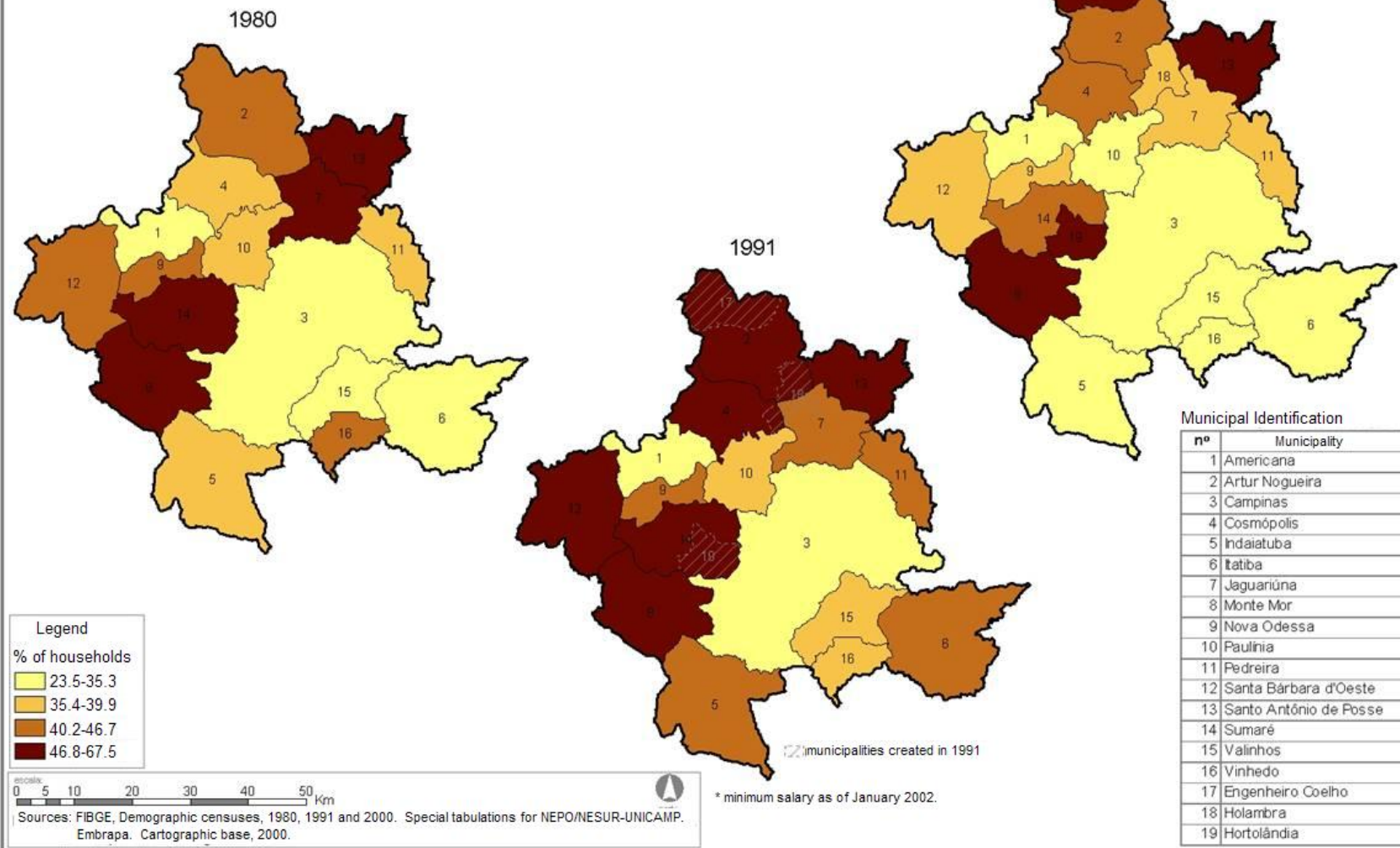


Figure 5. Percentage of Households with Mean Monthly Per Capita Income of 10 Minimum Salaries* or More, Metropolitan Area of Campinas, 1980, 1991 and 2000.

