

# On the Urban Landscape Transformation and residential Sector Formation through Land Use Competition and Land Price Distribution in the Matsumoto City Urban Area, Nagano Prefecture, Central Inland Japan

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## Abstract

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**Abstract :** The land rent factor has provided us with a basic framework to explain the relationship between the land price and the land use and the urban structure of a city in which the functional zones are arranged. By drawing land price iso-value map on the land price distribution data (Nagano-ken, 2002), the author has examined the urban spatial structure of the Matsumoto city and identified two main functional zones. One is so called C.B.D., that shows itself very clearly in the landscape of clustered high-rise buildings. It occupies only limited and small areas surrounding the urban core, the highest land price area, having a radius of approximately 1km. The other is the outer suburbs which is included in the zone of residential purposes. In Matsumoto city it extends north-south beyond a radius of 10 or more kilo meters forming outskirts of urban area where the land price is not so high that the housings has increased rapidly and land reclamation of paddy fields are processing. Under the recent economic slow growth or stagnate situation, land prices within the C.B.D. zone above mentioned has fallen but land prices in the suburbs mainly for residential purposes has kept the price levels high. Moreover their territory has expanded and land use competitions has been more intensified.

**Key words** : Residential Land Use, Land Price Distribution, Iso-value Map, central Urban Area, Transportation Focal Point

## **I . Subject and the Research Method**

Today Matsumoto City now dominates not only its surrounding Matsumoto Basin area but also the whole of western portion Nagano Prefecture as a provincial center with a population of 210 thousands. It is not only the district center administration but also the center for every aspect of peoples life including education, medicine and cultures.

Against outward looks, urban landuse does not develop at random, but follows a system. There has been many research ways to make clear the process and to examine how the residential sector are formed in urbanized areas. This paper aims to make clear the transition and formation process of residential area in Mastumoto City. In order to analyze the relationship between the Matsumoto urban area's spatial structure and land price distribution, the writer had devised iso-value map of the land price.

It is easy to recognize the reason why in urban area especially near the urban center many of the single-storey type of houses have to give way to high-rise buildings. Adding to the residential use those of high-rise buildings can accomodate various activities and can also obtain far higher rent income per square floor than the ones for residential use only.

Under the market economy system land use competitions are inevitable and as a result the following landscapes are realized. Thus the land for residential purposes are pushed out from the inner area toward the outer zone in degrees. The rent theory can explain this situation very clearly.

Fundamentally the value of the land price is depending on the amount of rent income itself and rent income is influenced by the land use itself. Thus the land price reflects the land use. We can find easily high land price areas in where many multi-storeyed high-rise buildings for businesses are common sight. For manufacturing purposes space cannot afford multi-storey floor operations and reverse is true.

In case of Matsumoto it also be appropriate that theoretical framework of rent theory can be applied to.

## **II. Origin and the Core of the Matsumoto Urban Area**

With its origin as one of a castle town urban Matsumoto had started its development steps from the ending of the Middle Era. Town was constructed after fully examination and careful planning. In the town the head of the clan, feudal ruler, resided in the innermost core zone. Upper and middle class warriors inhabited surroundingly as protecting their head lord. Those residential areas were enclosed by moats, stone walls and

