Perception of Earthquake Risk and Post-disaster Reconstruction:

Comparative Study of Two Residential Neighborhoods on Different Socio-economic Status in Tehran

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- Study Area: Tehran in brief
- The case study
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- Conclusion

Introduction (1)

Earthquake is such a disaster, which cannot be predicted. Thus, the only way to reduce the damages and losses due to an earthquake is effective preparedness. However, in most of the countries, an earthquake occurs once in several years, which may vary from 10 to 50 or even 100 years. Thus, obviously the priority of earthquake is lower than other more frequent disasters like floods, cyclones and draughts. Consequently, in most of the countries, earthquake disaster remains within a dilemma of sudden occurrence (which needs preparedness as the only way to reduce losses) versus infrequent occurrences (which means the priority of preparedness becomes lower compared to other hazards) (Shaw *et al*. 2004:39)

Introduction (2)

Because of the large geographical size of the country, Iran often faces natural calamities like floods, earthquake and drought occurring fairly frequently in different parts of the country. As well as, Iran is considered to be among the most earthquake-prone in the world. Geographical situation of Iran on the one hand and unsuitable and unsafe construction on the other hand aggravates the weakness of the country against natural calamities. According to some studies the phenomenon of earthquake threatens ninety seven percent of Iran cities and rural areas. Lack of sufficient efforts for managing this phenomenon threatens the life of millions of human beings. The vulnerability of Iran against natural calamities wouldn't only affect the inhabitants of one country, but it is the problem of human kind living all across the Globe.

Earthquake risk perception

Risk, risk perception and risk communication have been dealt with by many authors in different perspectives.
Risk can be seen in different ways: as a hazard; as a probability; as a consequence; and as a threat (Slovic and Weber, 2002).
Risk perception has been described from different sources: geography, sociology, political science, anthropology and psychology.
While geographical research focused on understanding human behavior for natural hazards, sociological and anthropological studies have shown that perception and acceptance of risk have their roots in social and cultural factors.

Study Area: Tehran in brief (1)

Tehran is considered to be among the most earthquake-prone in Iran. Geographical situation of Tehran on the one hand and unsuitable and unsafe construction on the other hand aggravates the weakness of the city against earthquake. Tehran is, after all, the undisputed political and economic center of Iran. A massive earthquake there could potentially collapse literally and symbolically the institutions of government and the country would face a massive crisis because earthquake in Tehran is a national catastrophe which will sustain irreparable damage for generations to come.

Tehran and a study on micro-zoning of the greater Tehran area conducted by JICA from 1998 to 2000 estimates that in a worst-case scenario, there could be as many as 380,000 casualties in a large earthquake.

Study Area: Tehran in brief (2)

"There is a strong likelihood of an earthquake striking the Iranian capital … On the basis of the studies, the probability of a quake above seven degrees on the Richter scale in the next 10 years currently stands at 65 percent, and this is expected to increase with the passing of time."(Ghafouri Ashtiyani, 2003)

Study Area: Tehran in brief (3)

The population of Tehran was 6.74 million in 1996 and it increases to 12.3 million in 2007.

There is a vast difference between the north and the south of Tehran, in all aspects. The physical slope of Tehran is same as its socio-economic slope.

The question is:

Does this likelihood occurrence of earthquake in Tehran enhance the perception and awareness of the people for earthquake preparedness?

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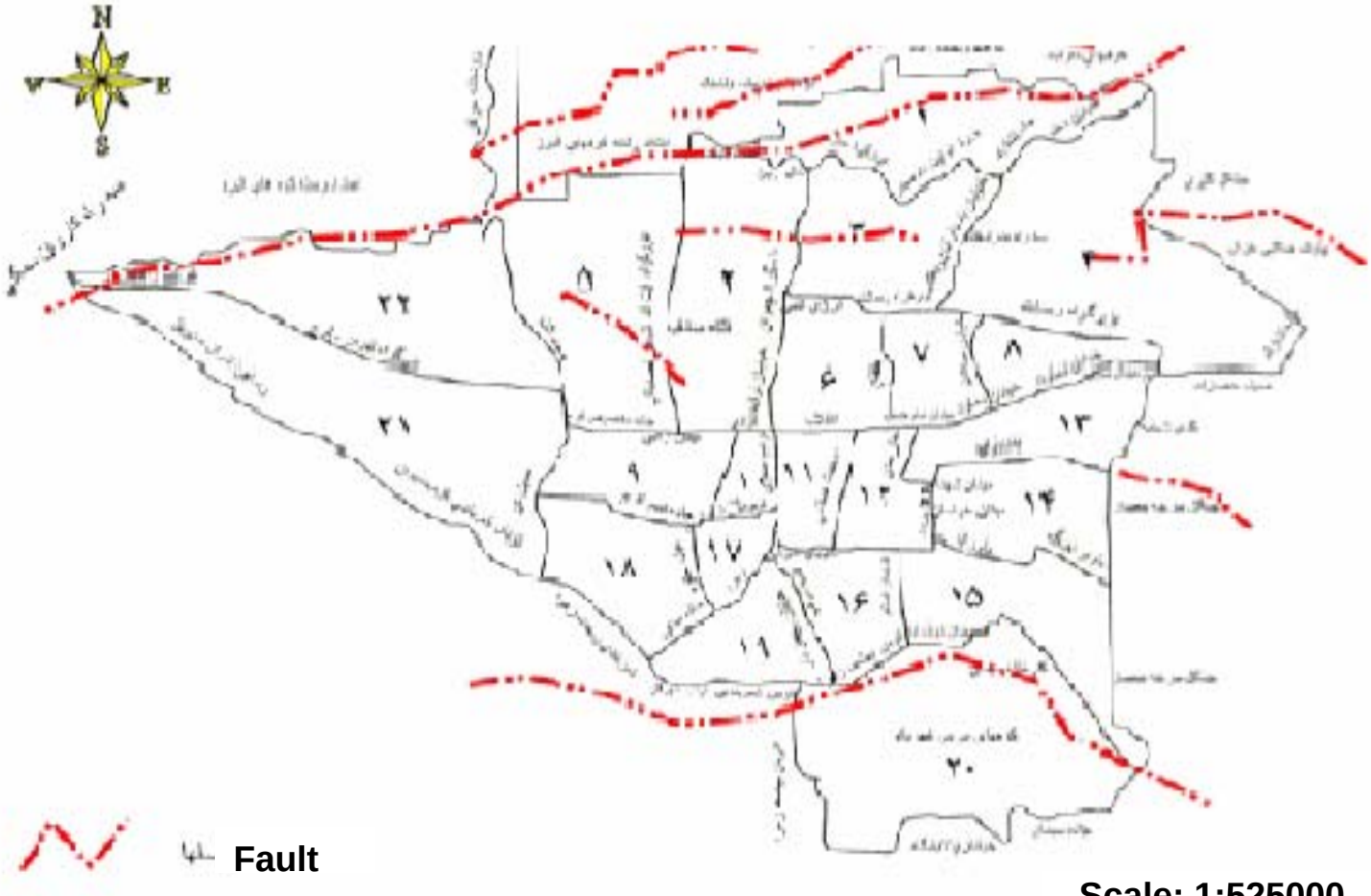
Fig. 1: Illustration of the Faults of Tehran Area