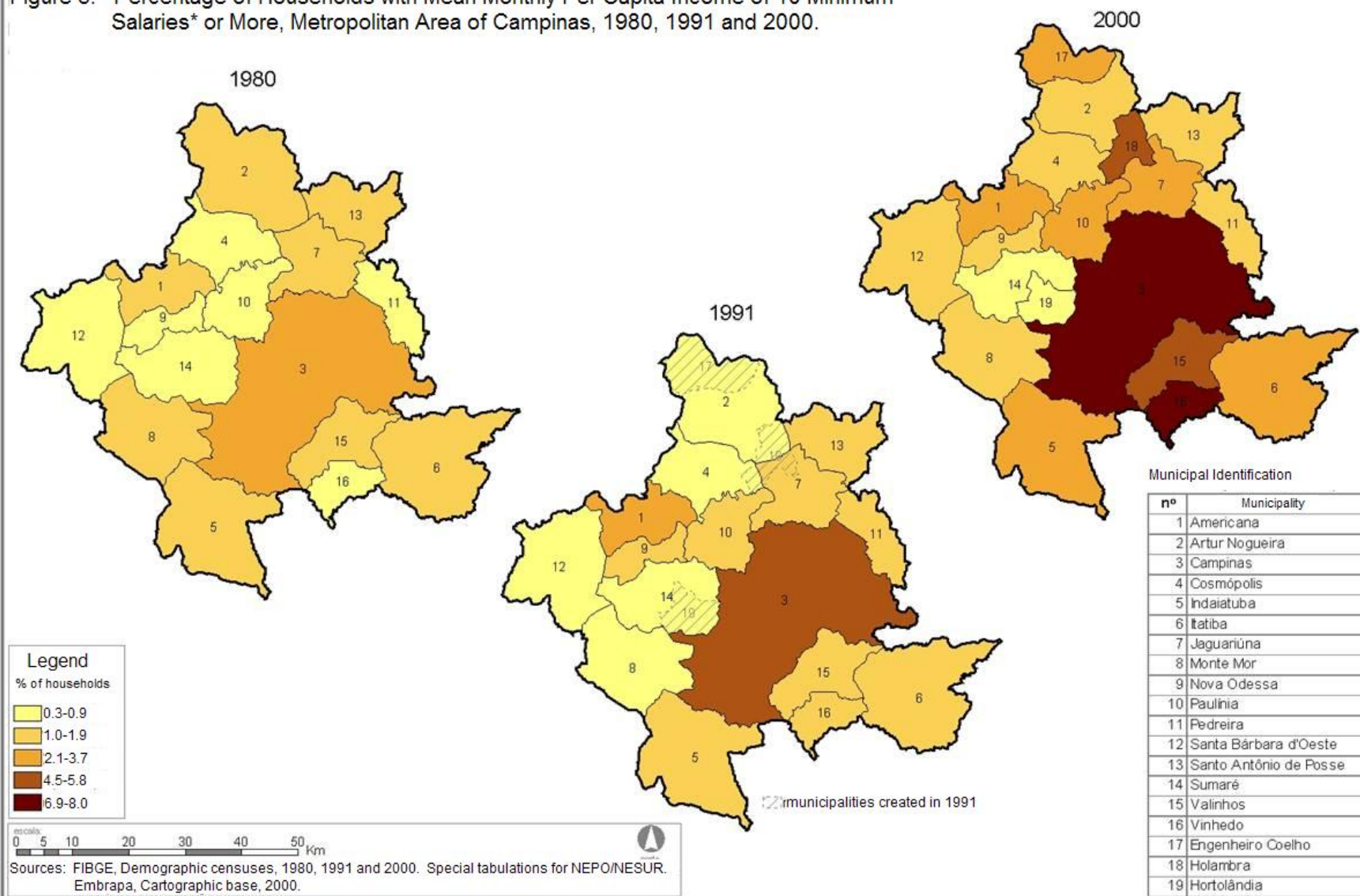


Figure 6. Percentage of Persons Ages 15 and Older With 0 to 4 Years of Schooling, Metropolitan Area of Campinas, 1980, 1991 and 2000.

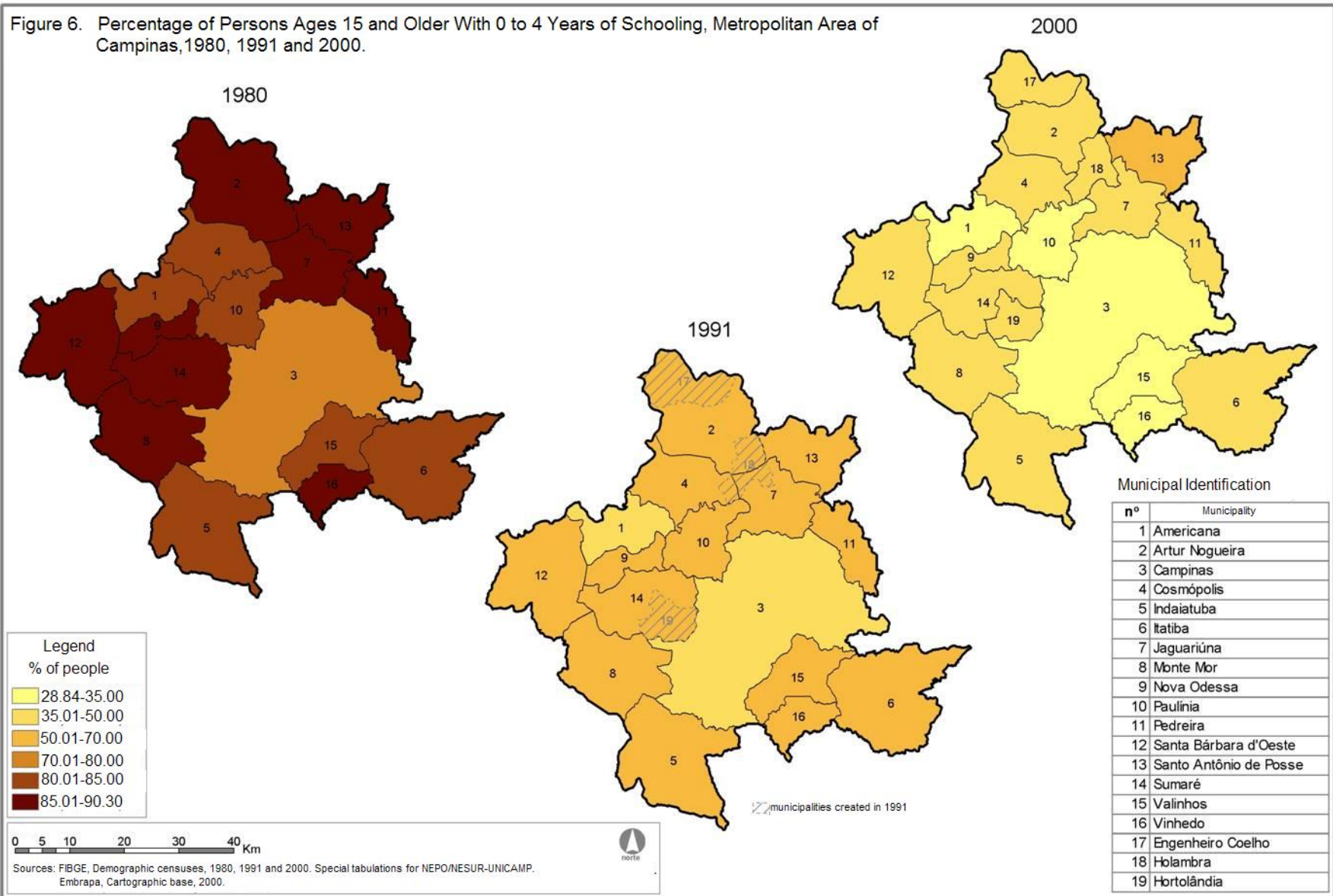


Figure 7. Percentage of Persons Aged 15 and Older With 12 Years of Schooling or More, Metropolitan Area of Campinas, 1980, 1991 and 2000.

