

A Study on Migrants' Preference and Satisfaction with Living Environment in Itoshima City

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1 Introduction

1.1 Background

After the peak in 2008, Japan entered a period of population decline. And the uneven distribution of population has accelerated. Calculated by population density, the problem of regional imbalance is becoming increasingly severe. If no measures were taken, these problems will eventually lead to the disappearance of local governments, which place a considerable threat to the development of society.

The "Grand Design of National Spatial Development towards 2050" announced by the Japanese government in 2014, proposed the "Creating urban-rural demographic flows"¹⁾ strategy and implemented several policies with the cooperation of local governments. The most important process to realize this goal is to strengthen the information exchange and provision system for potential migrants and relevant local organizations. As the result, since 2015, the number of consultations of migration has increased year by year nationwide. It can be seen that people's awareness and interest in migration are increasing remarkably.

Itoshima City of Fukuoka, as one of the examples which Ministry of Internal Affairs and Communications actively takes advantage of ICT to propel the growth of settled population in local regions in 2017²⁾, has addressed concerns these years. As a matter of fact, the annual transfer population of Itoshima City recorded in basic resident register exceeded 4,000 for the first time in 2016, and has increased continuously since then.

1.2 Purpose

This paper is intended to clarify the migrants' preference of residence and examine migrants' satisfaction with the living environment in Itoshima City.

1.3 Methodology

1.3.1 Research Methods

First, the overall characteristics of 95 migrant households were examined through the comparative analysis using consultation records of those who moved into Itoshima City and not.

Second, the living environment of migrants was quantitatively analyzed using 8 aspects related to living environment derived from consultation records, and corresponding indicators were selected from literature, and a hearing from the Itoshima Government.

Next, migrants' preference of residence was explained by calculating the correlation between migrants' distribution and quantified living environment via Pearson's correlation coefficient.

Moreover, a questionnaire survey was conducted to study the satisfaction with 8 aspects of the living environment. Finally, the differences in satisfaction among primary school districts were analyzed based on correlation analysis (Fig. 1).

1.3.2 Study Area

There are 16 primary schools in Itoshima City, and the catchment area of each school is defined as a primary school district (Fig. 2). It can observe by the land-use information of the whole city and specific statistics of primary school districts, that areas rich with the natural environment and highly convenient areas are mixed in Itoshima City. This suggests that there are significant differences in the living environment among school districts (Fig. 3, Table 1). The population is unequally distributed related to the proportion of built-up land. Depending on the availability of data and the principle of reflecting the environmental differences, this study utilizes the primary school district as unit for research.

2 Characteristics of Migrants

From 2017 to 2020, a total of 442 people went to the Itoshima Government for migration consultation. Among them, 95 eventually moved to Itoshima City with their families to start new life. The contents of the consultation

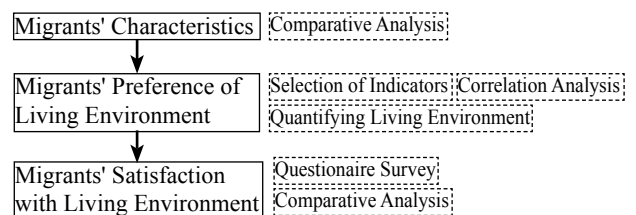


Fig 1. Research Flow

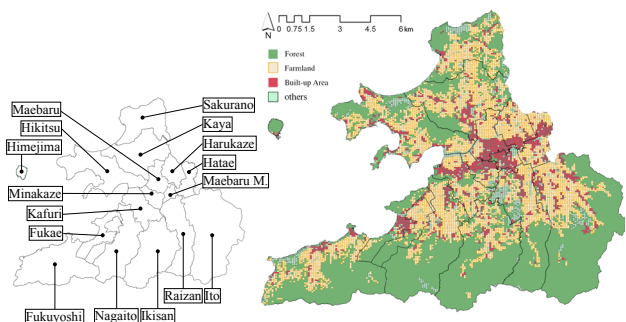


Fig 2. Primary School District

Fig 3. Landuse of Itoshima City

Table 1. Landuse of each Primary School District (Area:km², Proportion:%)