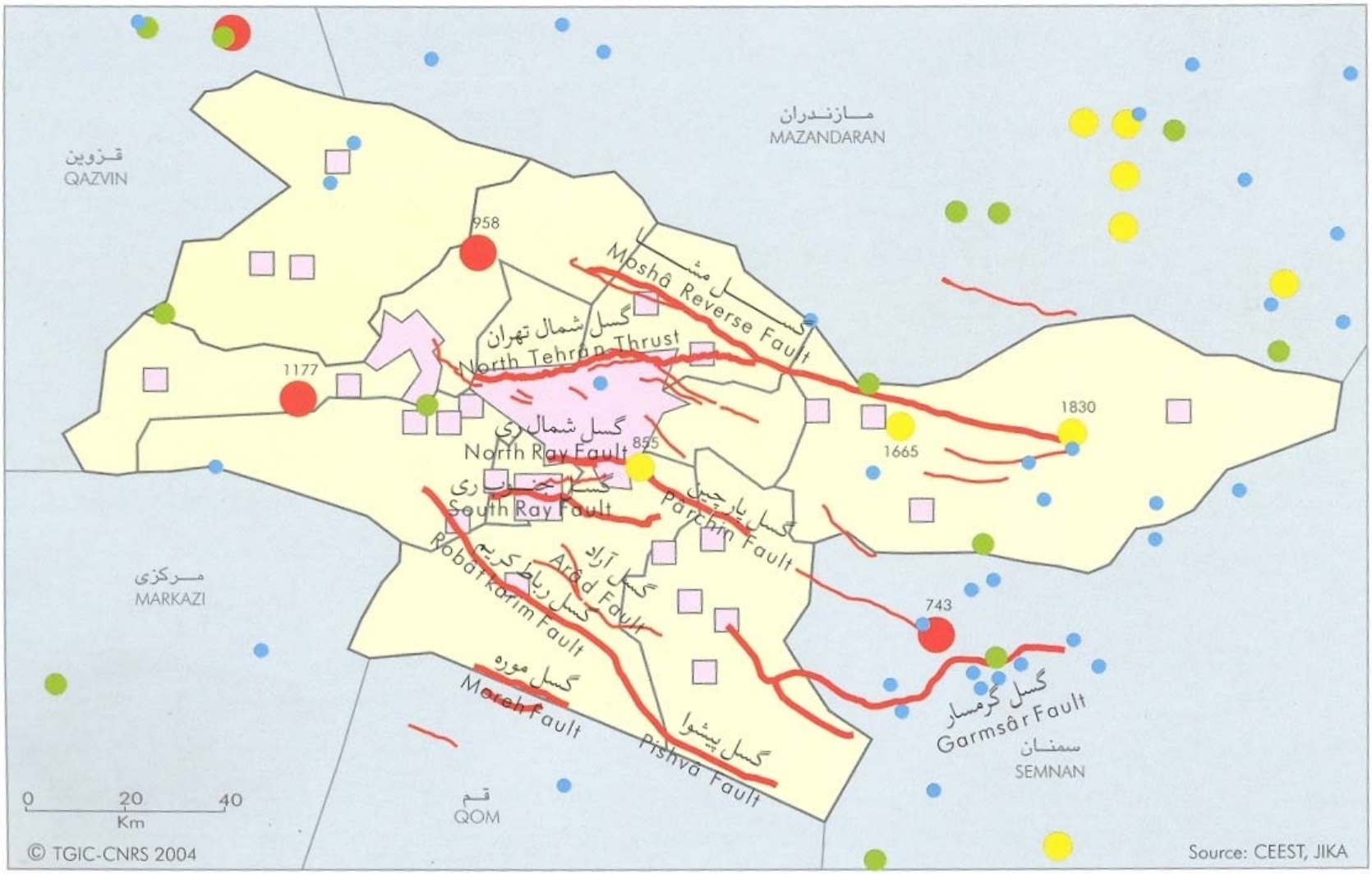


Scale: 1:525000

Histoire sismique de la région de Téhéran

Seismic History of Tehran's Region

تاریخ زلزله های منطقه تهران



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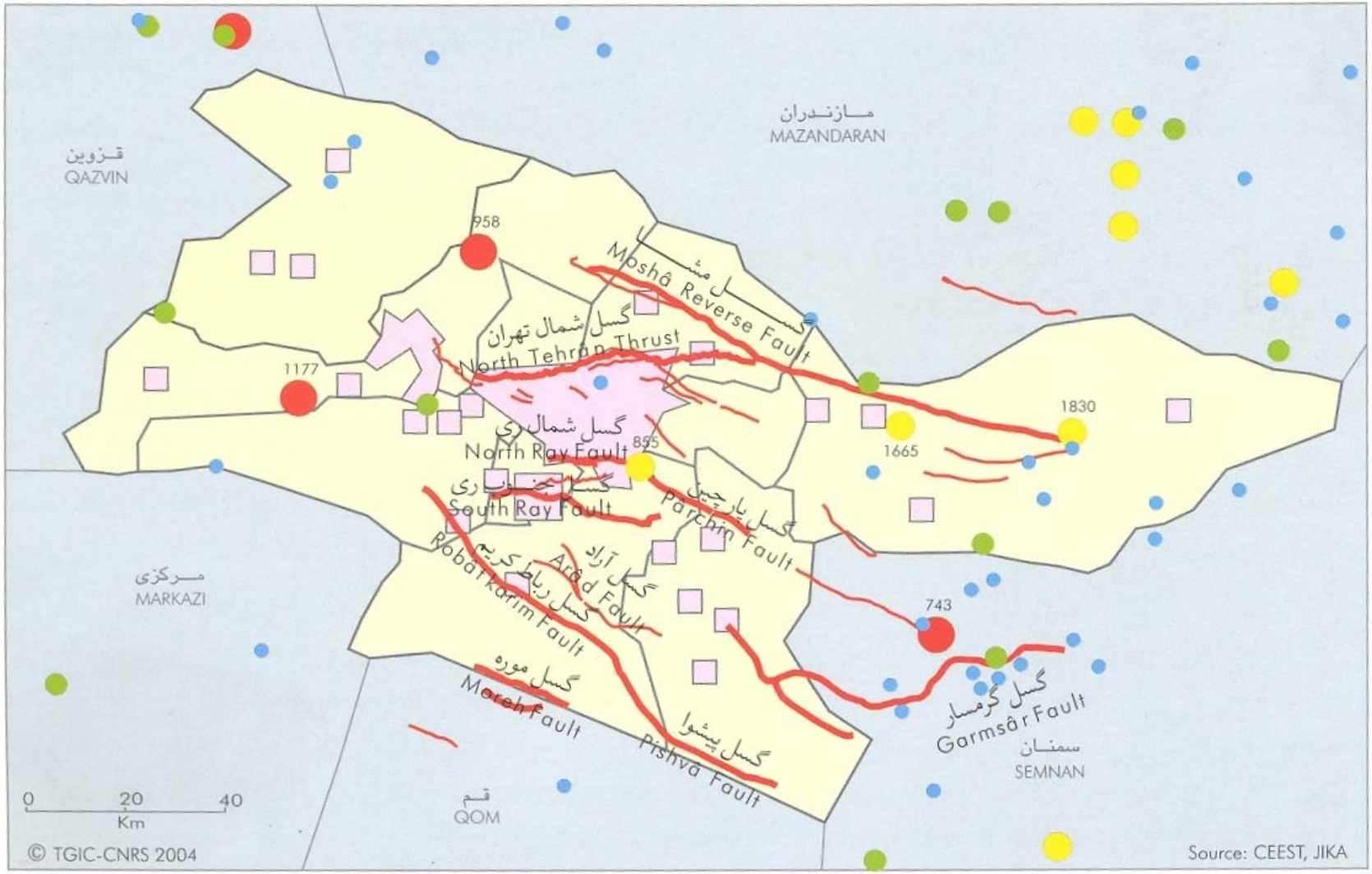
Histoire sismique de la région de Téhéran

Seismic History of Tehran's Region

تاریخ زلزله های منطقه تهران



شدت زلزله (Mw)
Magnitude (Mw)
Magnitude (Mw)

7-8
6-7
5-6
4-5

شهر
Ville
City

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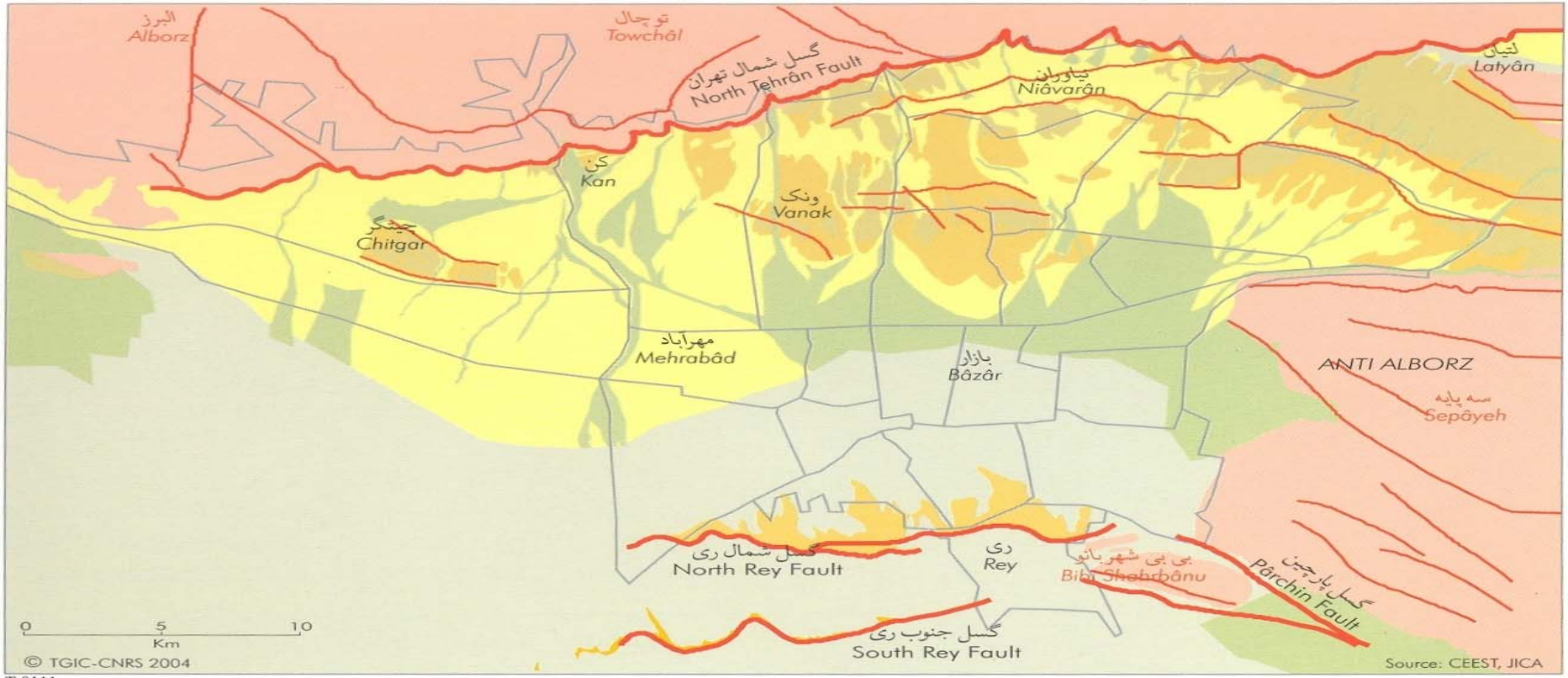
Géologie et sismicité à Téhéran
Geology and Seismicity of Tehran