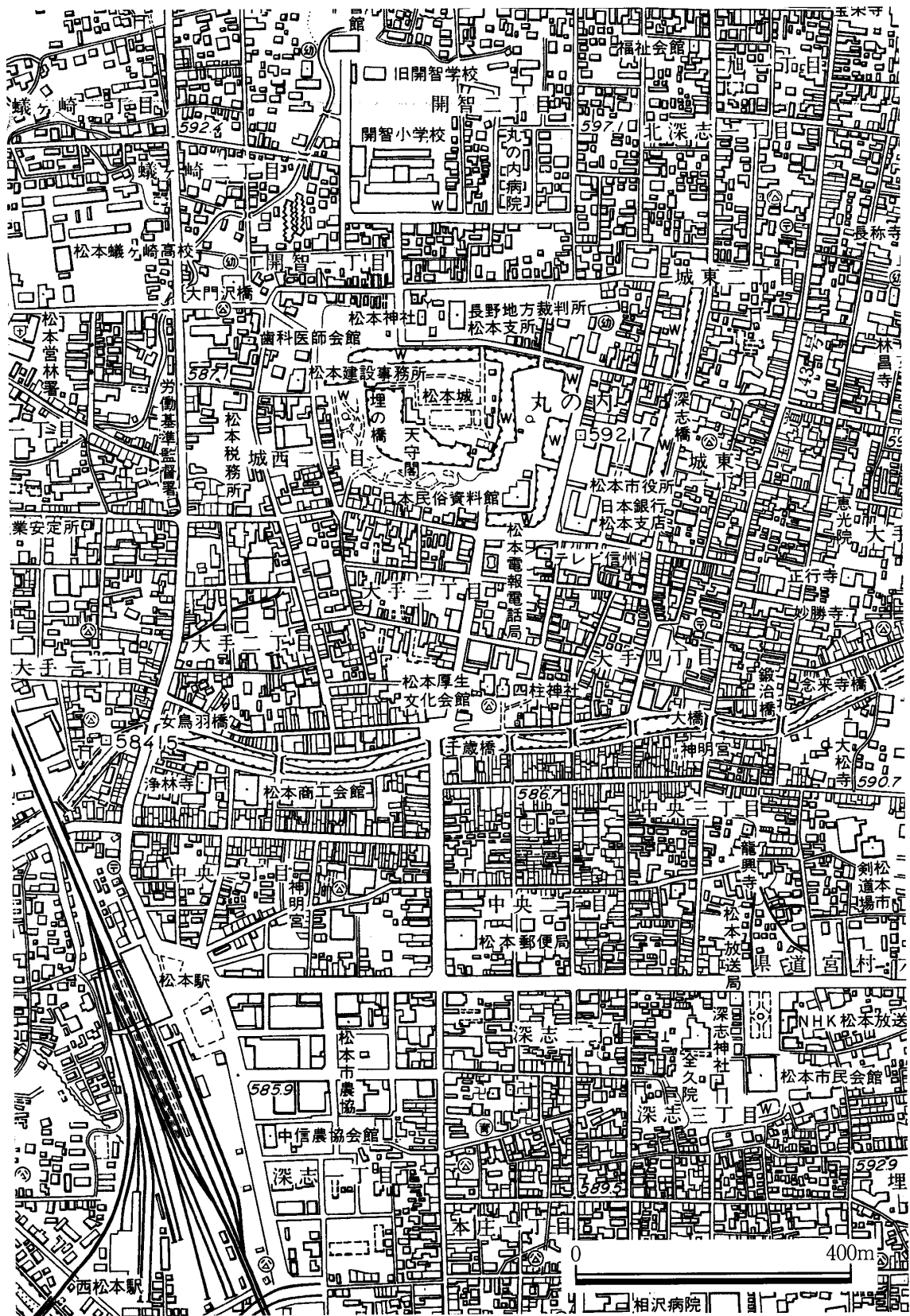


Fig. 1 Matsumoto urban core area, by 1 : 10,000 urban planning base map, Matsumoto city office, 1979.

earthenworks (Matsumoto City, 2004). Lower class warriors such as footmen resided outside the enclosure. Similarly marchants and craftsmen inhabited outside the enclosure, under the living space separation systems. Residential areas for upper and lower class warriors were named *bukeyashiki* and for marchants and craftsmen were *machiya*, and zonings were very strict. In Fig.1, donjon, moats with water, and stone walls can be seen. We can find also Matsumoto station square plaza were just under urban renewal works.

From the castle town Matsumoto, several important trails had emitted. Toward northwest direction, Chikuni road had accessed to Japan sea coast via market town Ohmachi. To the north Zenkoji Temple pilgrimage route. To the west Nomugi road for Takayama was destined. To the east Edo road accessed to capital Edo via Ueda and Nakasendo. To the south Nishi Oukan and Nakasendo road accessed to Kyoto. Matsumoto castle town had seated on where so called transpotation focal point and transportation works were very busy and prosperous in those days. Historically once along the land on those main routes, Honmachi (on Zenkoji-michi) and Isemachi (on Nomugi-michi) , into the city was once the most accessible place. Many shops and offices lined the main street with single-storey buildings. After the opening railway service operation, station square plaza has become the most accessible point of the city.

After the Meiji Restoration urban land use restrictions formerly under the feudal authority had abolished and replaced by the market system ones. Land lots of the castle core area in where former head of the clan resided had been converted to the properties of national or public owned. Thus at the heart of Matsumoto city it show a old sector, a reminder of its historical significance. Today near and surrounding castle zone the urban landuse originally developed by feudal lord can still be seen. Since the Restoration many towns including Matsumoto had and has continued as administrative centers and they assumed new commercial and industrial functions.

### **III. Physical Environment, Endowment of Natural Resource...ample ground water**

On the south-eastern corner of the Matsumoto Basin which has ranks of the first class scale among Honshu inland the Matsumoto urban area is situated. From the physical geographical view, it is seated on the ground that can be described followingly. In the Basin there are many fans surrounding mountain foothills. Almost all of those fans occupy western basin side and are arranged in linear form. But the eastern corner in where Matsumoto urban area is situated, such rivers as Metoba from the north, Susuki from the east, Ta and Narai from the south and Azusa from the west flow. They respectively have extended their own fans and on the whole has formed the larger one fan unit simultaneously by jointing their each fan margins, as if they might lay heads

together.

This is the reason why Matsumoto urban area had and has been blessed with plentiful groundwater. In its early urban days of the Middle Era moats for protection were filled with heavy amount of spring water by ditch construction. In the modern days groundwater was used for railway locomotives, for power mills of silk reeling industry, for materials of various foods production, and industrial cooling, cleaning and washing purposes. No doubt it had and has been very useful for domestic water supply of many citizens through modern piping systems.

#### **IV. Modern Urbanization...Rail Station is still elementary Factor**

When we consider for Matsumoto Urban area's modern history, we can recognize two turning point of important events. The one is the opening of the rail service operation (1902) and the other is the designation of the New Industrial City (1963). The former one had to do with the development and renewal of central urban areas, the latter have related to the newly expansion and filling up of outer fringe areas.

The set up of Matsumoto urbanization of modern era can be traced back to the beginning of 20th century. The most important event was the rail service commencement. The present Matsumoto railway station stands on a site where not well drained padi-field once were. Rail station was built beyond the edge of suburbs then. Rail station had to obtain extending space because switchyard required adequate room and mass of cargo and passengers had to be dealt with smoothly. Soon after rail service had started, surrounding station area taken on more functions. Started as transportation center, it had added commercial and business service functions. Station plaza had performed even as a industrial center. At the beginning of the 20th century when of the rail operation commencement time till the end of 1960s, printing, dyeing, textile, food processing, woodworks and silk reeling had been concentrated in the station surrounding area. During approximately of 70 years length cargoes and passengers had to depend mainly on rail service because the road facilities were poor and the numbers of available vehicles had been smaller. Vehicles had only played secondary role at one time. Those situation strongly have influenced spatial structur of Matsumoto uraban areas. We can find even today railway origin urban landscapes followingly. Cargo and passenger transport functions had left behind bus service center, hotel and restaurants, commodity store houses of the present days. Afterward cargo services were separated and relocated Minami-Matsumoto station. Matsumoto station now is performing passenger services as its dominant function.