Primary School District	Pop-ulation	Farmland		Forest		BUILT-up Land		Others	
		Area	Proportion	Area	Proportion	Area	Proportion	Area	Proportion
Maebaru	11,841	2.24	48.45	0.07	1.55	1.88	40.70	0.43	9.30
Hatae	12,369	2.29	59.23	0	0	1.59	32.29	0.41	8.49
Maebaru M.	10,356	0.35	18.14	0.09	4.64	1.17	59.92	0.33	17.30
Kafuri	7,333	3.26	46.93	1.53	22.00	1.32	19.07	0.83	12.00
Fukuyoshi	3,969	6.44	25.82	15.43	61.87	0.97	3.92	2.09	8.39
Kaya	8,975	8.78	48.32	6.36	35.02	2.06	11.35	0.96	5.32
Fukae	5,204	1.37	23.70	2.81	48.44	0.93	16.15	0.68	11.70
Ikkisan	3,434	1.88	27.09	4.49	64.53	0.35	5.11	0.22	3.28
Harukaze	8,977	3.16	63.01	0.13	2.60	1.35	26.95	0.37	7.43
Ito	7,102	8.87	23.79	24.89	66.73	2.42	6.51	1.10	2.97
Minakaze	8,765	1.22	38.50	0.38	11.91	1.12	35.18	0.45	14.4
Raizan	3,790	5.26	30.27	9.07	52.17	1.29	7.47	1.75	10.09
Sakurano	2,438	5.68	38.02	6.56	43.87	0.69	4.62	2.01	13.49
Hikitsu	5,152	7.22	35.40	8.02	39.30	1.81	8.87	3.35	16.43
Nagaito	1,960	4.66	22.10	15.15	71.77	0.78	3.70	0.83	2.44
Himejima	286	0.01	0.96	0.11	61.54	0.01	5.77	0.05	31.37
All	101,951	63.32	28.4	95.09	43.97	19.74	9.10	37.85	17.52

records provided by the Itoshima Government include the age, gender, family structure, occupation, current residence, type of migration (I- turn, U-turn and J-turn), ideal housing (purchase or rent), and the aspects valued in the selection of residence. The records of 95 consultants who have finished migration are extracted from all 442 records, separated as migrated group and unmigrated group, and the common characteristics of migrated group are able to be generalized. In the all contents, the following four items show obvious differences between two groups in the percentage of their answers (Fig. 4) .

First, the proportion of male in migrated group is high, and female has a higher proportion in unmigrated group. It can be inferred that the motivation for migration among men are higher than women. In the term of age, the proportion of 50s and 60s in migrated group is higher than that in unmigrated group. The migration rate of these generations is higher than that of 30s and 40s. It can be seen that young generations' attitude towards migration is relatively conservative. As for family structure, although the proportion of nuclear families are high in both groups, the migration rate of couple family and single are slightly higher. It roughly reflects that the simple family structure leads to higher possibility of migration. When it comes to occupation, the proportion of employed people are higher in unmigrated group than that in migrated group. On the contrary, the percentage of unemployed and part-time in migrated group is higher than that in unmigrated group. This result indicates that stable career may have negative effects on decision of migration.