زمین شناسی و لرزه خیزی تهران



T 0111

گسل / Fault
پنجه آبرفتی جوان ریزدانه / Fine grained young alluvial fans
پنجه آبرفتی جوان / Young alluvial fans
آبرفتهای جدید (دوره چهارم) / Recent alluvial deposits (Quaternary)
شن سنگ (پلیوسن) / Conglomerate (Pliocene)
سازند هزار دره (میوسن) / Hezardarreh formation (Miocene)
سازند آتشفشانی سبز "سازند کرج" (ایوسن) / "Karaj formation", volcanic (Eocene)
محدوده مناطق / Limits of Tehran's districts

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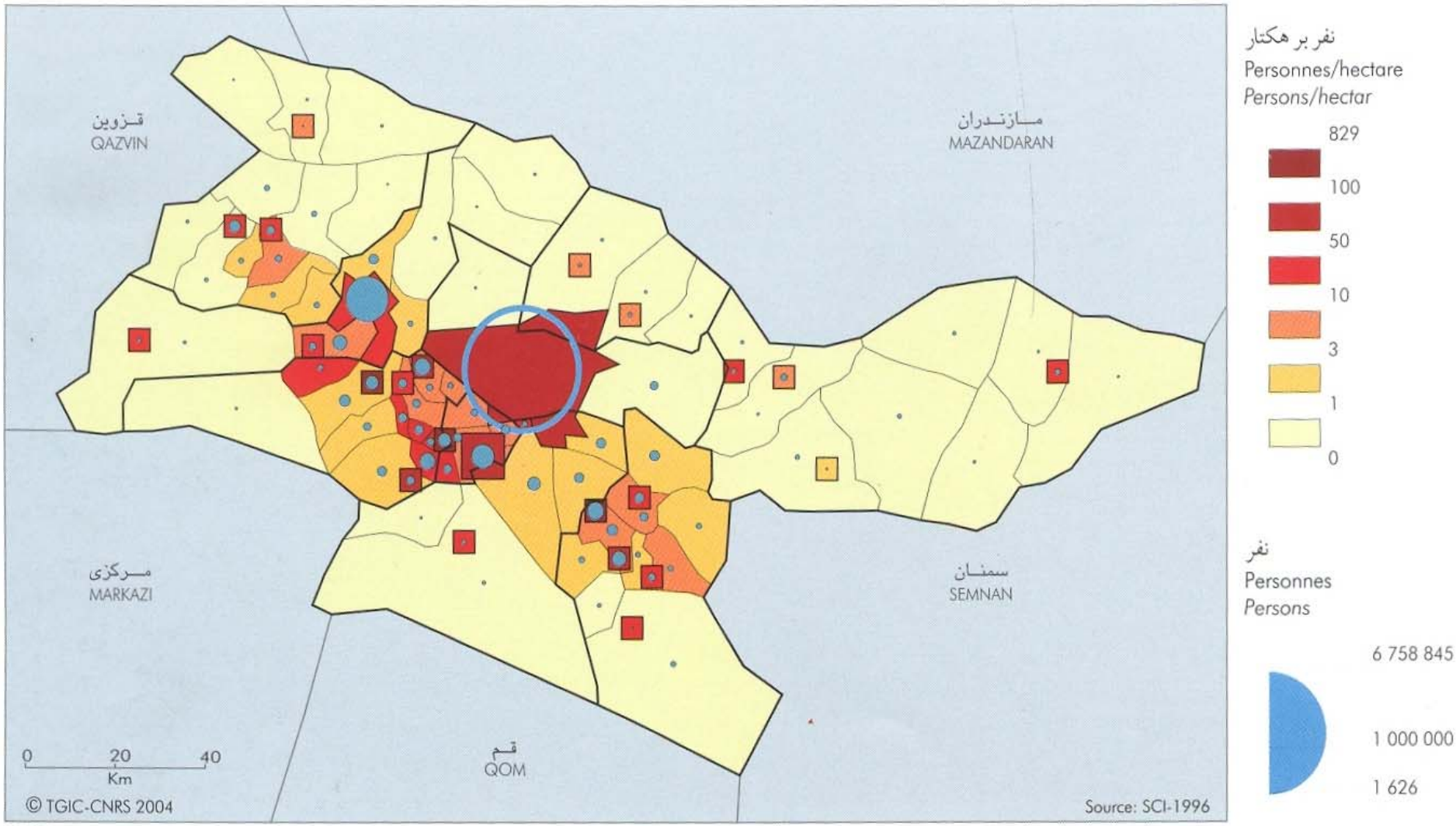
Densité de la population

Population Density

تراکم جمعیت



M 0301

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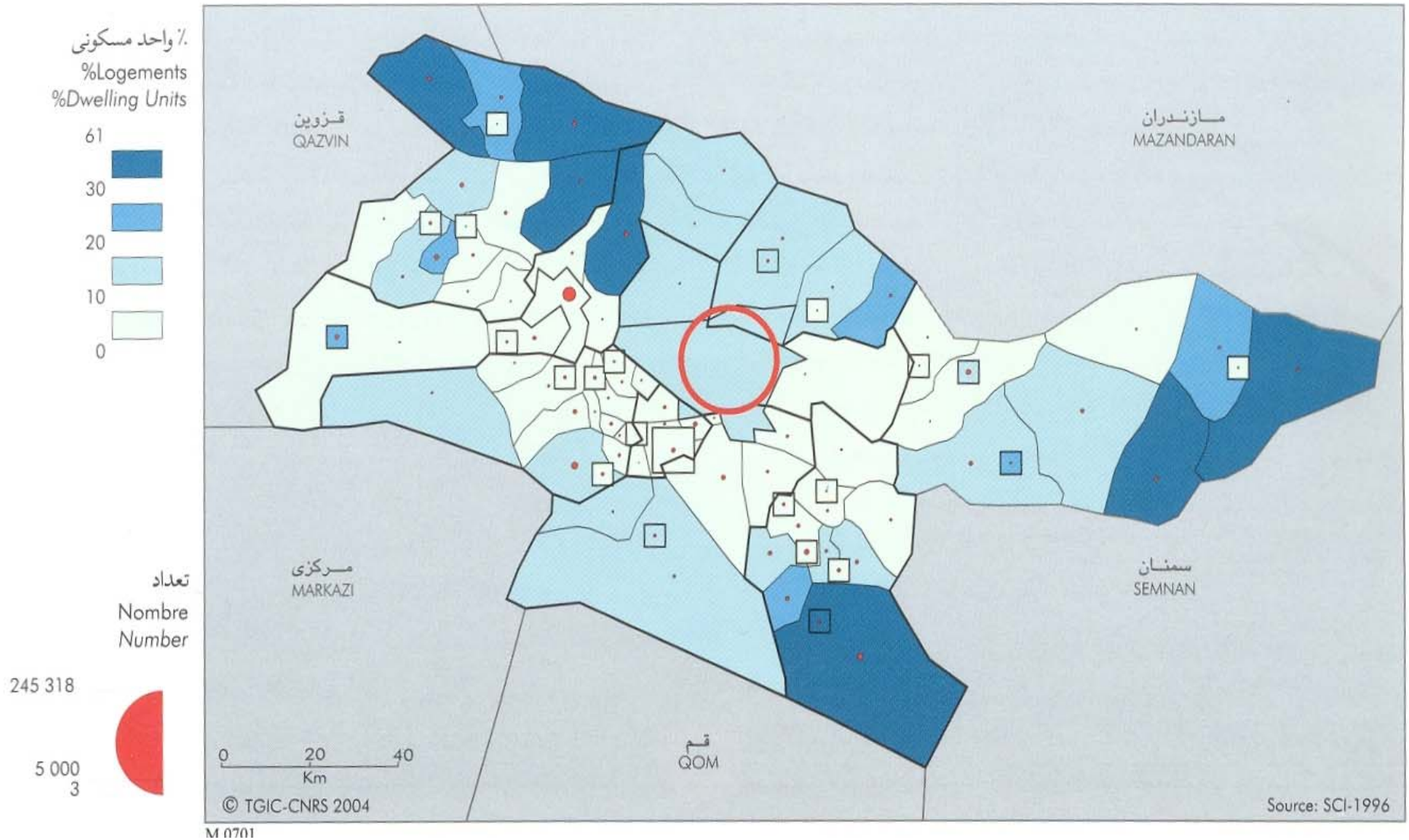
Logements construits avant 1966