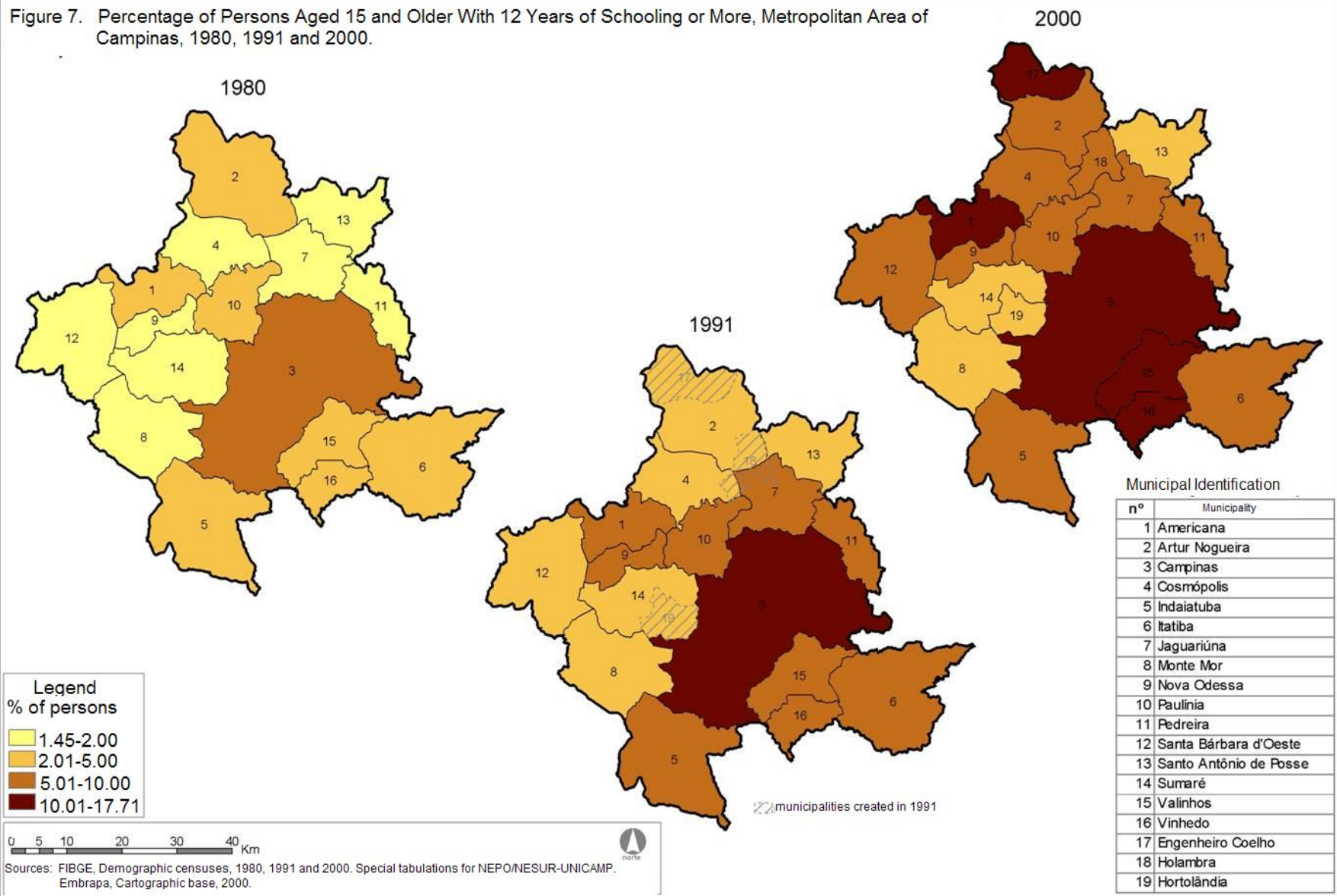


Figure 8. Percentage of Households Without Running Water, Metropolitan Area of Campinas, 1980, 1991 and 2000.

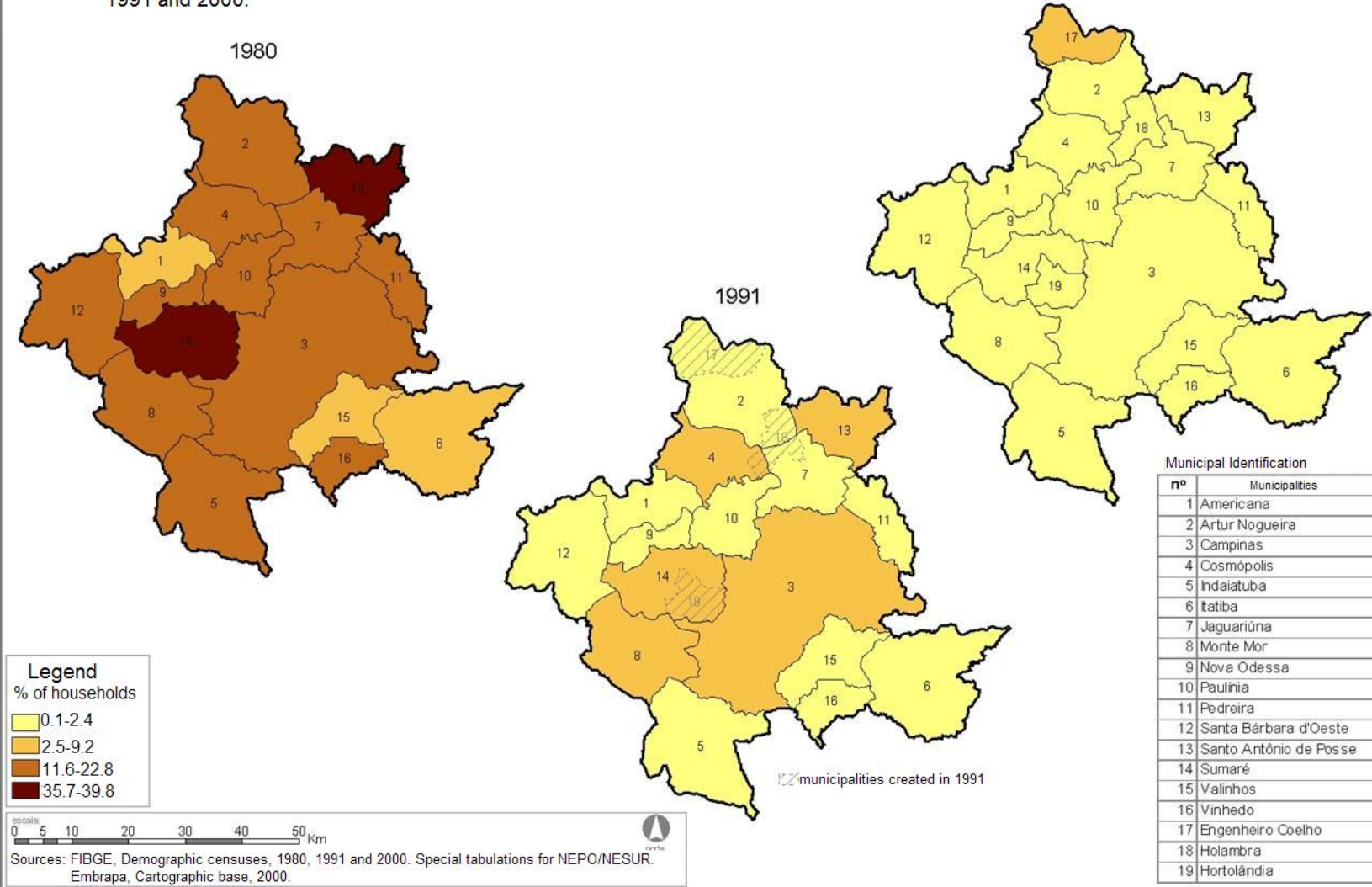


Figure 9. Percentage of Households Not Connected to Waste Water System or Without Septic System, Metropolitan Area of Campinas, 1980, 1991 and 2000.