In fact, the place around of station square plaza is the central urban area of Matsumoto city, where high-rise and multi-storeyed buildings are a common sight and exhibits the highest land price. Those buildings are clustered together. Station square plaza extends

up to a radius of 1km to cover east side of railway line, integrating built-up area of the Modern Era.

There are two JR lines from four directions and one private company line which meet in the Matsumoto station and rail-net service focal point has realized. Rail-service diagrams reflect passengers movement destinations and represent regional connections. Its hinterland has been consisted of whole Matsumoto Basin, Kiso district, Okaya, Suwa and Chino district and Hakuba lain beyond Ohmachi district and Prefectural capital Nagano district. From the rail station urban streets emitting for several directions and the most lively downtown, station square plaza, has been formed. Adding shopping street, many business offices, financial services and travel offices are concentrated in this zone forming C.B.D. in fact.

For long times the area around of Matsumoto Station square plaza had facilitated as the focal point taking charge of both cargo and passenger traffics. But sometimes the growth of town may be in a disorderly manner, when this happens, problems arise.

There are severe competition for urban land between the private sector within and public and private sector, as each is trying to get the best areas in the town to promote its own interest. Matsumoto station plaza had and has been so attractive all sort of activities that business offices, commercial and transportation functions has concentrated. As the result central Matsumoto urban area has confronted with typical urban problems, related to traffic congestion.

While Japan has experienced High Growth Era (1970s and 80s) , owning and using of private motor car widespreaded rapidly. Shortly after, streets were crowded and spilled over with great number of cars in urban areas and, all of them suffered from car congestion. Also Matsumoto city had to overcome this problem swiftly. The city began to trials for solving the problems.

In finding way out of the difficulties, one important undertaking was urban renewal task. Urban renewal undertaking was mainly based on town-lot readjustment work. In urban renewal, conversion of land use was from urban to urban purposes. So constructions of high-rise buildings with multi-storeys, usable land would expand actually. In addition, it might be possible to squeeze out car parking space amidst highly built-up areas.

Matsumoto urban built-up area has experienced two large urban renewal achievements as described in latter part. Between 1965 and 85, the first urban renewal was planned and conducted.

Thus as the first task in the Matsumoto Station surrounding area urban renewal schem have done and transformed the station plaza into refined newlooking landscape streets. Renewal area extended 21 ha.

Urban renewal scheme of station plaza had produced remarkable result that stimulated citizens to bring about the another urban renewal project, that was Chuou-Nishi

Corner Renewal Planning. This second project has completed in 2002, covered range of renewal areas has been 12 ha.

Sometimes towns or cities grow in such a manner that they merge to form a more larger shopping street. Then they can attract more larger number of peoples on the common base. In Matsumoto city station square plaza street and Chuou-Nishi street might be corresponding to such case.

## **V. Land Reclamation and Land-lot Readjustment in suburbs for housing under New Industrial City Project**

If possible, it is desirable that urbanization, namely, converts of land from some purpose (agricultural) to another purpose (industrial or commercial), might be processed orderly under well examined planning. Land-lot adjustment is one of the most appropriate method for such intention. In Matsumoto city land-lot adjustment with land use transformation from agriculture to urban has been actively promoted mainly in suburban areas.

Adjustment of land-lots are conducted followingly. Roads or streets are made be more widen, be more straighten, and be met at right angle with each others, then, those areas become gridiron pattern. Streets become rectangular in shape. Thus land for business and commercial other than for agriculture might be more affordable and be more suitable for profit making. Land productivity per square unit has been arised. MUSHA has conducted intensive and suggestive research (MUSHA, 2004). Land reclamation originally for agriculture itself is also useful for housing purpose. As the result of reclamation, be widened and straightend road with improved drainage might get anti-hazard ability. So carrying out the land-lot readjustments would become effective way of solution for many urban problems.

Matsumoto city government took promotion policy for farmers to conduct cultivating land readjustment with incentives of easy access to domestic water supply systems and to sewer drain trunk lines. The results of decisions of many individual farmers have affected the landscape to a large extent. Land for housing had prepared with the land-lot readjustment programs. It was, at its early stages, reclaimed from the padi-field for agriculture and later converted for housing purpose. In this way more land was opened up for new housing estate by reclamation of padi. Fig.2 shows the location of those adjusted land for agriculture.

Evolution of landscape of Matsumoto suburban area also owes greatly to the Designation of New Industrial City (1964). New Industrial City Construction project nationally supported under the National Development Plan in 1964 since its designation till the 1980s and has been promoted actively by public investment in two sectors. One was for building of the infrastructure such as railway switchyard, fully equipment with roads and power

supply lines came first. Construction of industrial parks followed. Minamimatsumoto, Ookubo, Seinann, Matsumot-airport were such industrial park examples.