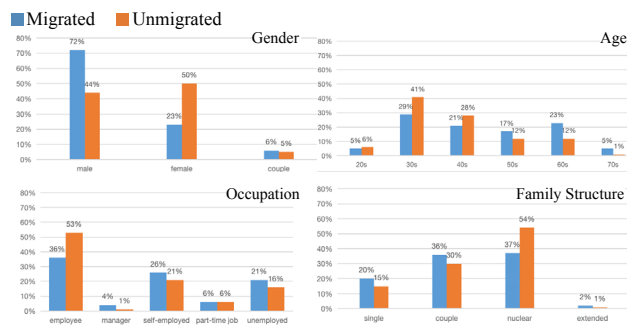


Fig 4. Answers in Consultation Records

Table 3. Indicators of each Primary School District

Primary School District	Natural Land Proportion:%					Mountain: 0/1	Density of Medical Facility: amount/km ²	Density of Purchase Facility: amount/km ²	Density of Bus Stop: amount/km ²	Average Shortest Distance to the Nearest Station:km	Road Density: km/km ²	Students of Primary School	Density of Park: amount/km ²	Average Price of Residential Land: 10000nyen	Total Area of Residential Land:m ²
	Farmland	Forest	River	Seaside	Sea										
Maebaru	48.45	1.55	5.62	0	0	0	18.09	8.51	11.70	1.12	16.29	660	14.89	6.72	1348,859
Hatae	59.23	0	3.87	0	0	0	5.03	6.29	5.03	1.47	18.59	737	15.72	6.94	941,643
Maebaru M.	18.14	4.64	2.53	0	0	0	5.98	5.13	5.98	1.29	19.66	583	15.38	6.36	1750,877
Kafuri	46.93	22.00	6.40	0	0	0	5.30	7.58	7.58	1.29	14.18	340	21.97	3.51	1269,600
Fukuyoshi	25.82	61.87	0.16	0.56	3.76	1	2.06	2.06	0	1.06	8.30	218	10.31	1.43	458,535
Kaya	48.32	35.02	1.30	0.43	0.54	1	4.37	0.97	11.65	4.90	8.89	501	15.05	3.82	1608,881
Fukae	23.70	48.44	2.07	0.59	6.67	1	7.53	2.15	0	1.01	10.76	261	18.28	1.40	830,568
Ikisan	27.09	64.53	0.52	0	0	1	2.86	8.57	0	1.99	21.27	139	37.14	1.33	438,446
Harukaze	63.01	2.60	4.83	0	0	0	6.67	2.96	10.37	1.42	14.50	600	17.04	6.79	851,412
Ito	23.79	66.73	1.12	0	0	1	1.24	0.83	11.57	5.40	7.26	334	7.44	1.39	0
Minakaze	38.50	11.91	6.37	0	0	0	6.25	6.25	11.61	1.24	18.41	632	14.29	6.25	970,379
Raizan	30.27	52.17	2.56	0	0	1	2.33	2.33	13.95	4.31	7.49	239	9.30	0.50	200086
Sakurano	38.02	43.87	1.22	0.51	4.75	1	1.45	1.45	11.59	9.99	8.71	117	2.90	0.80	172,869
Hikitsu	35.40	39.30	1.97	0.70	8.22	1	2.76	3.31	11.05	8.09	8.78	247	2.76	1.42	1,552
Nagaito	22.10	71.77	0.91	0	0	1	0.00	2.56	8.97	5.41	7.72	91	8.97	1.80	0

3 Quantifying Living Environment

3.1 Aspects Identified the Living Environment

According to the migration consultation records, to obtain the environmental priorities when choosing a residence, the Itoshima Government offered several alternatives to choose during the consultation, such as: nature, parenting, education, transportation, convenience, cost of housing, internet, and infrastructure. Most possible migrants selected nature. The internet and infrastructure were the least concerned. This study quantifies the abstract concept of "living environment" from these aspects, so as to establish the basis for the next process of correlation analysis.

3.2 Indicator Selection and Data Source

To quantify the living environment of migrants, the first step is selecting the corresponding specific indicators, that meet following three requirements:

- (1) being valued by migrants;
- (2) possible to collect data and calculate;
- (3) could demonstrate regional differences.

After hearing from the Itoshima Government, it turns out that there is no regional differences of internet and infrastructure in Itoshima City, so indicators are found from the rest 6 aspects (Table 2,3).