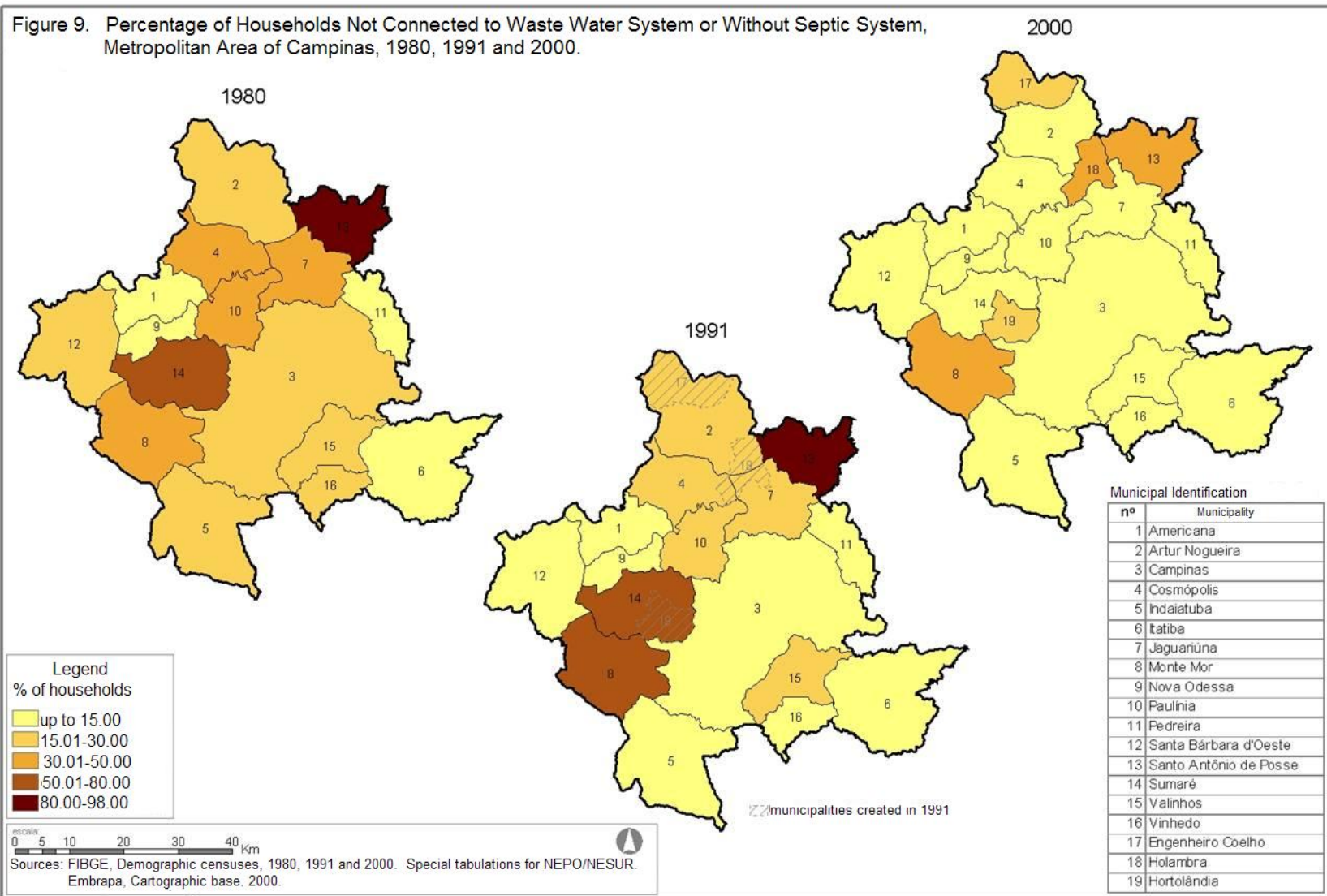
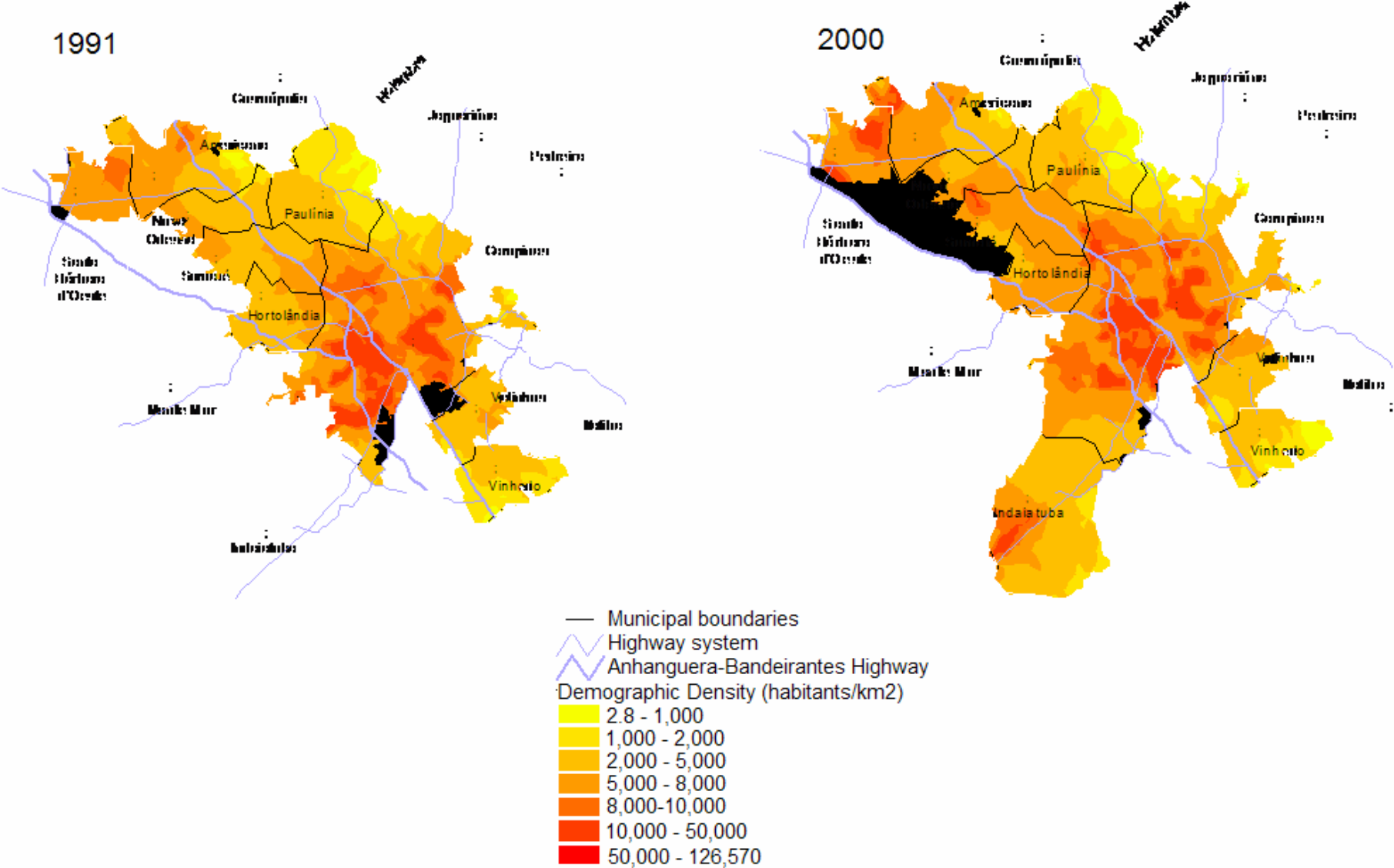