Dwelling Units Constructed before 1966

واحدهای مسکونی ساخته شده قبل از ۱۳۴۵



M 0701

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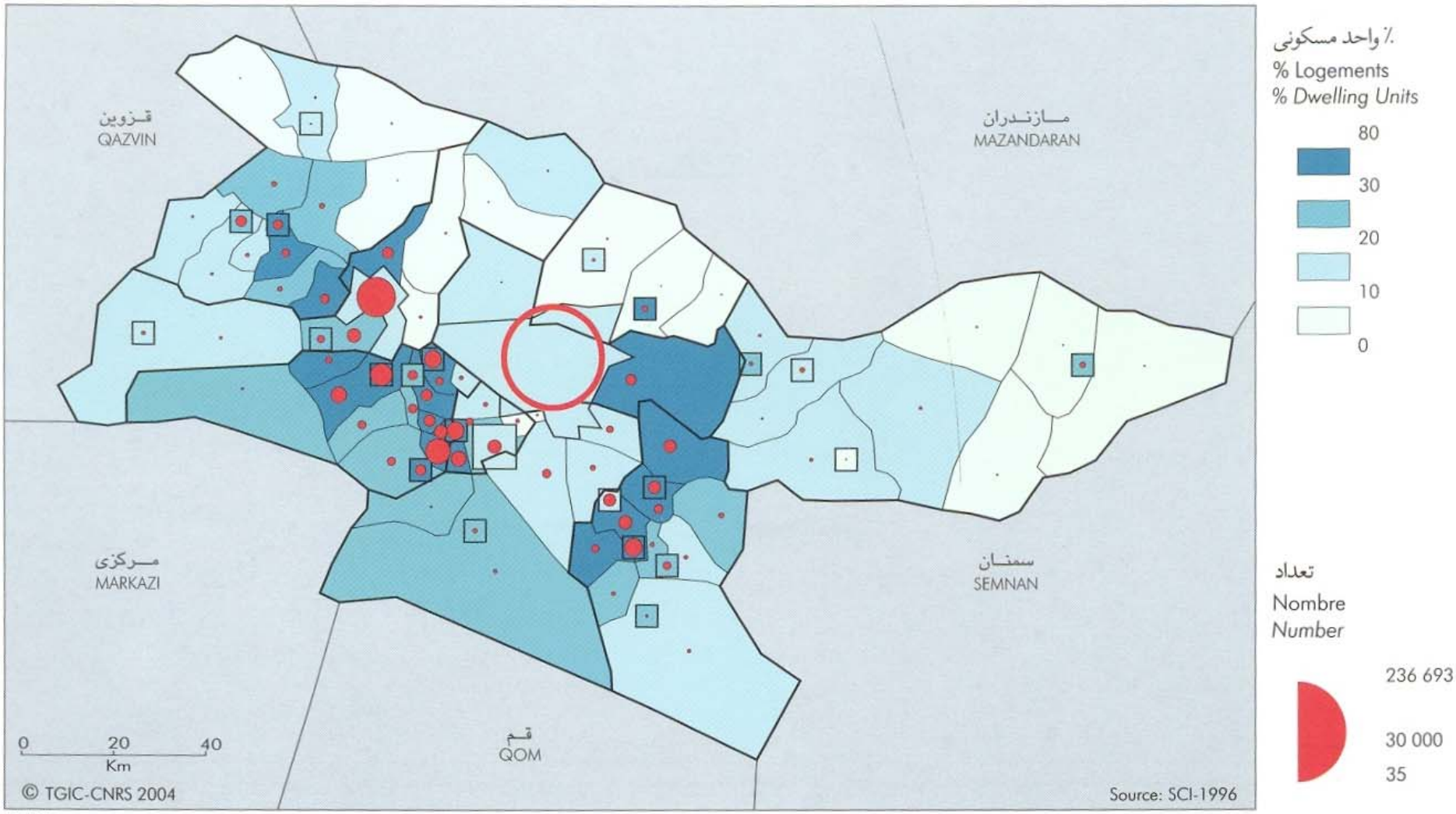
Logements construits entre 1991 et 1996

Dwelling Units Constructed in 1991-96

واحدهای مسکونی ساخته شده بین ۱۳۷۰ تا ۱۳۷۵



M 0704

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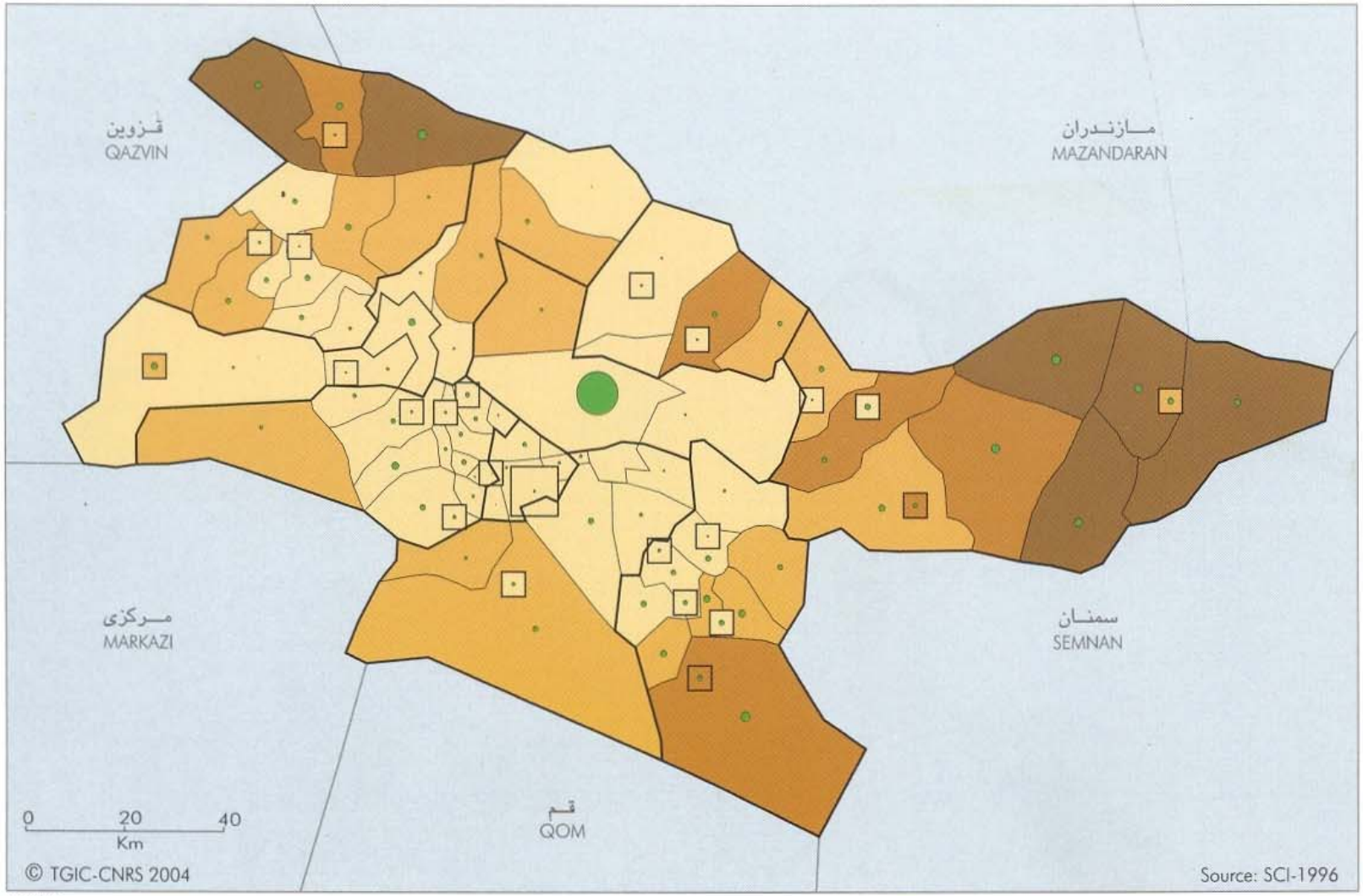
Logements construits en matériaux peu résistant

Dwelling Units Constructed with Low Resistance Materials

واحدهای مسکونی ساخته شده با مصالح کم مقاومت



M 0708

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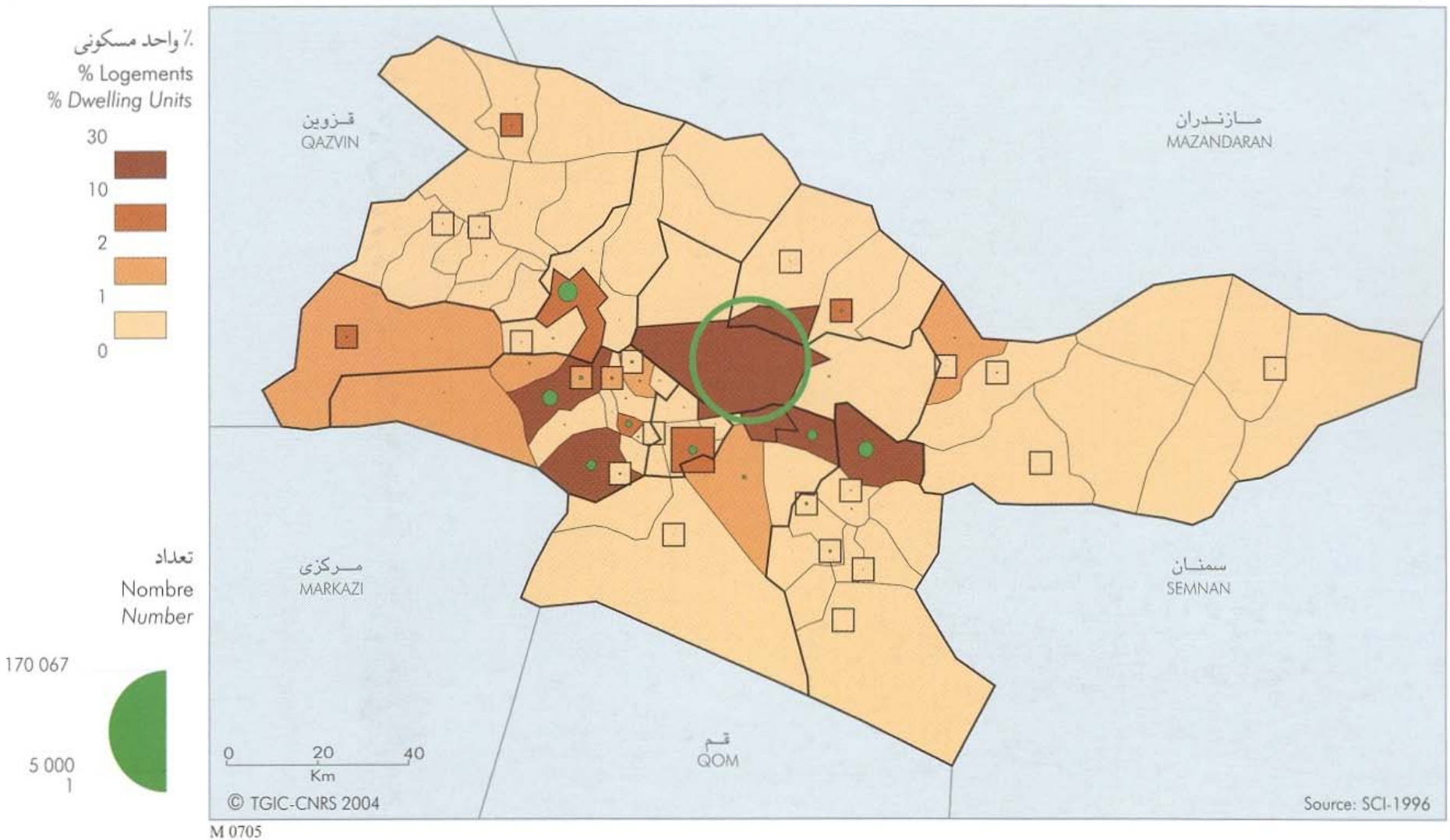
Logements construits en béton

