

CHAPTER 2

II TENDENCY OF URBANIZATION IN MAEBASHI CITY

1. Land-use changes to urban uses

In order to view a tendency of land-use change in Maebashi city, the mesh method was taken for the years of 1976 and 1989 with Digital Land Information data obtained from the National Land Agency of Japan. The data were compiled from 100 m intervals, giving a total of 18,700 grid points for Maebashi city in each year. There were 1,904 sections that underwent land-use change between those years, which was 10.2% of the total number of sections (Table 1) (Kikuchi and Tsutsumi, J., 1998). The vertical axis of the matrix represents land-use in 1976 and horizontal axis land-use in 1989. The number of grid points indicating land-use change to 'vegetable fields' were 656 (34.5%); 'buildings' were 561 (29.5%); mulberry fields were 227 (11.9%); traffic-use were 79 (0.4%); and 'other uses'¹³ were 222 (11.7%). When using Digital Land Information, the following two matters should be kept in mind: (1) truncation error; and (2) category error (Bito, 1992). Truncation error occurs because only the primary land-use category is recorded for each grid point. Secondary and tertiary categories are not shown in cases of multiple land-use for a single section of land. For example, the major uses for a section of land maybe vegetable, mulberry and paddy field in 1976, but the land-use code only indicates 'vegetable'. After development, the vegetable fields are converted to building use, so that the major uses of this land become mulberry, building (from vegetable field) and paddy field in 1989. But, the land-use code identifies 'mulberry' only. Land-use code information records a change in land-

Table 1. Number of land-use changes measured in 10000 m² lots (100m ×100m square interval) for 1976 to 1989.

| 1976\1989 | vegetable | | fruit | wasteland | | traffic | water area | | Total | | |
|------------|-----------|----------|--------|-----------|------------|---------|------------|----|-------|---|-------|
| | paddy | mulberry | forest | buildings | other uses | | | | | | |
| paddy | | 64 | 21 | 4 | 1 | 11 | 171 | 31 | 88 | 3 | 394 |
| vegetable | 12 | | 185 | 2 | 3 | 1 | 47 | 4 | 18 | 1 | 273 |
| mulberry | 58 | 557 | | 20 | 5 | 19 | 197 | 32 | 92 | 3 | 983 |
| fruit | | 2 | | | | | 2 | 1 | 1 | | 6 |
| forest | 2 | 9 | 8 | | | 5 | 12 | | 18 | | 54 |
| wasteland | | | 1 | | | | | | | | 1 |
| buildings | | 16 | 7 | 1 | | | | 11 | 3 | | 38 |
| traffic | | | | | | | | | | | 0 |
| other uses | 5 | 6 | 4 | 1 | | | 130 | | | | 146 |
| water area | 1 | 2 | 1 | | | 1 | 2 | | 2 | | 9 |
| Total | 78 | 656 | 227 | 28 | 9 | 37 | 561 | 79 | 222 | 7 | 1,904 |

Source: Digital Land Information of Japan.

use from 'vegetable' to 'mulberry'. But, according to the information from the Agricultural Affair Division in Maebashi City Hall, the proportion of mulberry fields to the total rural land has been in decline during the same period. Therefore, 'vegetable to mulberry' changes were excluded from the data because they were not considered as indicative of the changes occurring during this period. Category errors arise because the varied possible urban uses of land were partitioned into only three categories. For example, both low-rise housing and high-rise buildings were placed in the common category of 'building uses'. Thus, land-use change from low-rise housing to high-rise buildings would not appear as any change since both types of land-use were recorded under the same category. Keeping in mind these problems, the following two general patterns of land-use change were identified: (1) general agricultural use (e.g., paddy, mulberry, etc) to vegetable fields; and (2) from various uses to urban use.

The author examined the urbanization of Maebashi city from 1976 to 1989 using the same data set. Figure 3 illustrates the spatial pattern of land-use changes aggregated by the third-order grid on the data set (i.e. one interval equals 1km²). Owing to data constraints, the conversion from rural to urban use¹⁴ was analyzed. Little change was observed in the central area, where by 1980 almost all land was urbanized. A high rate of change was identified in two zones: the inner fringe zone (two to four kilometers from the CBD); and the isolated residential and industrial parks zones (six to seven kilometers from the CBD) (Tsutsumi, 1995).