Figure 10. Density of Urban Sprawl Within the Metropolitan Area of Campinas, 1991 and 2000.



0 10 20 30 40 Kilometers

Source: FIBGE, Demographic Censuses, 1991 and 2000.

Figure 11. Dependency Ratios Within the Urban Sprawl of the Metropolitan Area of Campinas, 1991 and 2000.

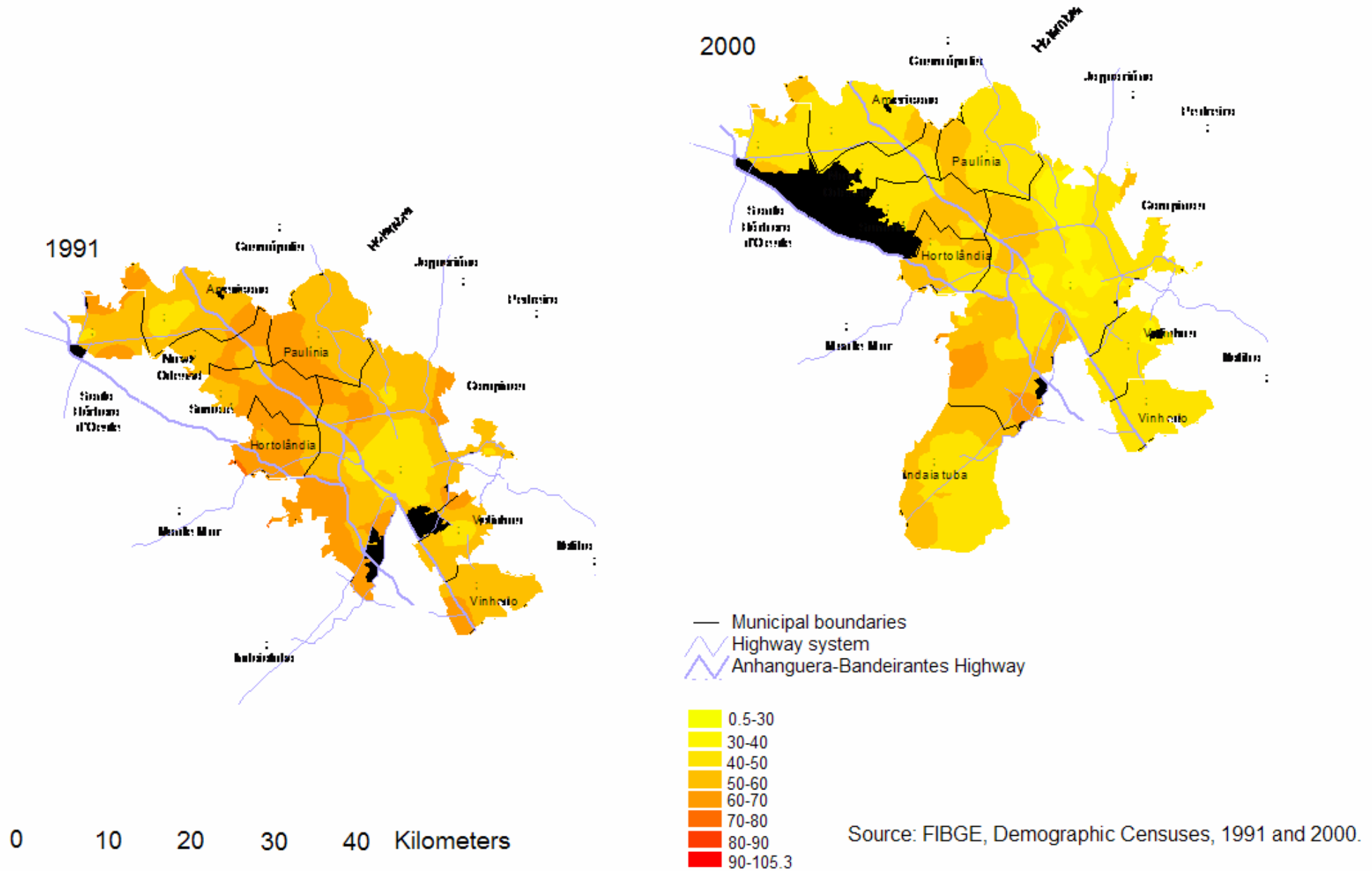


Figure 12. Proportion of Household Heads With Salaries of up to 1 Minimum Salary in the Urban Sprawl of the Metropolitan Area of Campinas, 1991-2000.