Dwelling Units Constructed with Concrete

واحدهای مسکونی ساخته شده با بتن مسلح



M 0705

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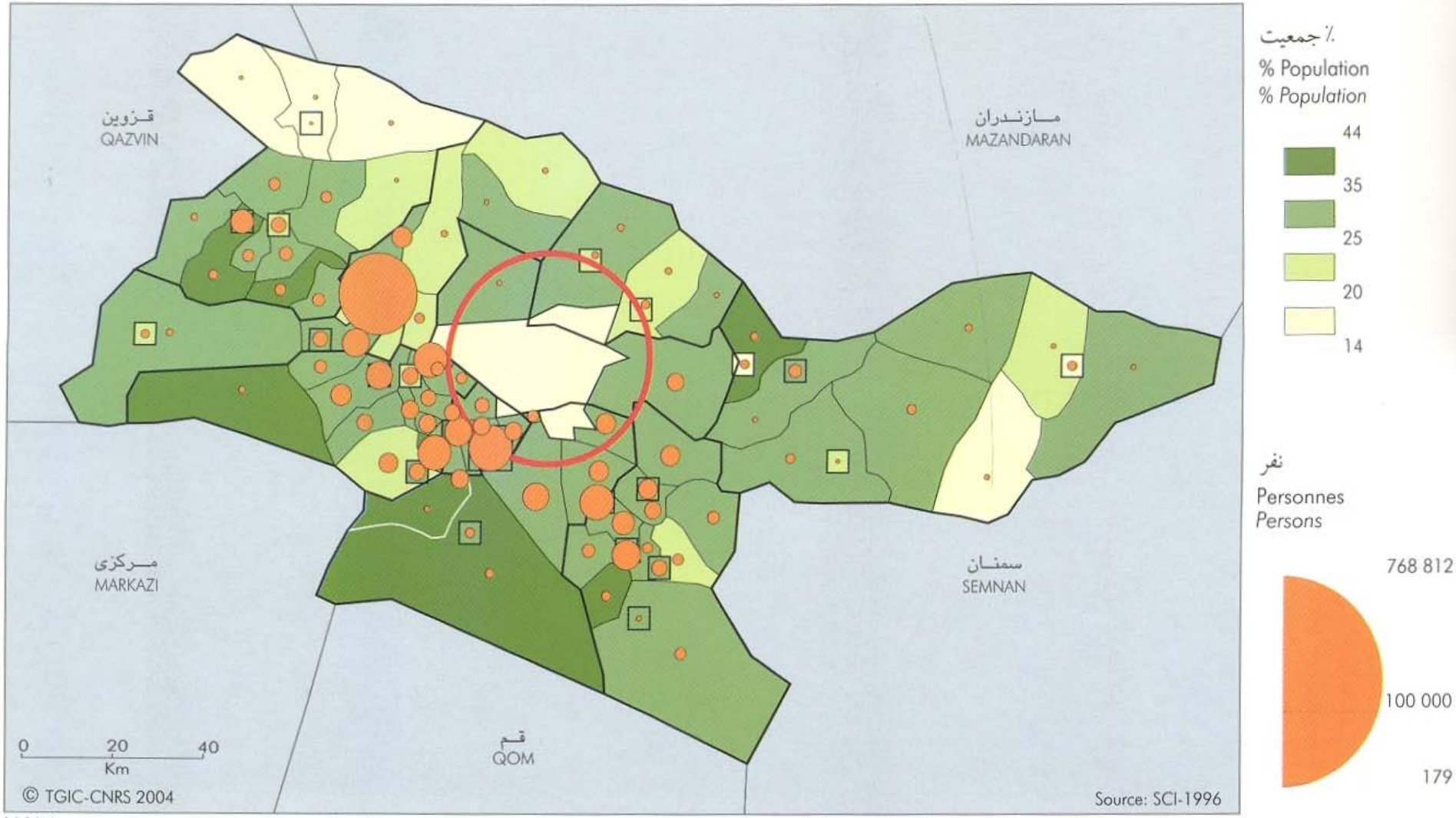
Population non-étudiante de niveau primaire

Non-Student Population with Primary Degree

جمعیت غیر محصل با تحصیلات ابتدایی



M 0611

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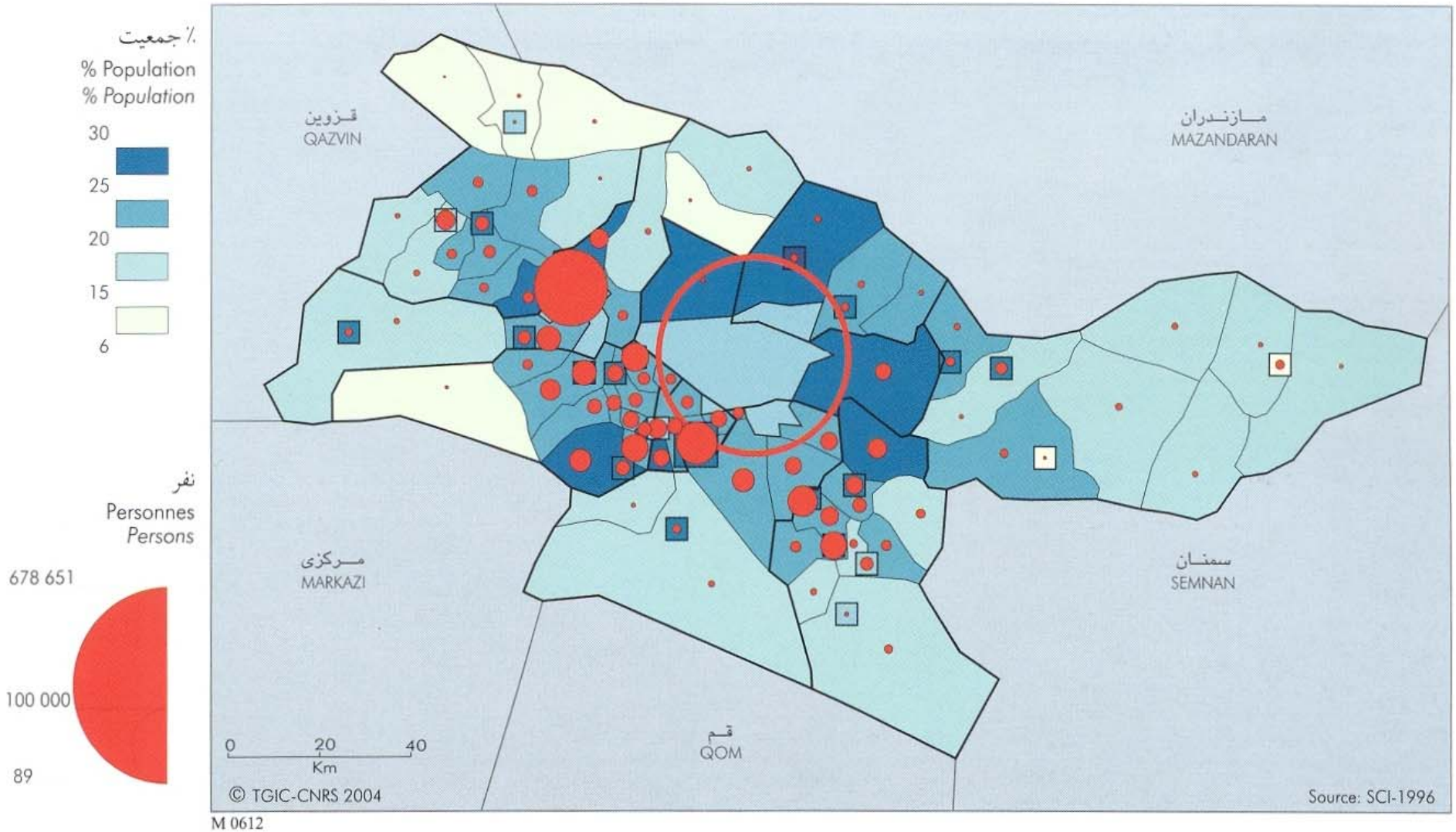
Population non-étudiante de niveau collège