To supplement the underestimate of urban land-use change, administrative rolls of construction permits, recorded by the Urban Planning Division of Maebashi City Hall for the years from 1991-93, were used for the city centre where by 1980 almost all land was urban (Figure 4). The addresses of new constructions were located on the map

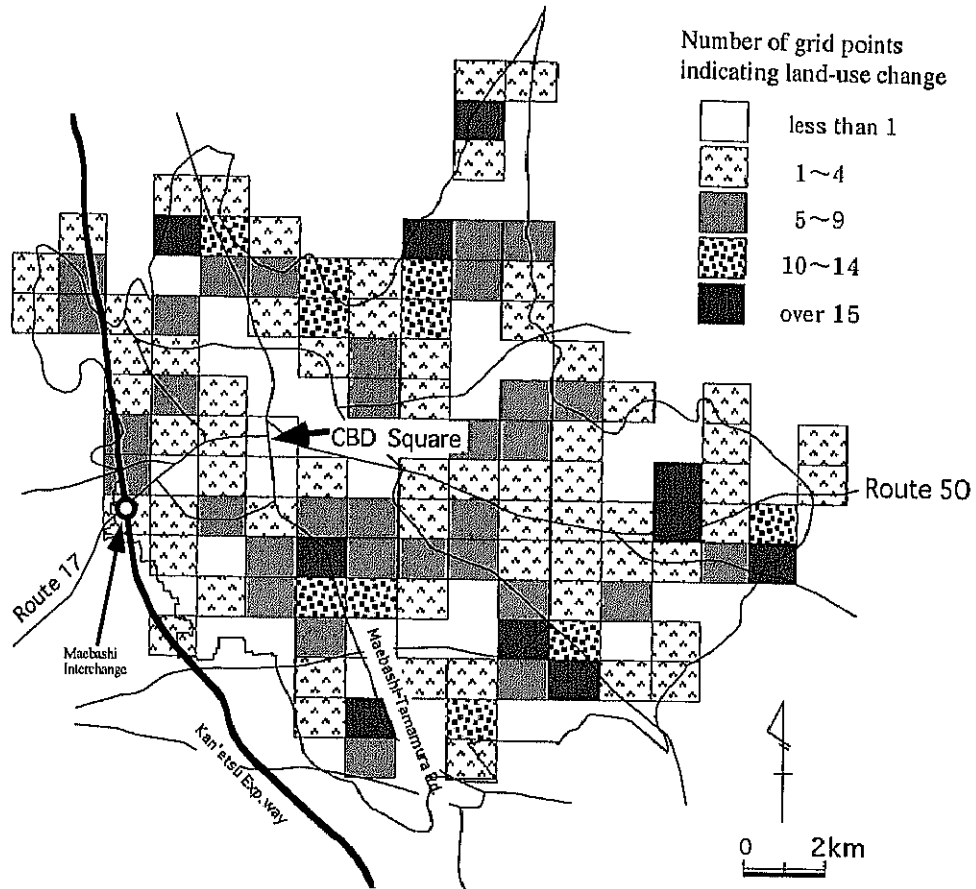


Figure 3. Conversion from rural to urban land-use in Maebashi city for 1976 to 1989.

Rate of land-use change observed for the period of 1976 to 1989, indicating change from a variety of uses to urban use. Each square indicates a 1 km² area, and records the number of grid points indicating land-use change (one square consists of 100 grid points).

The square labeled 'CBD' includes the Gunma Prefectural Government, Maebashi Municipal Office, and the highest priced piece of land.

Source: Digital Land Information of Japan.