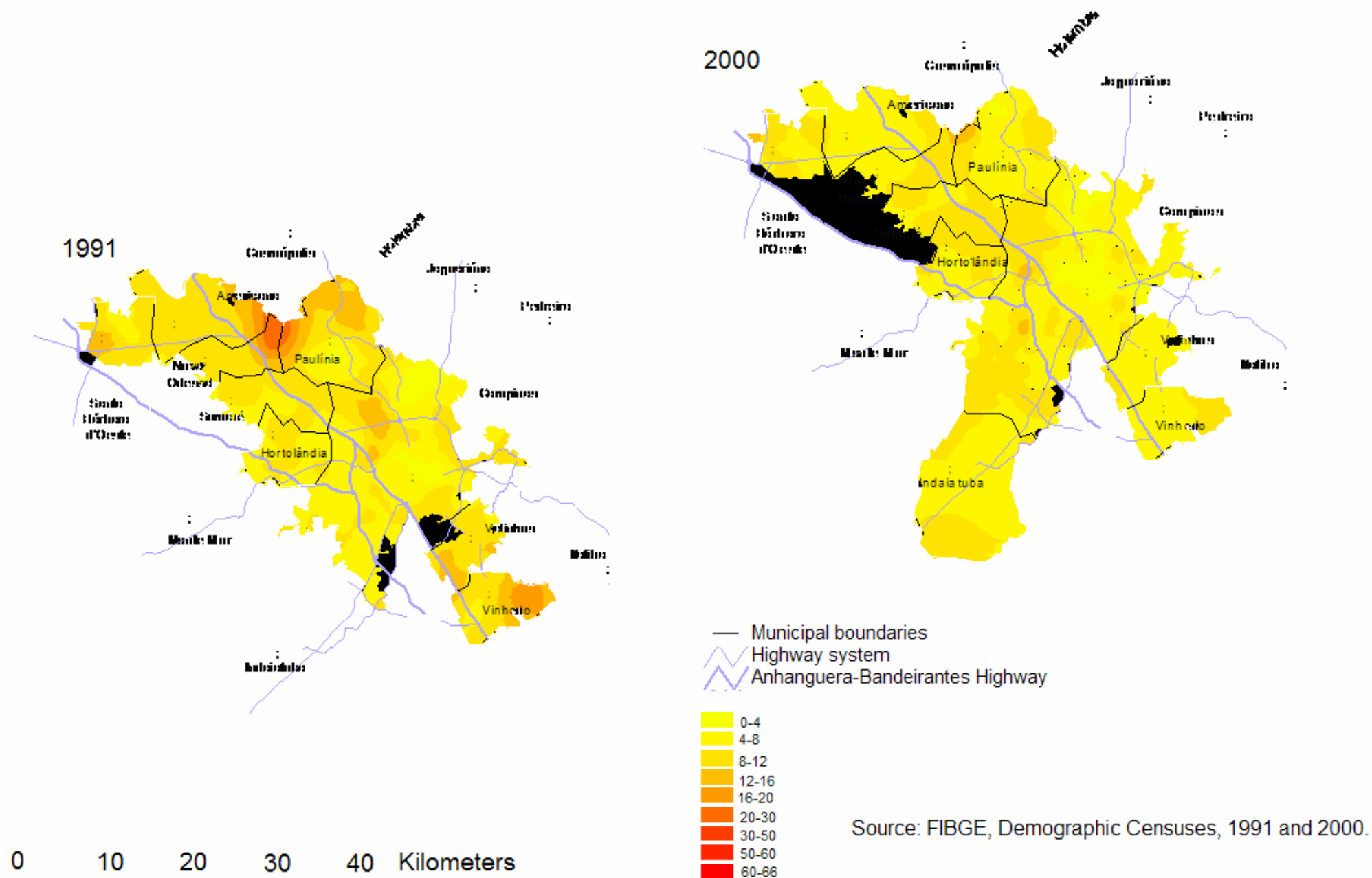


Figure 13. Proportion of Household Heads With Salaries of 10 Minimum Wages or Greater Within the Urban Sprawl of the Metropolitan Area of Campinas, 1991 and 2000.

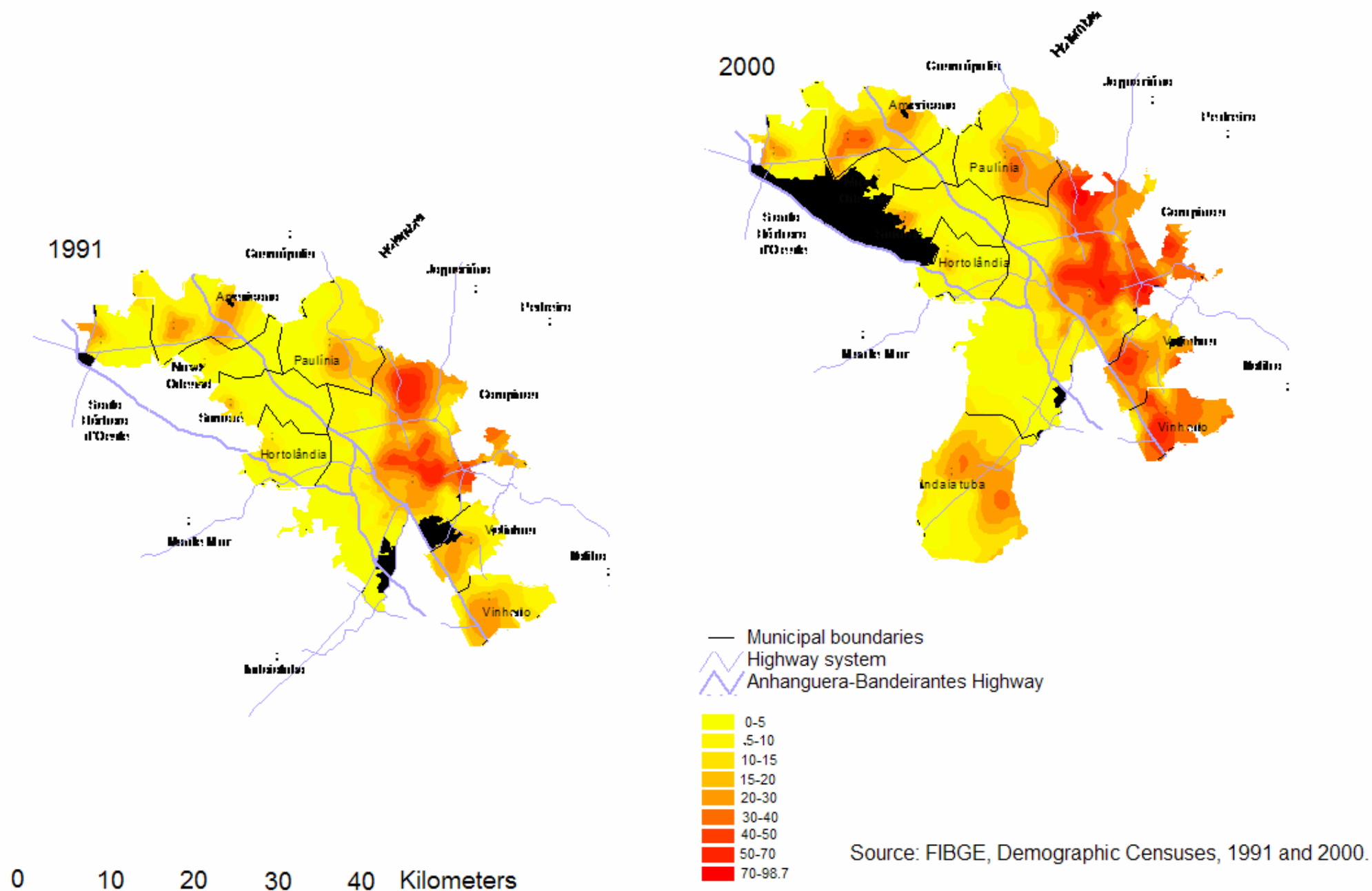


Figure 14. Percentage of Households Heads With 0 to 4 Years of Schooling Within the Urban Sprawl of the Metropolitan Area of Campinas, 1991 and 2000.