Non-Student Population with College Degree

جمعیت غیر محصل با تحصیلات راهنمایی



M 0612

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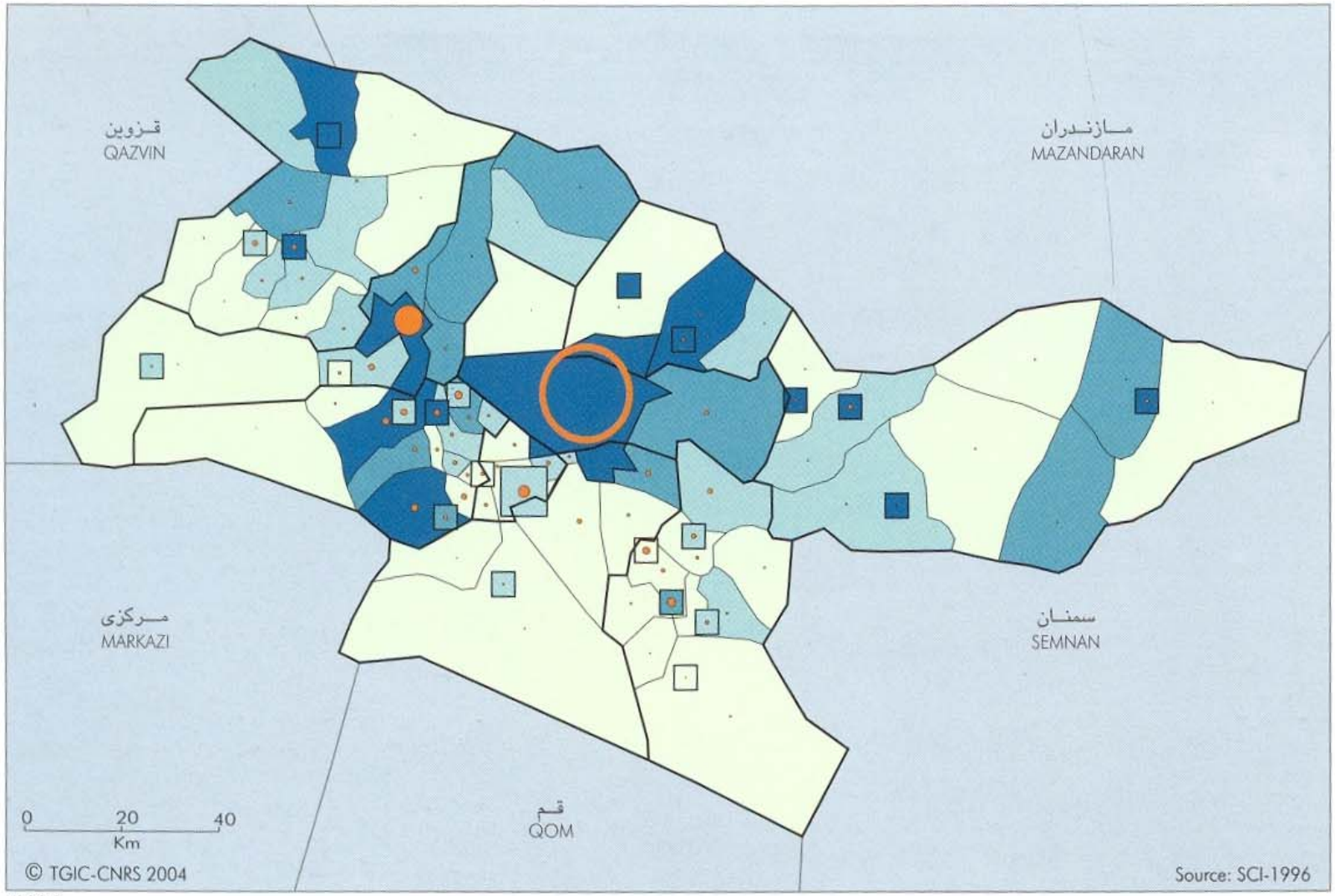
Population non-étudiante de niveau lycée

Non-Student Population with High School Degree

جمعیت غیر محصل با تحصیلات دبیرستانی



M 0613

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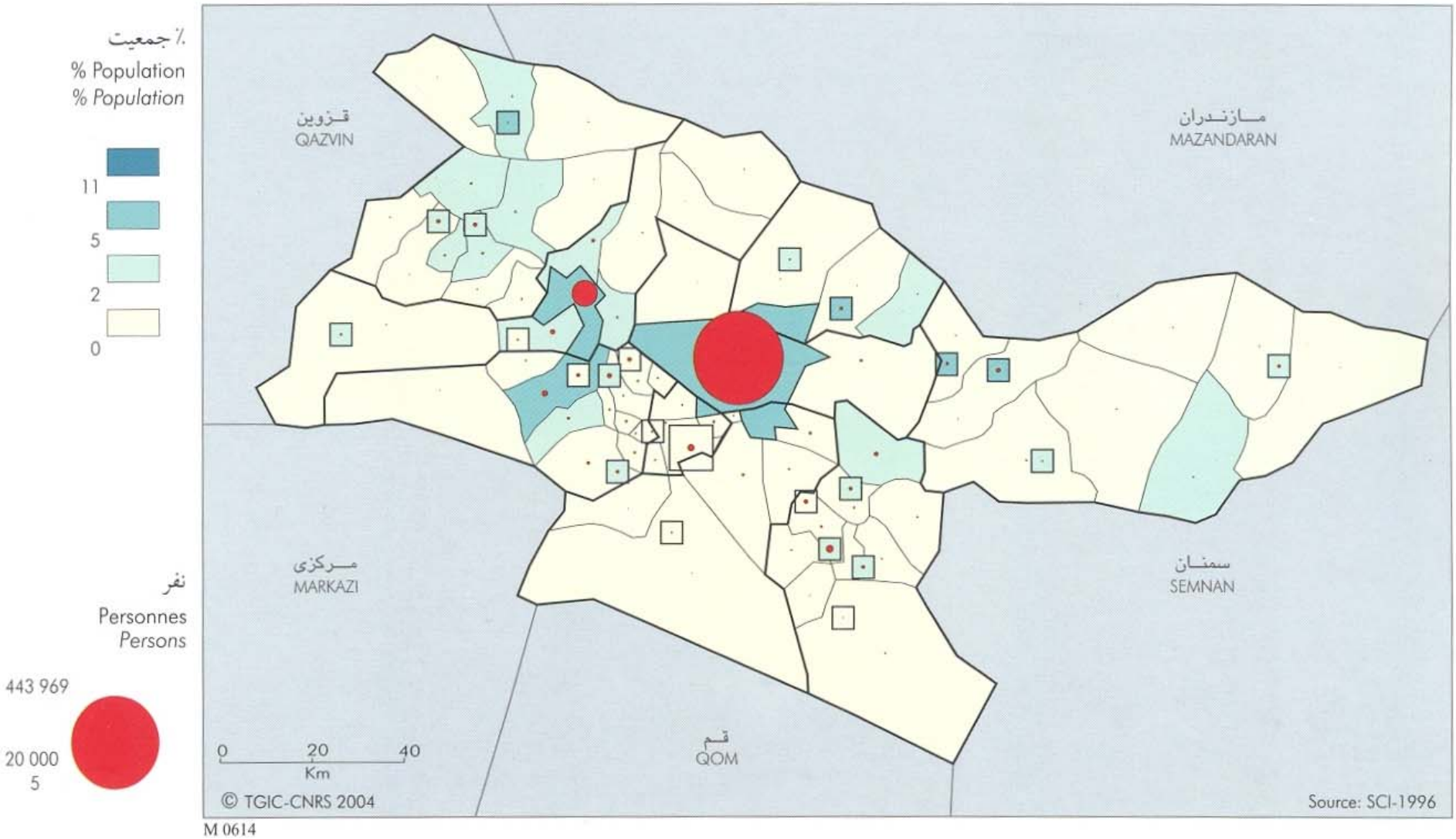
Population non-étudiante de niveau universitaire

Non-Student Population with University Degree

جمعیت غیر محصل با تحصیلات دانشگاهی



M 0614

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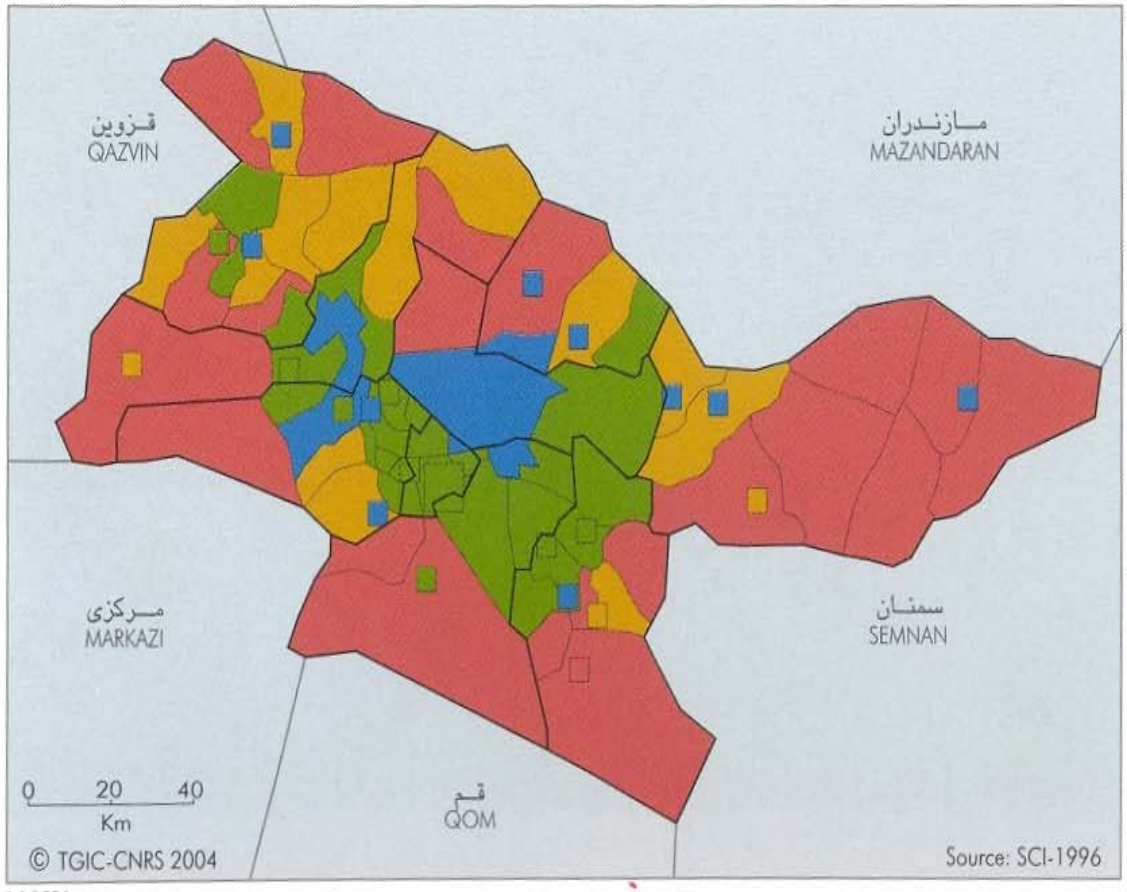
Typologie de l'emploi et des activités