Number of new buildings
per 500 meter square

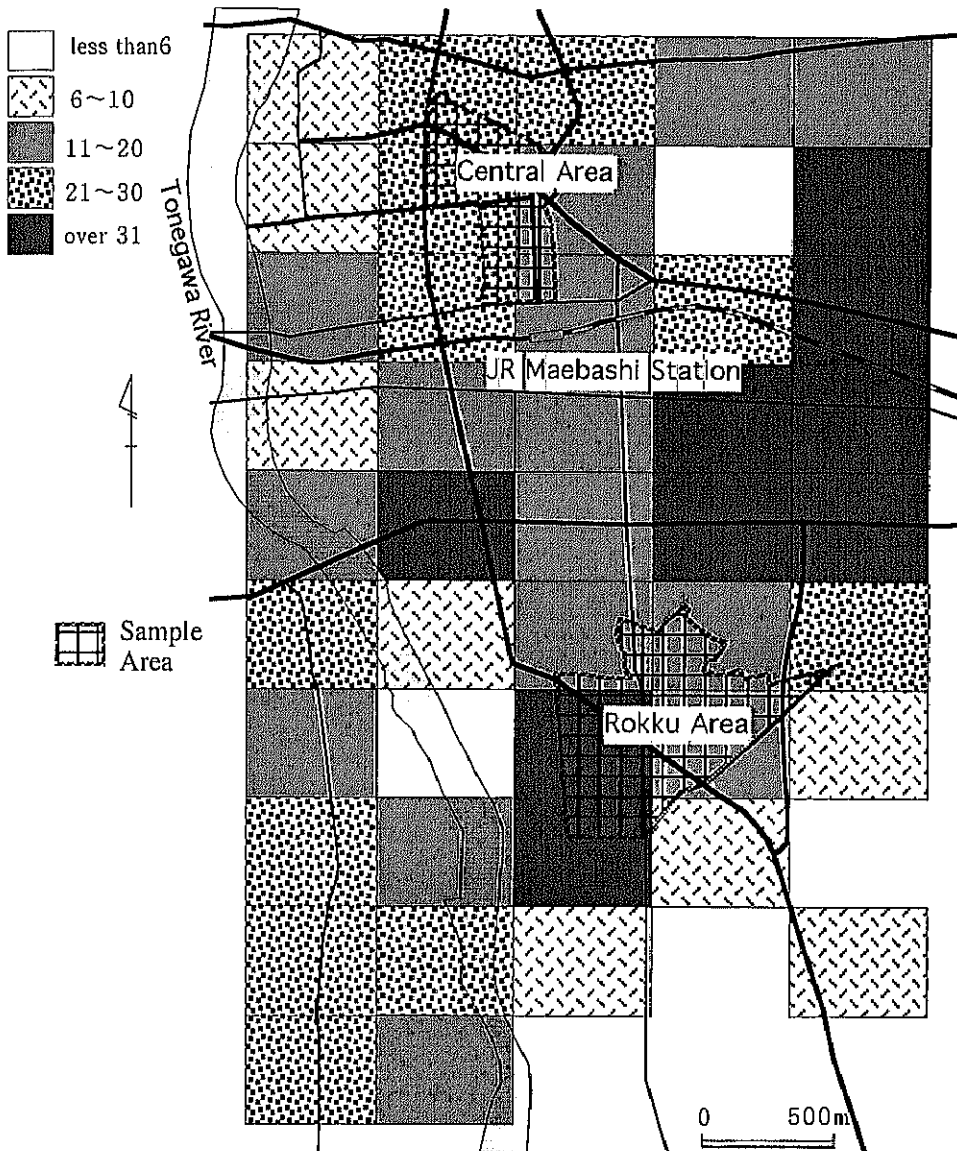


Figure 4. Locational tendency of new buildings in the southern suburb of Maebashi city during 1991 to 1993.

Source: Based on data from the Urban Planning Division of Maebashi City Hall.

using the information recorded on the rolls. The number of new constructions was aggregated over 500 m intervals. The largest number of constructions was identified in two areas: the eastern part of Maebashi station; and the sample area of Rokku. The high rate of change found in the eastern part of Maebashi station, however, was considered to be an exception, limited to that period. Because the settlement procedure (liquidation or compensation) for land re-adjustment had finished by that time, unusually more of the new constructions and transfers centered on that area. New construction of residencies were seen in 850 sites, which accounts for 86% of the total 994 sites; and 'shops' in 129 sites (13 %). The remaining 15 sites had other types of construction. It is notable that only seven grids accounted for almost half of the new constructions of shops: six grids surrounding the city centre; and one grid with an important intersection some distance from the centre. According to Figure 3 and Figure 4, the city centre is characterized as a centre for the construction of new shops and high-rise buildings; and Rokku, situated at the inner fringe, as a newly developed residential area adjacent to the existing built-up area of Maebashi.

2. Agents in the Maebashi urban land market

Most of the urban functions and activities are located in an area ranging from the city centre to the inner fringe. The number of land transfers is therefore very intense in this zone, with land-use change occurring in the proper direction (i.e., from non-urban to urban land-use). In this dissertation, the author uses the phrase 'Decision Agent' to denote decision-makers including landowners, land buyers, and intermediate actors who have a close relationship to the process of land-use change. The decision agent is responsible for an act of subjectivity. When we consider a micro-level analysis of

agents' decision-making processes from a macro-level viewpoint, for example, in the context of several restrictions affecting their behaviour, it is possible to analyze land-use synthetically (Giddens, 1979; Tsutsumi, K. 1995).