The other was to improve citizen's living environment of most important was the housing estate construction. Public housing project and construction have been actively promoted in the then Matsumoto urban fringe areas. Japanese name of housing estate is *danchi*, and Kotobuki, Namiyanagi, Minamimatsumoto are examples of *danchi* prefec-tural or city owned and managed housing estates. Kotobuki housing estate alone itself have molded Densely Inhabited District.

## VI. Consideration of Housing Land Situation by making Land Price iso-value Map

It shows that certain urban functions tend to be nearer the city center while others are found farther away. This is because the price of land within a city varies according to its location. Land prices tend to be very high near the city center but they fall quite sharply towards the zone next to the city center and then they fall gradually towards the outer suburbs. Fig.2 and Fig.3 shows the relationships between land values and distance from the city center. In Matsumoto city since 1950s' residential areas had experienced outward expansion, that were, they had been pushed outward.

Urban landuse does not develop randomly, but follows a system. For the research purpose the author applied an expedient to make land price distribution map by drawing iso-value lines.

In normal topographical map relief features are represented by means of contour lines. These are lines which join place of equal hight. Like weather chart, iso-value lines are made hypothetically. On the topographical map the distance between two adjacent contour lines is called the vertical interval e.g. in 1 :50,000 topographical map 20 meters are regular. They show slope and its direction, gradient, shape and the relief pattern of the place. Similarly in the land price distribution map, sphere of iso-values and sloping directions are important. Like as normal topographical map, some relief feature is also represented on the land price distribution map. Those features are, peak... not like of summit but like dome although represents highest value place, ridge, plateau or terrace, and valley. See Fig.2 and Fig.3. For example, plateau or terrace may represent flat land, so represent the continuation same value land price. Valley represents some continued depressions of land price. Where contour pattern is circular, land price falls alike in degree in all directions. Figure showing value of land price is represented per 1 m<sup>2</sup> and each figure unit of value is thousand yen, so Japanese 6 Man-yens are represented as 60 thousand yens (Fig.2). But for more simple expression, in Fig.3, Japanese Man is adopted and accounting is 10 thousand yens unit.

In Matsumoto urban area, year of 1989 data, represented in Fig.2, iso-Value lines were



composed of, 800 • 400 • 200 • 100 • and 60 thousand yens. Respective figures represented unit of accounting thousand of yens per 1 m<sup>2</sup>. Then comparison with year of data 1989 and 2003 are author's following task.

In the land price map of Fig.2 and Fig.3, represented slope is extremely steep and considering the large extension of the land price distribution, that is proper. From the year 2002 map the 800 thousand yens line has disappeared because the highest value of data 2002 fell below 800 thousand yens. In place of disappeared 800 thousand yens line of 1989, in the 2002 year, 600 thousand yens appeared (Fig.3). In the year 1989, the highest price value point showed 1,390 thousand yens and next 847 thousand yens point followed on, then 800 thousand yens line had been able to be represented (Fig.2). In the year 2002, the highest price value on the same point of year 1989 was 607 thousand yens, that was the reason why 600 thousand yens line appeared. In 1989, number of land price researched points were 40, and in 2002, were 39 points. Between the year 1989 and 2002, almost all data locations of specific point has experienced little change.

By comparing the 1989 data with 2002 ones, differences between the land price contour map can be described as follows.

- 1) Above 800 thousand yens zone had disappeared in the 2002 map.
- 2) Areas within limited by respective 800 (600) • 400 • 200 thousand yens lines all seems has curtailed. They have been and are used land for highly specialized purposes such as office of the Bank of Japan, hotel, insurance and real estate service office, post office of central and department store. Above all, that whole of district branch offices of Japanese top class company occupying this zone are remarkable fact. In this central zone, residential buildings exhibit multi-storey high-rise form without exception.
- 3) On the contrary, 100 and 60 thousand yens lines have expanded outward. It is striking that in 2002 year map, an island of 100 thousand yens has arisen in the southern portion (Fig.3). Among 100 and 60 thousand yens lines, i.e. lands are used for commercial side by side for residential, there are mixed use and land use is compact. In this area we can often find such buildings as the ground floor is for shop and second and third are used for residential. Open space for residential land is very small.
- 4) The outermost zone outside of 60 thousand yens line are mainly used for residential.
- 5) In the 2002 year map, shape of the 60 thousand yens line have more elongated from the north to the south direction and east to west direction more widened too. Elongated and widened shape means the land use competitions has been more intensified. Available land for the people with ordinary incomes has passed over far beyond out of their obtainability.

Let us consider the meaning of 60 thousand yens per 1 m<sup>2</sup> land price. In the Japanese traditional accounting measure per TSUBO, its value is acquired by 3.3 times of the per 1 m<sup>2</sup> value, and will become 198 thousand yens. A person who wants to get 30 TSUBO dimensions land for his own housing, he must pay 5,940 thousand yens amount of money.

for residential land, land only. This is the upper limit for workers with normal income in present Japan, including Matsumoto city.

Although land price of the central Matsumoto urban area exhibited price fallen, enclosed area of 60 thousand yens per 1 m<sup>2</sup> value line that is the upper limit of the normal income peoples housing has been expanded, elongated and more widened, land use competition been intensified under the situation of Japanese economic stagnation not with standing.

Within the zone of those above upper marginal limit where being more accessible to urban center, higher obstacle toward realizing owner-housing make people to have their residence inevitably rental house or rental room. And housing lot become more smaller and close together without open space and garden. It can be said that, in 2002 year, outer margin of the owner-housing had extended more wider outwardly than that of the 1989. Then, the residential area for the people with normal income has been pushed out, more far distant away.