Typology of Employment and Activities

گونه شناسی اشتغال و فعالیتها



M 0521

بانک، آموزش، بهداشت، خدماتی، کارفرمایان، حقوق بگیران
Bank, Education, Construction, Service, Wage Earner

صنعت؛ ساختمان؛ بیکاری؛ تعدادی کارکن مستقل و بخش کشاورزی
Industry, Construction, Unemployment, Few Independent workers and agriculture

جقوق بگیران، بخش خدماتی، آموزش، تعداد بسیار کمی صنعت
Wage Earner, Services, Education, Few Industry

بخش کشاورزی، مستقلین، بخش خصوصی، تعداد کمی کارفرمایان، بهداشت، خدماتی و حقوق بگیران
Agriculture, Independents, Private Sector, Few Employers, Health, Services and Wage Earner

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Densité de la population

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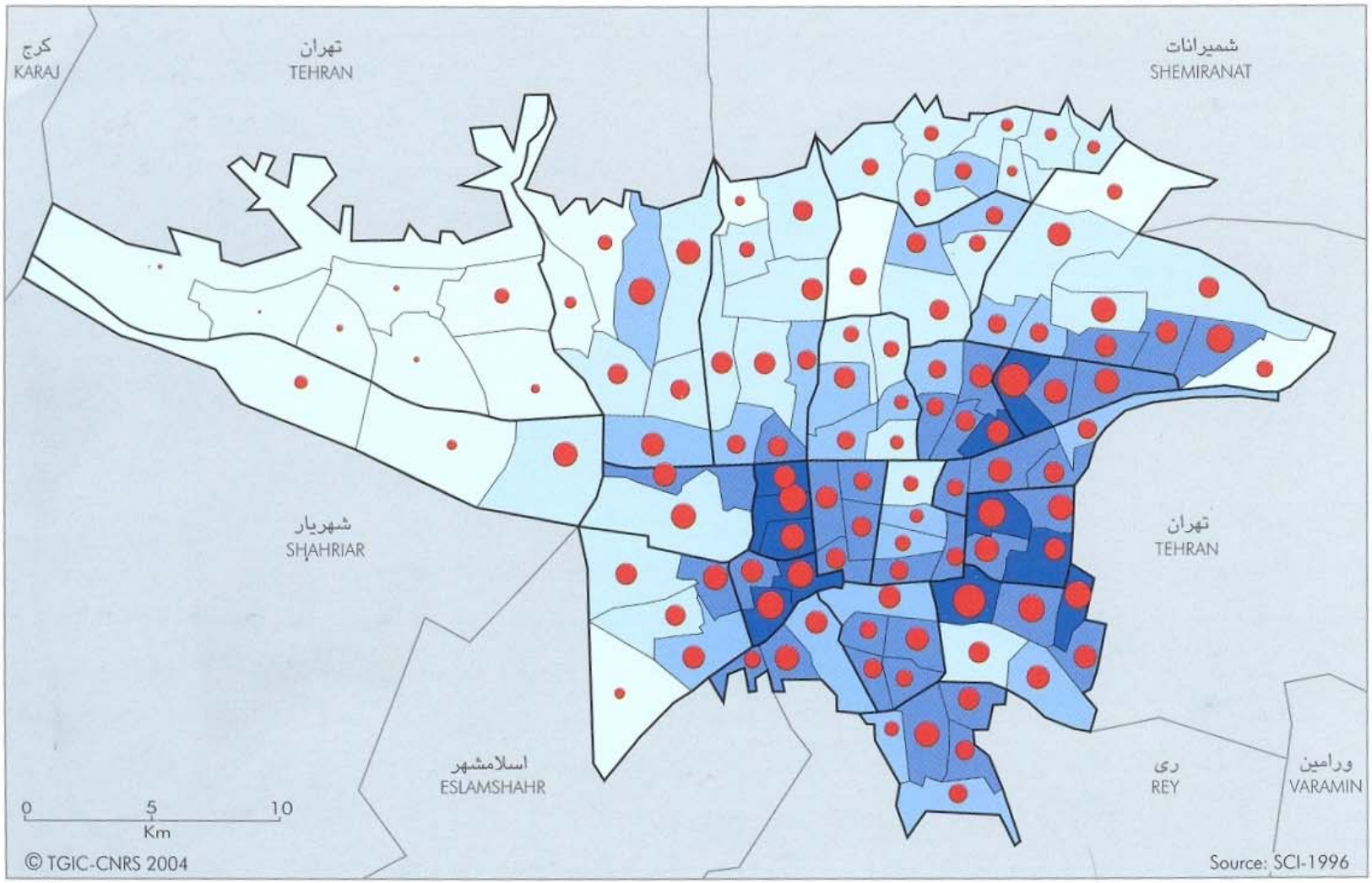

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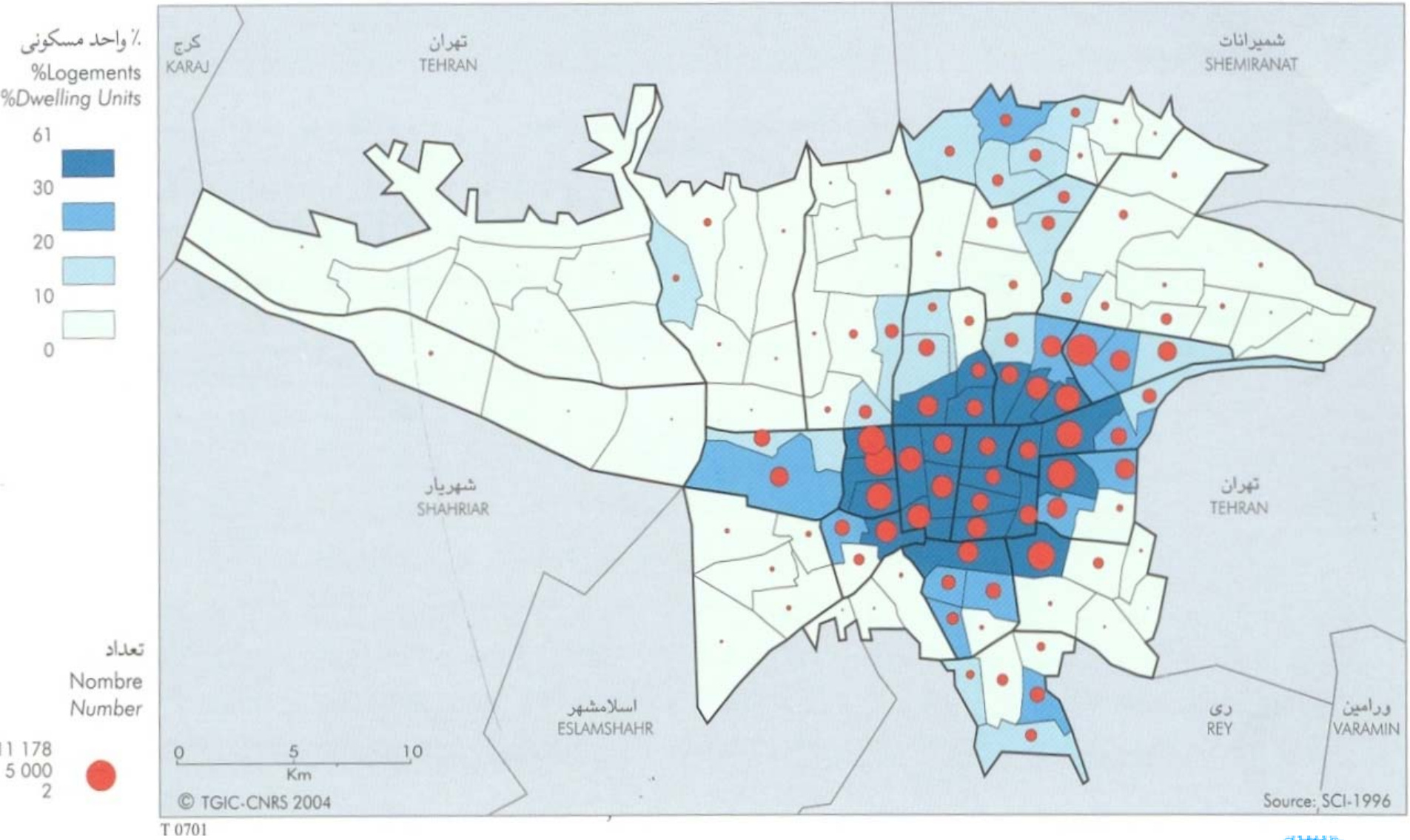