Table 2. Indicators of each Aspect and Data source

Aspect	Index	Reference	Data Source
Nature	existence of mountain	Residential environment : methods and theory for the evaluation ³⁾	Google Map
	proportion of sea		Digital National Land Information
	proportion of seaside		
	proportion of river		
	proportion of forest		
	proportion of farmland	hearing from the Itoshima Government	
Convenience	density of medical facility	Sustainability of Residential Estates based on Living Convenience ⁴⁾	i-town Page
	density of purchase facility		Digital National Land Information
Transportation	density of bus stop	Residential environment : methods and theory for the evaluation	
	average shortest distance to the nearest station		
Parenting & education	road density	hearing from the Itoshima Government	WHITE PAPER Information of Intoshima City
	density of park		
Cost of Housing	students of primary school	Researching Factors of the Younger Generation's Dwelling-Place Selection ⁵⁾	Digital National Land Information
	total area of residential land		Public Announcement of Land Price
	average price of residential land		

4 Migrants' Preference of Residence

4.1 Migrants' Distribution

95 households of migrants are distributed as Fig. 5.

4.2 Correlation Analysis

By analyzing the mathematical relationship between numbers utilizing Pearson's correlation coefficient, this paper discusses the correlation between the distribution of migrants and their living environment.

According to the rule of Pearson's correlation, the R reflects the correlation between two variables. It is generally acknowledged that when $|R| \geq 0.8$, the two variables are highly correlated; when $0.5 \leq |R| < 0.8$, the two variables are moderately correlated; when $0.3 \leq |R| < 0.5$, the two variables are weakly correlated; when $|R| < 0.3$, the two variables are basically uncorrelated.

As the result shown in Table 4, [proportion of farmland], [density of medical facility] etc. are positively correlated with migrants' distribution, while [proportion of forest], [existence of mountain], [average shortest distance to the nearest station] and [density of bus stop] are negatively correlated with that. It can be inferred that the area attracting more migrants has more farmland, fewer forests and mountains, intensive medical and purchase facilities, higher road density, larger scale of primary school, more parks, more valuable residential land, closer to the JR station and fewer bus stops. These common features of living environment can be described as migrants' preference of choosing residence to some degree.

5 Satisfaction with the Living Environment

From December 9th 2020 to December 28th 2020, the Government of Itoshima City and Sakai lab. conducted a survey on satisfaction among migrants. The questionnaire was sent to 91 households by post, and 47 responses were received with a response rate of 51.6% (Table 5).

The questionnaire investigates the satisfaction with 1) transportation, 2) parenting, 3) education, 4) convenience, 5) food, 6) cost of housing, 7) medical treatment, 8) nature and 9) comprehensive evaluation. The evaluation

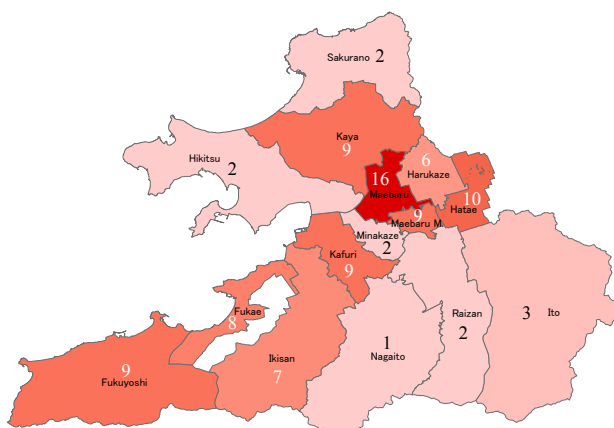


Fig 5. Distribution of Migrants

Table 4. Correlation Calculation Results

Indicator	Land Proportion					Mountain	Density of Medical Facility	Density of Purchase Facility	Density of Bus Stop	Average Shortest Distance to the Nearest Station	Road Density	Students of Primary School	Density of Park	Average Price of Residential Land	Total Area of Residential Land
	Farmland	Forest	River	Seaside	Sea										
R	0.34	-0.50	0.29	-0.10	-0.20	-0.46	0.75	0.50	-0.35	-0.63	0.45	0.53	0.44	0.52	0.72

of dissatisfaction, slight dissatisfaction, indifference, slight satisfaction and satisfaction was expressed by five points method.