Now we must pay attention to the fact what sort of the factor that had encouraged suburban land price made to rise high. Between 1970s and 1990s Matsumoto city government had actively promoted the improvement and construction of belt line roads surrounding built-up area to overcome traffic congestion. Since then new type shops as convenience stores rapidly increased along those improved road. Koyama conducted intensive research concerning those shops locations (1997). He found that newly inhabited residential areas had supported those increased shops. New inhabitants were largely attracted to those new shops because of their very high accessibility. As a result land price had soared and the range of on and above 60 thousand yens zone expanded outwardly.

## VII. Conclusion

In early days of the pre-Modern Era, Matsumoto urban area had been spatially composed of two sectors, one was for warrior class residential area named *bukeyashiki* and for marchant and craftsmen was another one named *machiya*. Under the feudalism, residential space dichotomy was strictly conducted.

From the Matsumoto castle town several important trails called *kaido* or *michi* emitted toward Edo or Kyoto and Japan Sea coast. Within castle town they facilitated as the termini and transportation focal point had arised. Along these trails various shops and warehouses line-uped and formed were active and busy street. Present Higashimachi, Nakamachi, Honmachi and Isemachi are remnants of those once prosperous days.

Matsumoto urban area had continued as the administrative center as well as commercial and industrial ones after the Meiji Restoration. In modern Era the most important event was the commencement of rail service operation. Since the opening of the

railway Matsumoto station and its square plaza has been consistently existed as the central place of the Matsumoto urban area.

The second important event was the New Industrial City construction Designation at the beginning of High Growth Era. For Matsumoto city it was the turning point of its residential area outward expansion, since national and prefectural government has actively promoted large scale housing project, with land-lot readjustment programs in the previous suburban area.

Near the ending decade of the 1990s Japanese economic stabilization had become normal situation, and although land price of the central Matsumoto urban area had fallen, outer margin of the residential land for owner-housing, outer margin for the people with normal income had and has expanded outwardly. Land price for residential purpose had never fallen, reversely 60 thousand yens per m<sup>2</sup> area were considerably expanded. For the normal income peoples available land has become more far distant away.

#### 和文要旨

「土地利用の競合や地価の分布からみた松本市の住宅地の形成・変容」

松本の都市形成については、ことに近世から近代の戦前までは豊富な文献の蓄積があるが、第二次大戦後とりわけ高度成長期の、郊外にあたる区域の変化については一括して概観のできるような文献に乏しい。いわゆる地代の理論は極めて単純な仮定を前提に組み立てられているので、複雑な現実の事象分析への援用には疑問が示されることが多い。しかしきわめて単純な仮定に立つとはいえず、複雑な事象を整理したり問題を探し出すヒントになるのであれば、理論の有効性は失われてはいないことになる。そうした例として筆者は松本市の郊外で進んできた住宅地化につき、地価分布の面から考察を試みた。地方都市松本市にも中心業務街がある。その中心業務街の地価は松本市の後背地の経済力を反映する。全国に販売網をもつ有力な企業の顧客の購買力の組織化が地方支社・支店・営業所などの機関で、これがC.B.D.のオフィス群の中身である。いっぽう地域住民の購買力は小売商業が組織化し商店街となる。有力な商店が集積すればより広い範囲の顧客を獲得できるから商店街にもそのための工夫が凝らされる。かくてオフィス群と商店街は土地利用の競合関係に立つ。

1960年代はじめの新産業都市の指定をきっかけに松本市を中心とする地方は産業基盤・生活基盤の整備を進め、それまでの郊外が市街地に組み込まれてきた。1990年代から日本経済の停滞が目立ちはじめ、それは有力企業の地方支社・支店・出張所の縮小統合再編を結果した。これで中心業務街の地価も下落した。いっぽう生活基盤の整備は住宅地の外延的増加をみちびき、住宅地の地価は下落せず、10万円/m<sup>2</sup>や6万円/m<sup>2</sup>の範囲は大きく広がった。交通混雑の緩和のため市当局は郊外を結ぶ環状線を拡充してきたが、これは深夜営業などの新業態店舗の進出を誘い、商業的用途の地価の水準へ住宅地の地価を引き上げた。中心市街地の地価の下落は持ち家を作りたいと願うささやかな庶民の夢の実現にはいささかの助けにもならない。これは地代の理論からは、用途が違うのだから当然のことである。

なお、C.B.D.を収める松本市の中心市街地の変遷を具体的にみるため、城下町時代や鉄

道の開通後の時代の変化を追った。意外なことに、鉄道の導いた市街地は、現在なお生きている。駅周辺地域とこれに連なる中央西地区の再開発が、都心機能の維持存続を物語る。ひところ新時代の到来と喧伝されたいわゆる郊外化は曲がり角に来た。整備された道路や上・下水道の維持費用は、公共団体の財政がいっそう窮屈になるこれから先、直接の関係者（受益者）だけで負担することになるであろう。郊外化が庶民の持ち家実現のささやかな希望の阻止だけで終わらないよう筆者は願う。