It is not unusual for multiple transactions of the same property to occur between different types of intermediate agents before land ends up in the hands of the final consumer, although much simpler sequences exist with land going directly from farmer to developer, or to final purchaser (Bryant *et al.*, 1982). Bryant and Johnston (1992) have stated that an investigation of basic phenomenon in the urban land market facilitates an understanding of impending land-use change or reorganization of urban structure. Indeed changes in land-ownership usually precede land-use change. These indications are reflected in the land-use studies during the last decade in accordance with a widespread availability of GIS (Pond and Yeates, 1993; 1994a; 1994b).

It is useful to categorize the various actors involved according to their position in the land conversion process. Pre-development landowners, intermediate actors and final consumers were identified as the key primary actors (Figure 5), while other actors such as lawyers, planners and politicians, who regulate and/or facilitate land conversion and land-ownership change, were only considered to be indirectly active in the process.

Primary decision agents include farmers, land dealers, developers, builders, office workers, and firms; secondary decision agents, the regulators and facilitators, include financiers, lawyers, realtors and planners. 'Pre-development landowners' control the stock of unbuilt land, including land with development potential. A variety of landowners can be considered as comprising this category, including farmers, and non-farm residents with land of a size beyond that necessary for personal

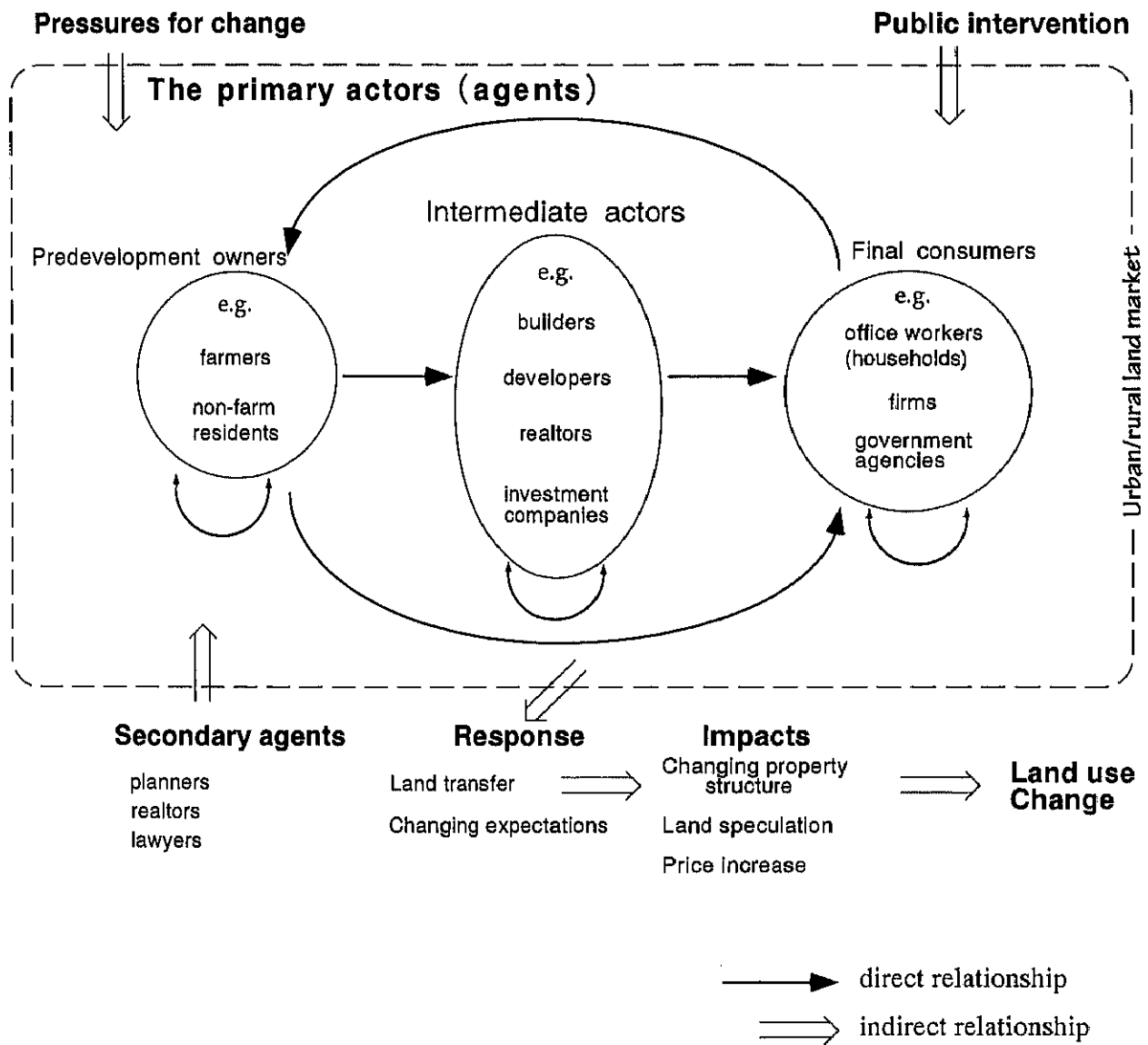


Figure 5. Decision agents in the urban and rural land market.

(Modified from Bryant *et al.* (1982)).

residential purposes. The basic idea behind the category of pre-development landowner is that they have not acquired an interest in the land with a view to development. Pre-development landowners may come under pressure to sell. Where property transfer takes place, one possible type of purchaser is the 'intermediate actor'. Intermediate actors can be seen as fulfilling a role of intermediary between the pre-development landowner and the final purchaser. Intermediate actors include those whose main purpose is to benefit from increments in land value - the 'speculators', investment companies and sometimes financial institutions. The 'final purchaser' also covers a variety of agents, including both private and public actors.