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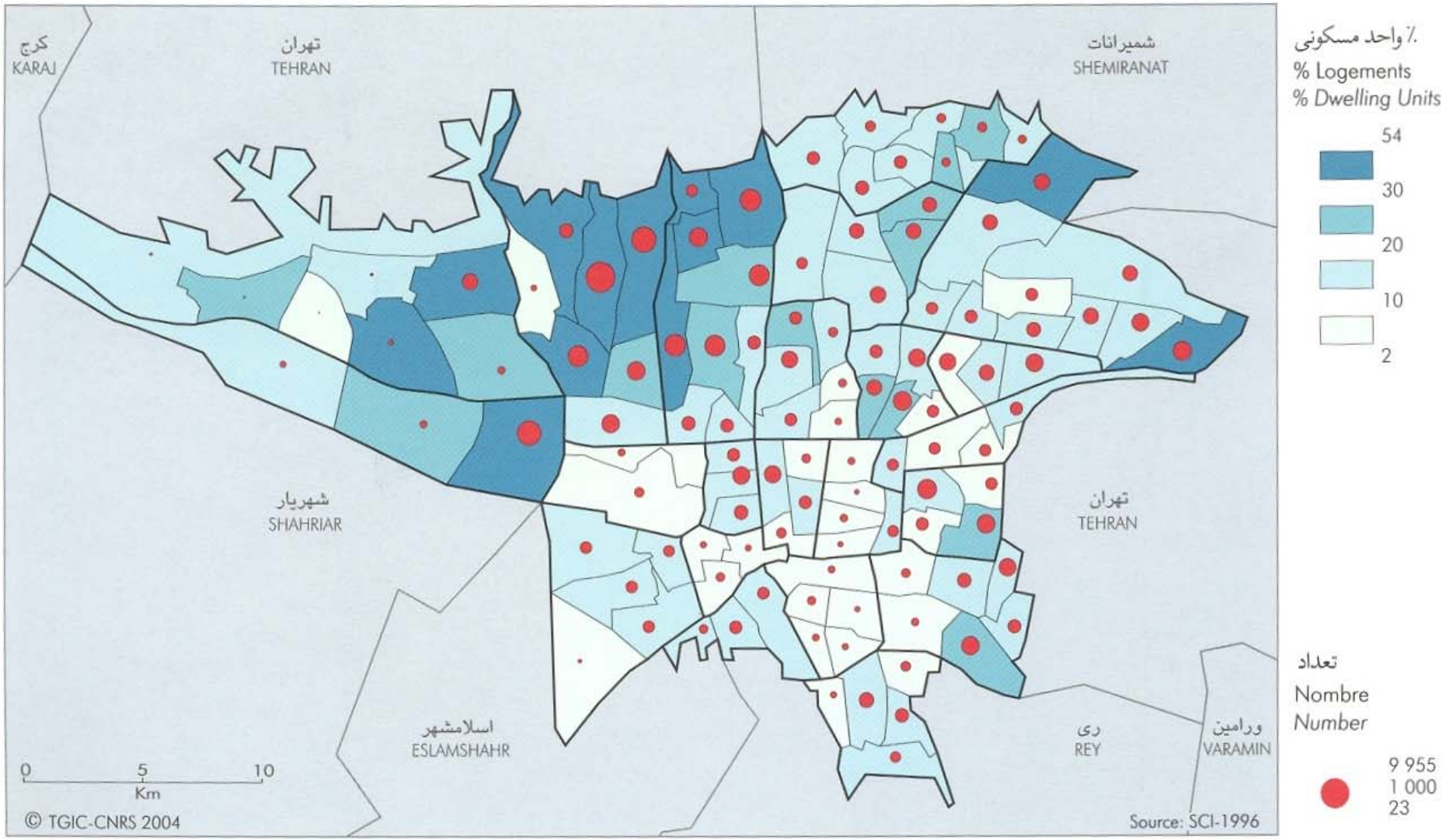

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Methodology

At this context, this paper describes public perception in two Residential Neighborhoods in metropolis of Tehran (Tajrish in the north and Molavi in the south) on a probable earthquake and the process of its management, especially after it. Additionally, differences in public response to the disaster are explained. A survey instrument was designed for respondents employing a conventional Likert scaled response technique, the respondents answered along a scaled line corresponding to complete agreement or to complete disagreement. This scaled reply allows simple quantification that can be used in descriptive and inferential statistical analyses. The survey consisted of some questions on demographic situation, socio-economic status and general quake historical knowledge. Finally, five Likert questions were designed to assess an individual's perception using a range of answers.

row	Statements	very disagree	disagree	low agree	agree	very agree
1	Because we do not aware when the earthquake happens, it's not so differ to be ready or not.	39.3	21.4	7.1	28.6	3.6
2	Awareness and preparedness will reduce human and financial losses in earthquake.	0	6.7	16.7	43.3	33.3
3	Awareness and preparedness only reduces human damages and losses	1.8	20.7	31.0	20.7	13.8
4	After earthquake, plural interests will be emphasized rather than individual interests	28.0	20.0	16.0	28.0	8.0
5	I never think about earthquake, because I afraid of it	25.9	22.2	14.8	14.8	22.2
6	After Bam earthquake, people follow the construction rules more.	20.7	37.9	20.7	10.3	10.3
7	Being worry and planning for mitigation is not so helpful. what will be, will be	44.8	20.7	10.3	13.8	10.3
8	Earthquake is a probable natural event, then we should think on revealing resolution	3.3	0	0	20.0	76.7
9	God saves good people against earthquake	26.7	10.0	13.3	20.0	30.0
10	Forecasting and predicting of earthquake is not Halal	69.0	10.3	6.9	0	13.8
11	Earthquake is the consequence of humankind's bad behavior and a sign of God's dissatisfaction.	36.7	10.0	10.0	16.7	26.7
12	Earthquake is a natural phenomena and due to earth's internal components	3.3	13.3	16.7	20.0	46.7
13	Government is responsible to secure and protect population and their assets against earthquake	3.3	6.7	23.3	6.7	60.0
14	People should prepare and protect themselves and their assets against earthquake. The government only has control duty.	32.1	25.0	10.7	14.3	17.9
15	Earthquake generally strengthen national unity and integration.	24.1	6.9	24.1	17.2	27.6
16	After earthquake conflicts between affected people arises.	6.9	13.8	13.8	31.0	34.5
17	God knows all things and we must rely on "What will be, will be"	23.3	10.0	13.3	16.7	36.7
18	If a strong earthquake hit my city and caused considerable damage to my house, I prefer to be helped others in my neighborhood.	26.7	20.0	26.7	16.7	10.0
19	If an earthquake is going to occur in Tehran, any effective preparedness can't be reduce the damages and losses.	23.3	16.7	26.7	16.7	16.7
-	Average	24.4	16.2	16.8	19.8	26.2

Findings

In response to the question as to what extent they could do efficiently to protect themselves and their families from the emergence of a probable earthquake, most of the respondents believe that they cannot take effective steps or therefore, must leave to the fate (33%) or not much work is likely to be accomplished (20%). Contrarily, there are few who think that some of the works are executable (17%) or those who believe that some preventative measures can be taken to face the emergence of an earthquake (13%).

Reaction of the respondents about the question: “To what extent do you think, following personnel and organs are responsible to protect you and your families from the damages of a probable earthquake?” Largely, it includes one by one as government, constructors of residential units, supervising engineers, municipality, and mass communication. Exactly, people consider themselves as the least responsible. Such a conception is not far away so far as Iranian society is concerned because with respect to the viewpoints of ruling circle as well as lack of serious participation of people in the affairs related to urban and rural developments, and emergence of government-centered approach among people in a way that even at the preliminary affairs (i.e. cleanliness in front of their residential units), they consider governmental institutions or in other words municipalities responsible to do it.

Conclusion

The findings which emerged from this study confirm many established propositions in the theory of risk communication: (1) perceived risk has a direct and positive impact on responding to warnings with protective actions, (2) warning information quality and quantity or reinforcement have a direct positive effect on response, as well as an indirect positive effect through risk perception, (3) Prevent hazard salience enhances warning response both directly and indirectly, and (4) Selected demographic characteristics can constrain both perception of risk and warning response, for example being old, being male, or being a member of a non-white ethnic group.

It is concluded that the level of social welfare and economic situation determined public involvement in response to a disaster. It shows that those social groups living in the south are more likely to promote community based activities and show stronger willingness to provide each other assistance and support in case of a sever emergency or disaster. From this point of view, there aren't existed any differences between the residents of sample northern city locality (Tajrish) or southern localities of Tehran (Moulavi). Perhaps, the extent of feeling of responsibility on this issue can be presumed more in the locality of Moulavi than the locality of Tajrish. However, with due attention to the financial condition of the residents of this part of the city, their least inclination for the investment in the security measurements to face with the imminent damage incurred by a probable earthquake is an obvious matter, in comparison to the residents of comfortable parts of the city (i.e. Tajrish).

Thanks for your attention