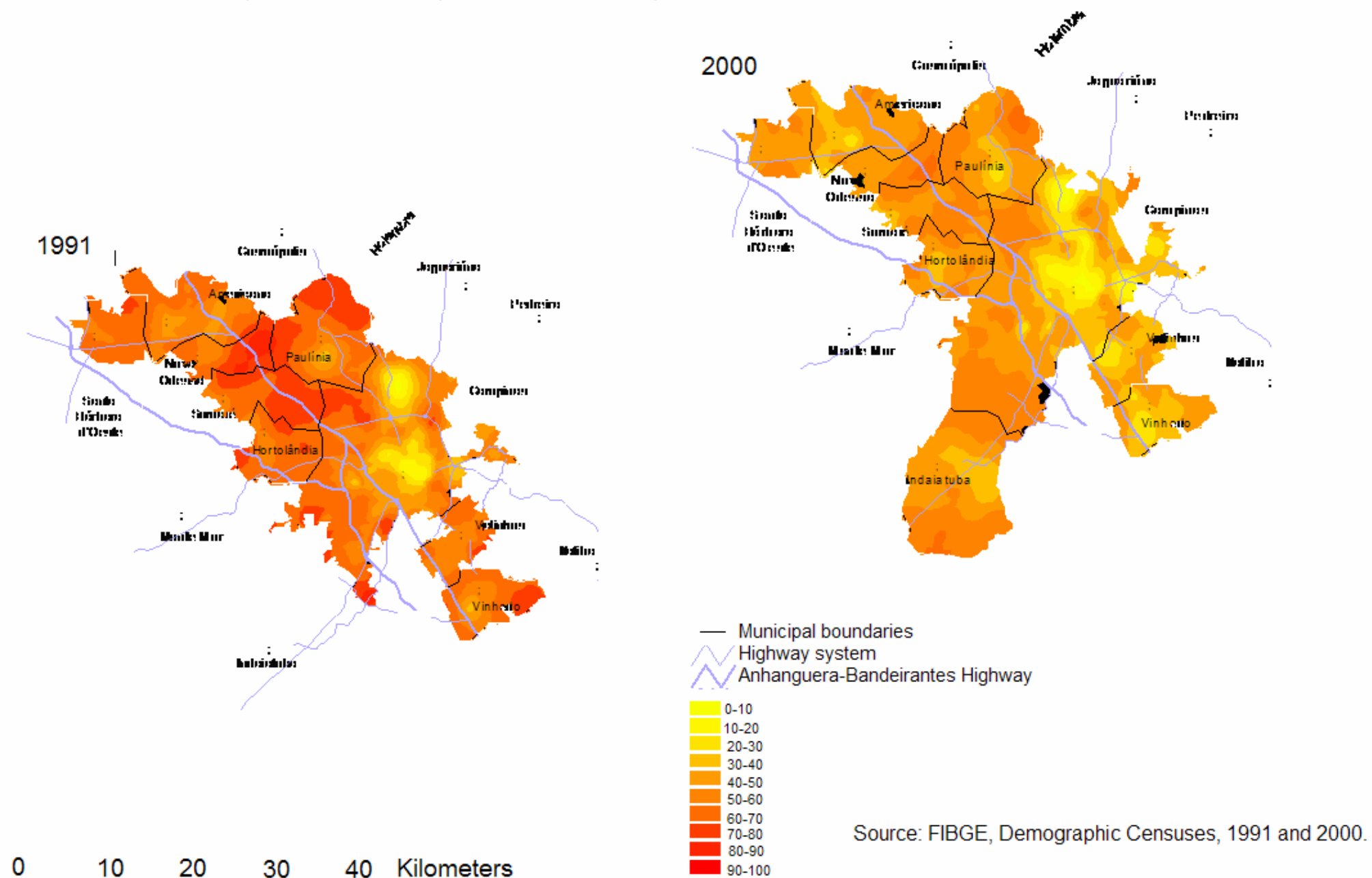


Figure 15. Proportion of Household Heads With 12 Years of Schooling or More Within the Urban Sprawl of the Metropolitan Area of Campinas, 1991 and 2000

