

Prerequisites for Maintaining Residential Population in Hilly and Mountainous Areas

Noboru HASHIZUME

1. Objective and Method

In order to revitalize agriculture and communities in hilly and mountainous areas, it is necessary to secure a population of a certain scale in those areas. At the same time, it is necessary to maintain the composition of the population at an appropriate ratio in terms of age so that reproduction of the population will be sustainable. However, there have been very few findings from studies that have analyzed the issue of residential population in the context of regional attributions of rural areas that possess diverse regionality and based on the net population that includes the non-farming population.

In this report, I tried to clarify trends of depopulation in rural areas in recent years, as well as study the prerequisites for maintaining the residential population in hilly and mountainous areas where depopulation and aging have progressed rapidly, by employing discriminant analysis.

2. Outline of the Results

There will be an overview of the shifts in population until 2030 according to the classification of agricultural area, starting at 1975 when the trend of rapid population decline stopped temporarily in rural areas as a result of significant economic growth. The figures after 2005 were established from the predicted population trend revealed by a cohort estimate based on the demographics between 1995 and 2000.

Figure 1 shows a comparison between the population shifts every five years, setting the base figure at 100 for the population by regional classification in 2000. Regional characteristics can clearly be seen here. Urban areas and flat farming areas are the areas where the population has risen consistently. It can be said that the changes in the population of these two areas are responsible for the increase in Japan's total population. However, the population increase of these areas will not last long, with the population of flat farming areas reaching their peak in 2005 and urban areas reaching their peak in 2010; and then declining thereafter.

On the other hand, the population of hilly farming areas and mountainous farming areas are already in a state of decline. It is most evident in mountainous farming areas. While the population index comparing 1975 to 2000 was 123.5 in mountainous farming areas, it is predicted that, in this same area, the index will

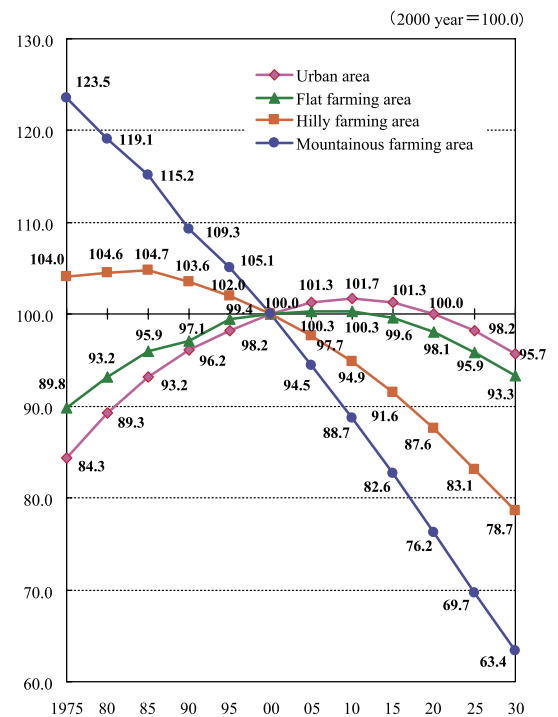


Fig. 1. Fluctuation of Total Population According to Classification of Agricultural Area

Source: Recompilation of the population census (yearly editions)

Note: The figures are indicated based on an index of 100 for the population in 2000. The figures after 2005 are estimates.

fall to 63.4 by 2030. Thus, the area will face a situation in which its population will be halved in just half a century.

The hilly farming areas have been experiencing a population decline since 1985. Until now, the decline was minimal, but it is predicted that depopulation will increase rapidly in the future, with the index plummeting to 78.7 by 2030.

It is thought that the rate of the population decline in the hilly farming areas - in other words, the progression of depopulation - will pick up even more speed in the future, reflecting the demographics of the hilly farming areas. Therefore, it is expected that securing a stable residential population will become even more difficult, not only in mountainous farming areas but also in hilly farming areas.

There is therefore concern that if the trend continues at this rate, the number of municipalities that will face the residential population issue will further increase. Therefore, by employing discriminant analysis, I determined the prerequisites for maintaining a residential population in hilly and mountainous areas (Table 1).