5.1 General Analysis

Fig. 6 reveals the satisfaction of all respondents with each aspect, which can demonstrate the general situation of Itoshima City. It can be seen that respondents' satisfaction with nature and food is very high since more than two-third gave 5 points respectively. Satisfaction with transportation is relatively lower with nearly one-third of respondents evaluating 1 point and 5 points being valued by the least. The distribution of satisfaction points of education and parenting is similar where respondents valued 3 points take up the highest percentage. It might be explained that some respondents do not concern about education and parenting environment owing to family structure. The number of respondents pointed 4 on medical treatment and convenience is the most, while more pointed 1 on convenience and more pointed 5 on medical treatment comparatively. One third of respondents marked 4 and 5 on cost of housing likely, accounting for the highest proportion. 4 is pointed by most of respondents for comprehensive satisfaction, closely followed by 5.

5.2 Differences among Districts

It is possible to discover the differences among primary school districts by calculating the average point of

Table 5. Information of Respondents

Gender	Male	43	Duration	<1year	8
	Female	4		1-2years	17
Age	20s	1	2-3years	17	
	30s	13	3-4years	4	
	40s	20	4-5years	1	
	50s	3	Family Structure	Single	8
	60s	6		Couple	12
70s	4	Nuclear		25	
Others	2	Others		2	
Occupation	Civil Servant	3	Housing	House Purchased	25
	Employee	19		Apartment Purchased	3
	Self-Employed	14		House Rent	5
	Part-time	5		Apartment Rent	13
	Un-employed	4		Others	1
	Others	2			