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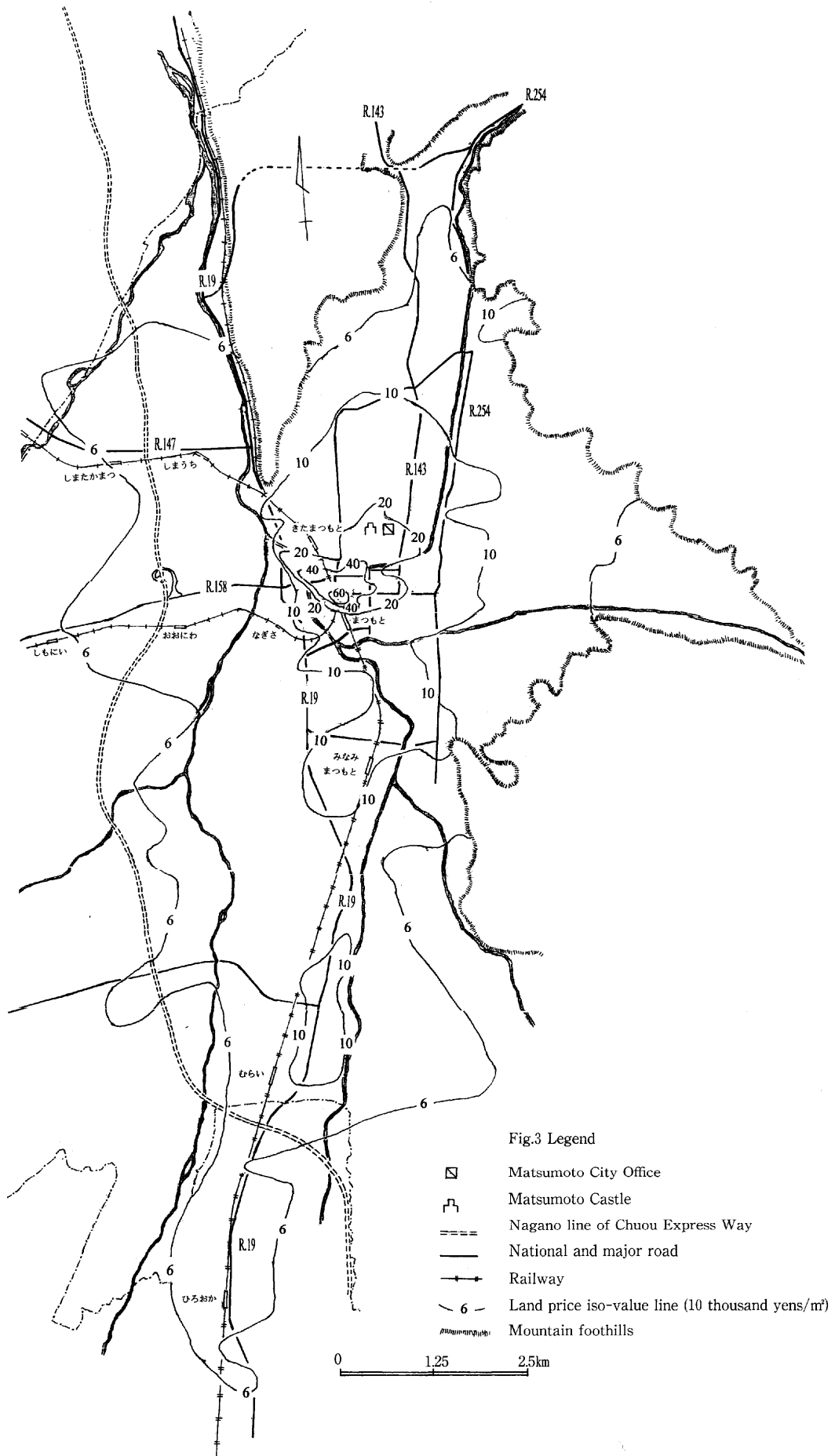


Fig.3 Land Price distribution iso-value Map of year 2002, by Author (data source were 長野県, 2002)