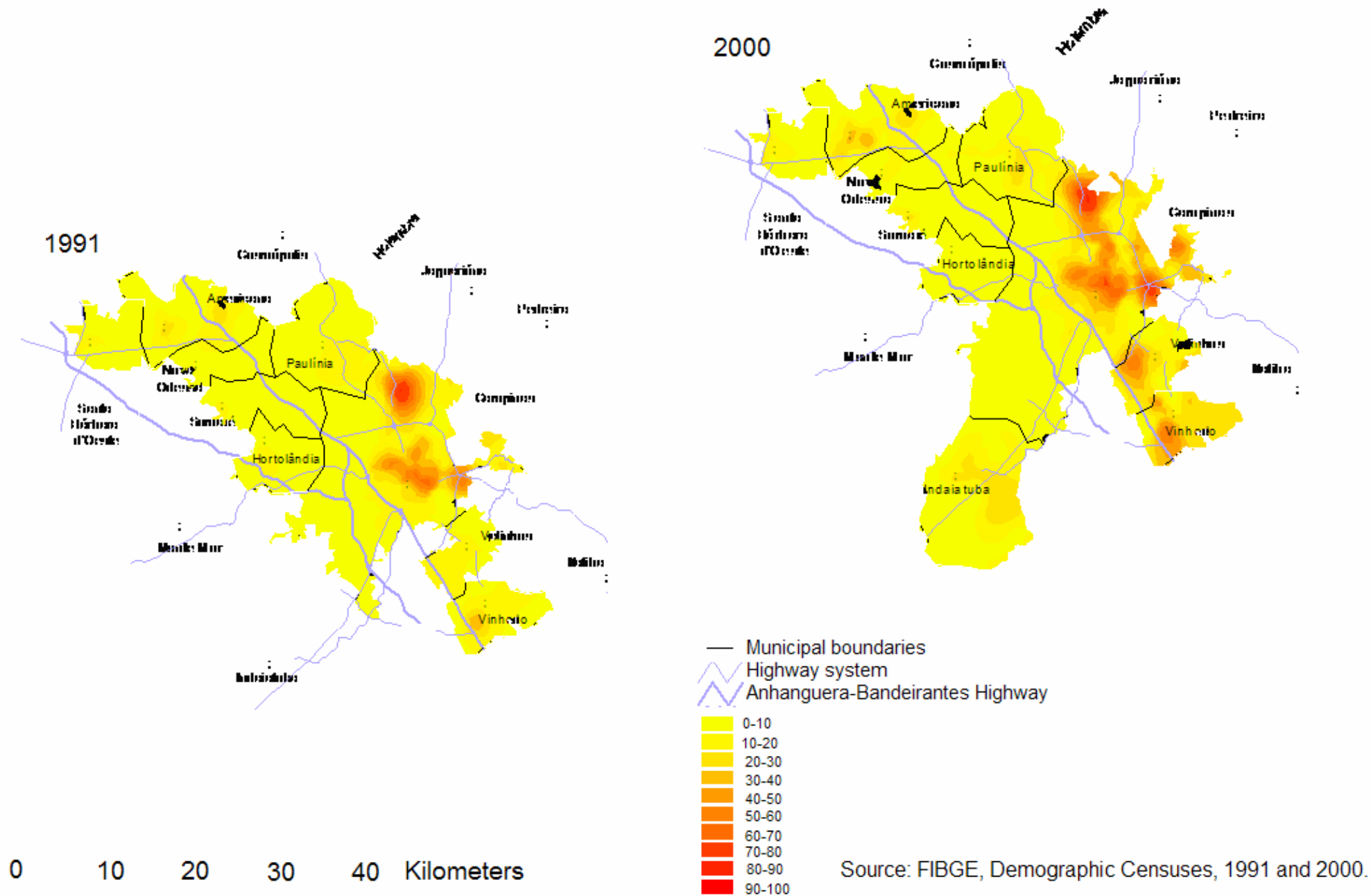
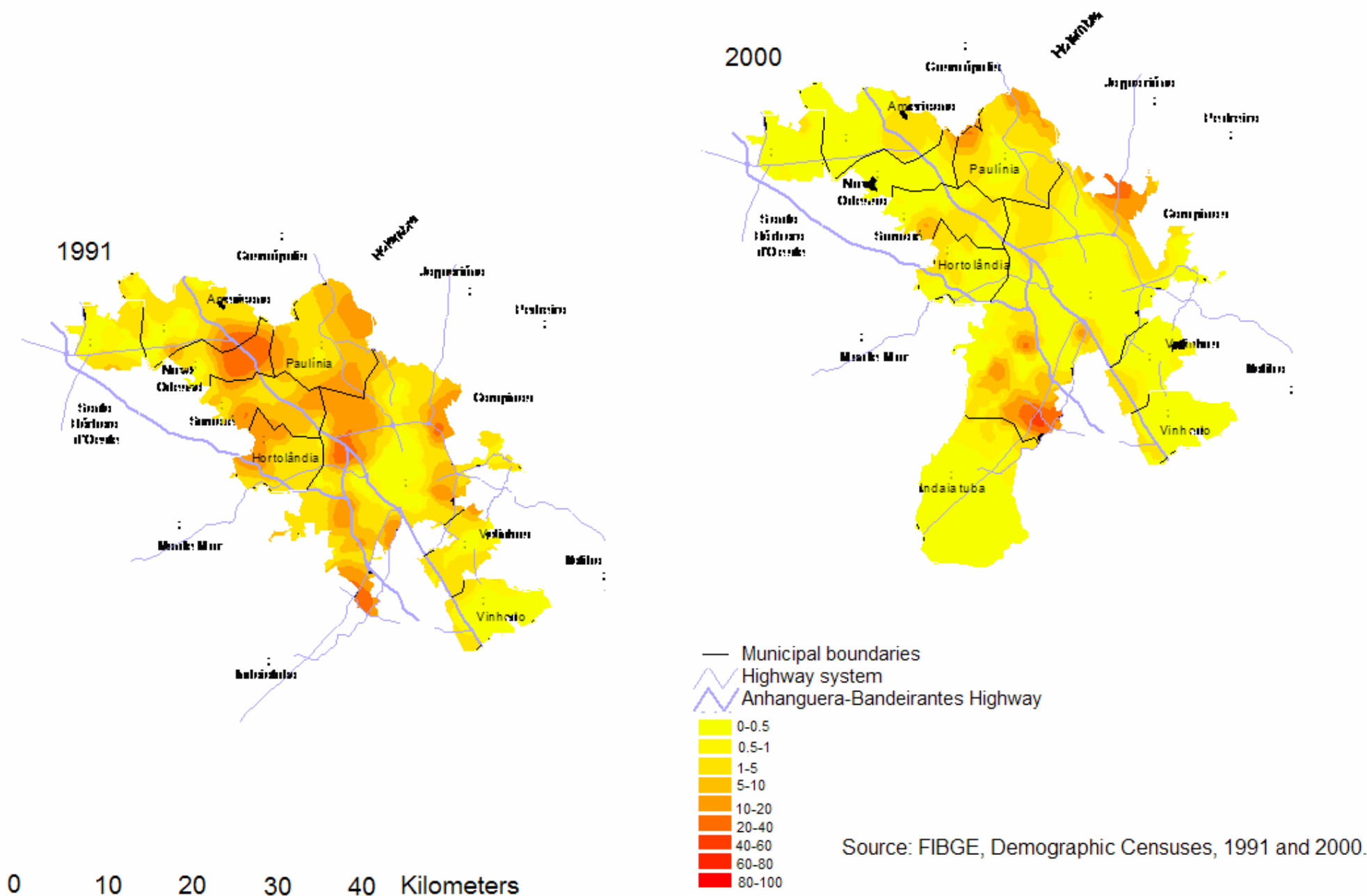


Figure 16. Proportion of Households Without Running Water Within the Urban Sprawl of the Metropolitan Area of Campinas, 1991 and 2000.



Source: FIBGE, Demographic Censuses, 1991 and 2000.

Figure 17. Percentage of Households Not Connected to Waste Water System or Without Septic System Within the Urban Sprawl of the Metropolitan Area of Campinas, 1991 and 2000.