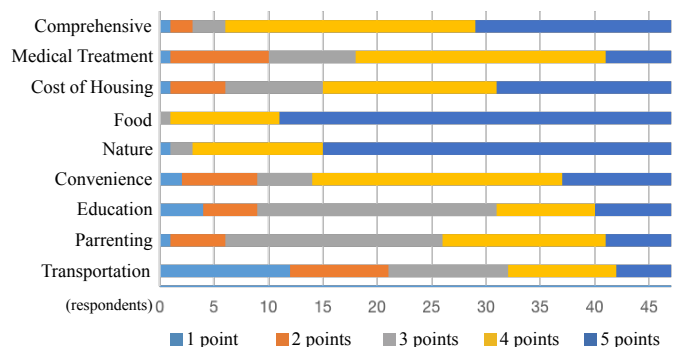


Fig 6. Distribution of Satisfaction Points

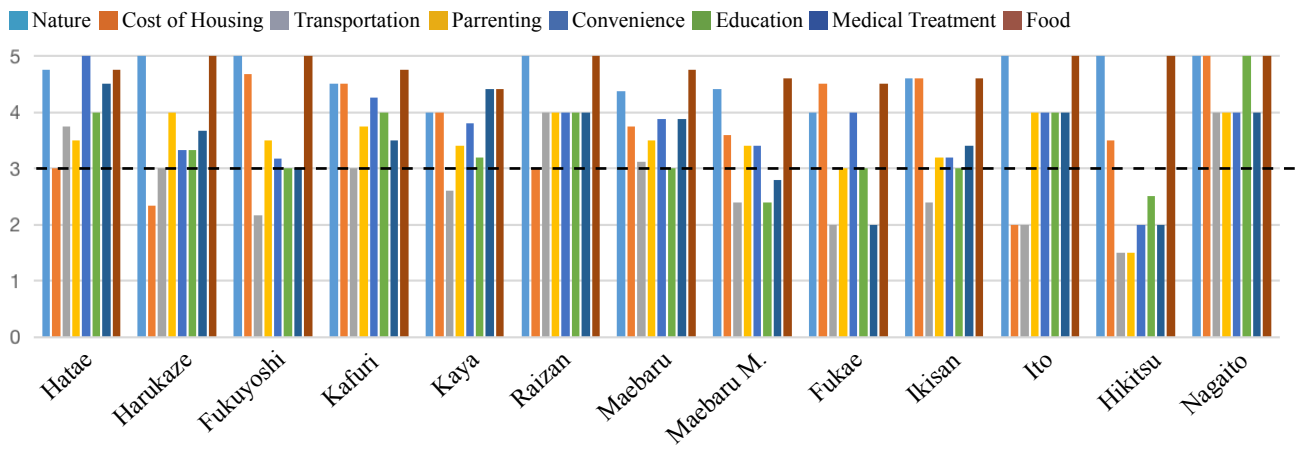


Fig 7. Average Point of Satisfaction with each Aspect in 13 Primary School Districts

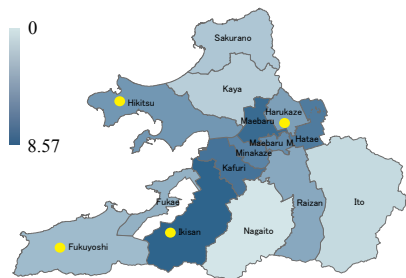


Fig 8. Density of Purchase Facility(amount/km²)



Fig 9. Density of Medical Facility(amount/km²)



Fig 10. Average Distance to Nearest Station(km)

satisfaction for each aspect of the living environment (Fig. 7). To improve the satisfaction of the migrants, 3 points can be seen as the threshold to focus on the aspects with low satisfaction. First, it can be seen that respondents in Hatae and Nagaito are satisfied with almost all aspects. With regard to parenting and education, points of Maebaru M. and Hikitsu are lower respectively. As mentioned before, although all respondents share low satisfaction points with transportation, the average point of Fukae, Ito and Hikitsu is under 2. Respondents in Harukaze and Ito are less satisfied with cost of housing than other districts. As for medical treatment, Maebaru M. , Fukae and Hikitsu received points less than 3. For convenience, Hatae ranked the first with nearly 5 while Hikitsu ranked the last.

5.3 Discussion with Correlated Indicators

The indicators correlated with migrants' distribution are used to explore possible reasons for unsatisfaction. Considering the strength of correlation, density of medical facility and purchase facility, average shortest distance to the nearest station are selected for comparative analysis among districts (Fig 8-10).

Respondents in Fukuyoshi, Iksan, Harukaze and Hikitsu are not satisfied with convenience while density of purchase facility in Iksan is higher than others, it may be reasoned that the quality, diversity or scale of facilities in Iksan might need more concerns. In Nagaito, Raizan and Ito migrants are relatively satisfied with medical treatment while density of medical facility in these 3 districts are lower than others, it may be reasoned that migrants are not that restricted with existence of hospitals nearby since many facilities are equipped with bus. Respondents in Fukuyoshi and Fukae are not satisfied with transportation while average shortest distance to the nearest JR station in these 2 districts are shorter than

others, it may be reasoned that the frequency of JR Chikuhi passing by is less than others and the condition of station is poor where there is no waiting room.

6 Conclusion

- (1)After consultation, prospective migrants who decided to move into Itoshima City share these four common characteristics: male, 50s and 60s, with simpler family structure and more flexible occupation.
- (2)Migrants prefer areas equipped with intense medical and purchase facilities, better access to JR station, larger primary school and more valuable residential land when choosing residence by correlation analysis.
- (3)Now, all migrants are satisfied with nature and food while less satisfied with transportation of Itoshima City. Via combination with correlated indicators, scale, diversity and quality of purchase facilities may affect the satisfaction rather than density especially in Iksan. Condition of station is likely to result in unsatisfaction with transportation especially in Fukae and Fukuyoshi.

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