In an analysis involving all hilly and

mountainous areas, it was determined that the “time required for access to the nearest densely inhabited district (DID)” is the greatest influential variable. In hilly and mountainous areas, where employment opportunities are scarce, access to cities, which leads to securing income, is an extremely large factor in maintaining a residential population. In addition, some indicators related to agriculture and forestry that were insignificant in non-hilly and mountainous areas were selected as significant variables. This will likely be noted as a result that objectively shows that the promotion of agriculture and forestry in hilly and mountainous areas will definitely lead to maintaining a residential population.

In addition, according to an analysis limited to mountainous farming areas, a variable indicating the educational environment as well as variables related to forestry that were not selected in other areas, carried more influence than agriculture-related variables. Moreover,

outlying areas (access time of more than one hour to the nearest DID) were the only areas where variables indicating the medical environment had significant influence.

Even within the same hilly and mountainous areas, the requirements for each municipality to maintain a stable residential population differed greatly, depending on the differences in socio-economic conditions. Therefore, it is necessary to promote settlement policies and agriculture and forestry policies appropriate for each area.

3. Related Publications

Hashizume, N. (2005) The Population Issue of Rural Regions in Japan, *Proceedings of the 3rd FANEA international symposium*, PRI-MAFF: 12-25.

Hashizume, N. (2005) *Necessary Conditions for Rural Revitalization in Hilly and Mountainous Areas*, Norin Tokei Kyokai: 40-67.

Table 1. Comparison of the Requirements for Maintaining a Stable Residential Population

	Ranking	Name of variable	Coefficient	F-value	Precision of Analysis
Regions other than hilly or mountainous farming area	1	1) Per capita taxable income	0.0087	132.69	n=802 Discriminant precision 90.9%
	2	9) Ratio of tertiary industry workers	0.1056	35.51	
	3	8) Number of employees per business	0.4550	24.71	
	4	16) Number of event participants per 1,000 people	-0.0001	18.20	Correlation ratio 0.639
	5	2) Per capita savings	-0.0003	10.86	
	6	11) Ratio of rural communities with sewage infrastructure	-0.0136	6.24	
Hilly and mountainous areas	1	10) Access time to the nearest DID	-1.3215	67.13	n=682 Discriminant precision 94.4%
	2	1) Per capita taxable income	0.0074	62.36	
	3	9) Ratio of tertiary industry workers	0.1334	50.76	
	4	2) Per capita savings	-0.0015	48.30	
	5	7) Per capita value of manufactured goods shipment	0.0004	15.20	
	6	12) Ratio of rural communities where it is difficult to commute to high school	-0.0179	13.97	Correlation ratio 0.680
	7	14) Index of fiscal strength	3.2482	10.50	
	8	4) Agricultural income per farm household	0.0014	10.25	
	9	15) Ratio of rural communities with exchange projects implemented	-0.0412	6.15	
	10	3) Ratio of upper-class farmers	0.0769	4.98	
Mountainous farming area	1	12) Ratio of rural communities where it is difficult to commute to high school	-0.0289	29.86	n=330 Discriminant precision 90.0%
	2	2) Per capita savings	-0.0014	25.71	
	3	10) Access time it takes to the nearest DID	-0.9566	24.44	
	4	1) Per capita taxable income	0.0053	19.95	
	5	9) Ratio of tertiary industry workers	0.0750	11.85	
	6	7) Per capita value of manufactured goods shipment	0.0003	11.12	Correlation ratio 0.587
	7	6) Ratio of deforestation areas of planted forests	0.0288	7.75	
	8	8) Number of employees per business	-0.4614	7.37	
	9	14) Index of fiscal strength	4.2050	6.85	
	10	4) Agricultural income per farm household	0.0019	5.94	
Access time of more than one hour to the nearest DID (outlying areas)	1	14) Index of fiscal strength	26.3779	22.20	n=144
	2	13) Number of doctors per 1,000 people	3.0026	20.96	Discriminant precision
	3	3) Ratio of upper-class farmers	0.2059	6.42	95.8%
	4	9) Ratio of tertiary industry workers	0.1448	5.67	Correlation ratio
	5	8) Number of employees per business	1.1453	4.95	0.565

Note: The table shows the analyses results of each area. Only the variables above the 5% level are shown.