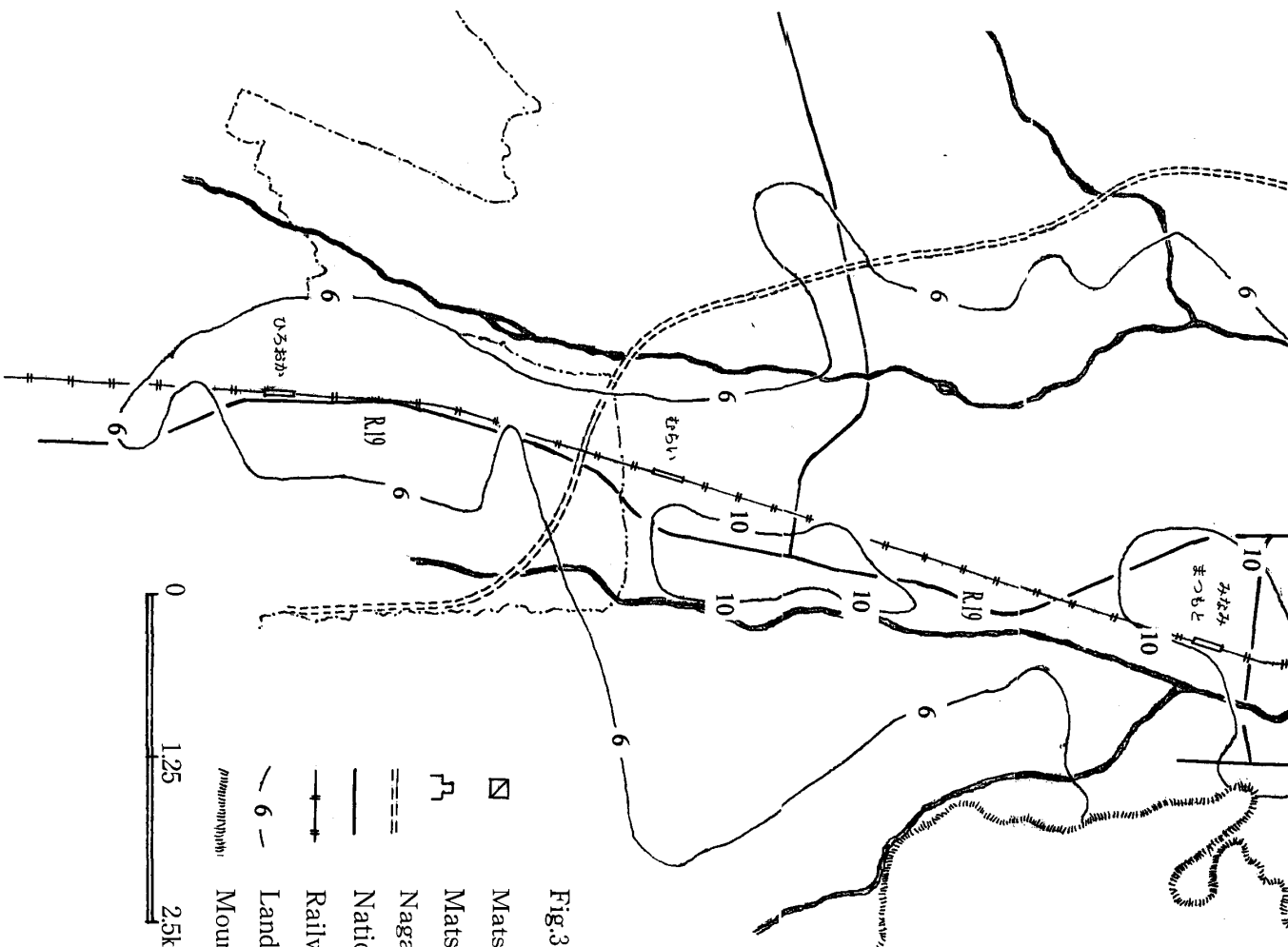


Fig.3 Legend

- Matsumoto City Office
- Matsumoto Castle
- Nagano line of Chuou Express Way
- National and major road
- +— Railway
- ~ Land price iso-value line (10 thousand yens/m²)
- ~~~~~ Mountain foothills

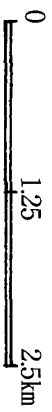


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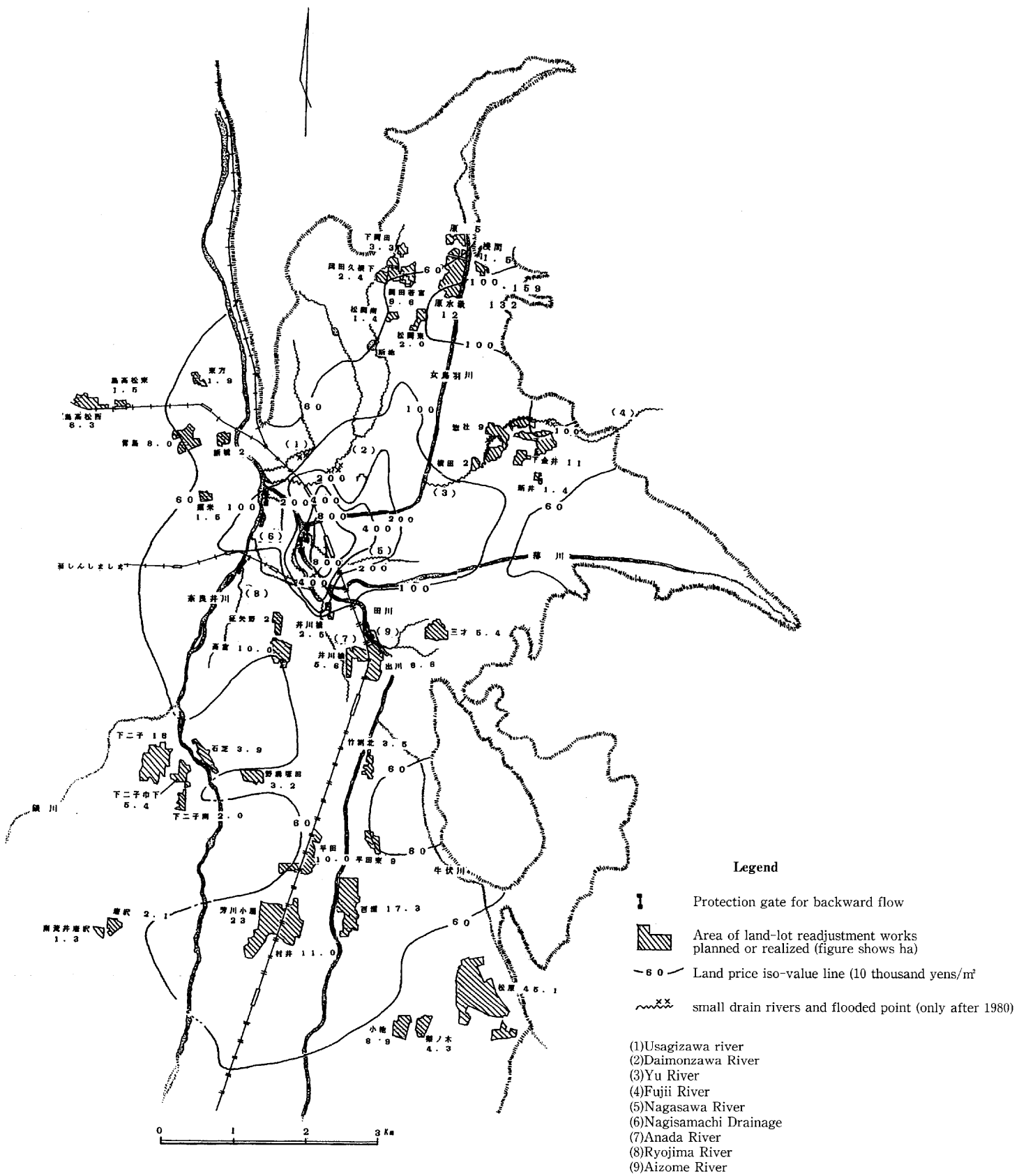
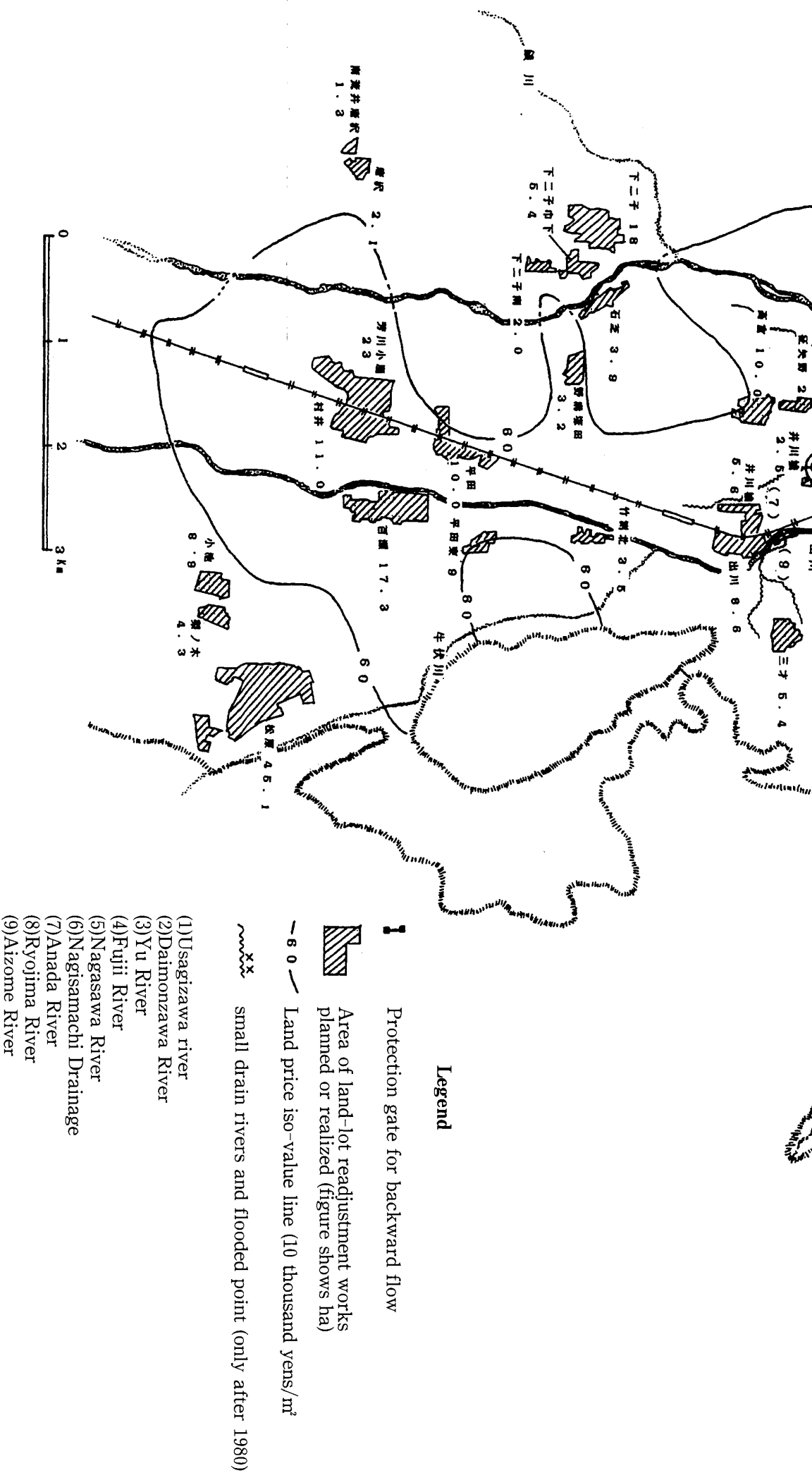


Fig.2 Land Price Distribution iso-value Map with land-lot readjustment works be undertaken of year 1989, by Author (data source were 長野県, 1989)











- Legend**
-  Protection gate for backward flow
  -  Area of land-lot readjustment works planned or realized (figure shows ha)
  -  Land price iso-value line (10 thousand yens/m<sup>2</sup>)
  -  small drain rivers and flooded point (only after 1980)
- (1) Usagizawa river
  - (2) Daimonzawa River
  - (3) Yu River
  - (4) Fujii River
  - (5) Nagasawa River
  - (6) Nagisamachi Drainage
  - (7) Anada River
  - (8) Ryojima River
  - (9) Aizome River

Fig.2 Land Price Distribution iso-value Map with land-lot readjustment works be undertaken of year 1989, by Author (data source were 長野県, 1989)