Before the city was developed, farmers bought and sold most of the property exchanged in the rural land market. After that, non-traditional owners have been buying smaller parcels at higher prices than farmers have paid. Many new landowners consider their property to be a consumptive rather than a productive good. Private buyers and sellers are not the only actors in the rural land market.

Since the simple model suggested in Figure 5 is a representative deriving from a variety of examples in the north American cities, it is rather too appropriate for the Japanese cities as it is. In Maebashi city, however, the author can identify almost all the decision agents, eg. farmers, builders, realtors, householders and firms, which are illustrated in Figure 5. Keeping in mind the problem of using this model, the author gropes for a new model which suits Japanese cities through a case study of Maebashi.

Land-transaction is a good predictor of impending land-use change. The number of land-transactions in Maebashi city is illustrated in Figure 6. The number of transactions in the inner fringe during 1980-84 was greater than other zones in Maebashi city. In other words, the land market in the inner fringe zone was more active

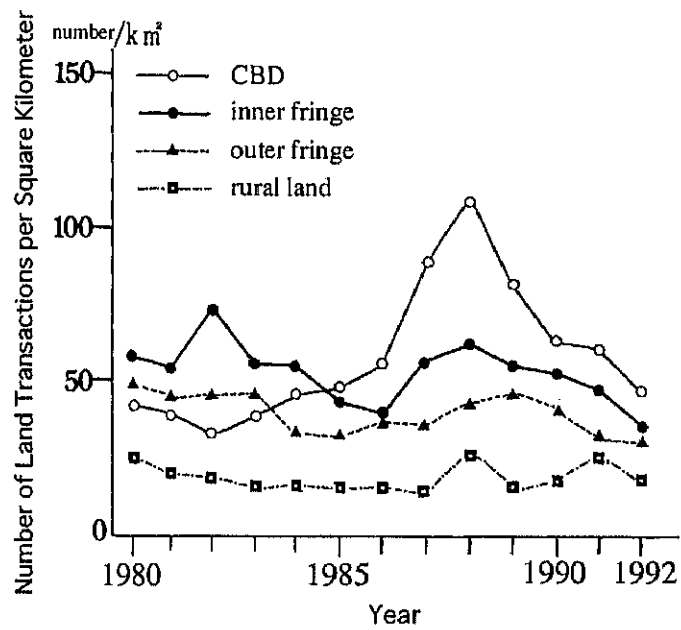


Figure 6. Number of land-transactions in Maebashi city by year for 1980 to 1992.

Sources: Based on data from the Property Tax Division of Maebashi City Hall.

than in the CBD or rural areas. After 1985, the number of transactions in CBD exceeded that of inner fringe. This dramatic change was driven by the *Bubble economy* creating a strong demand in urban land-use (eg. office space), which was concentrated in a very small area. After the *Bubble economy*, the number of transactions in CBD fluctuated. Conversely, the number of the transactions in the inner fringe was generally stable, around the level of 50 transactions per square kilometer. The number of land-transactions for rural land increased temporarily in 1988 and 1991 due to the development of some industrial estates.