Regional Seminar in Ureshino/Saga
June 2015

Academic Papers & Study Reports

Working Committee
EAROPH 2015 Regional Seminar

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FOREWORD

The EAROPH 2015 Regional Seminar was performed at Ureshino, Saga-prefecture in Japan from June 1st to 3rd 2015.

Ureshino City is located on Kyushu Island, Western Japan, and very famous for its excellent hot springs. City itself is not so big with the population of 27 thousand. But the location is just between Fukuoka-City and Nagasaki-City and developed as a lodging and hot spring town.
The regional seminar this time was designed for the main theme “Activation of Cities based on the Local Resources" and sub-themes as follows.

1) Human Settlement: Ecology and Environment

2) Health and Tourism

3) Infra-structure and Urban Development

Activation of local cities and towns is a keen topic in Japan because Japan is facing the population decrease especially in local areas. For that purpose , it is necessary to develop local resources such as historical heritage or local food and drinks.
There were 26 applications for the paper presentation and 5 were canceled later. Screening committee was established by 7 members and requested to each applicant to brush up the paper and could have received very good responses.
This proceeding of the papers consists of 2 parts. The first part is for those prepared in a style of academic papers that presented useful conclusions to be shared with readers. The second part is for those prepared in a style of research reports on some specific subject. Screening committee is very glad that there were so many applicants of foreign students studying in Japan. The committee thanks a lot for the all of the distinguished speakers and delegates and hopes that this regional seminar could have contributed for the betterment of the Asian communities.
Thank you.

EAROPH: Eastern Regional Organization for Planning and Human Settlements

1. Livability Planning in Gated Community Residential Scheme: Malaysian Socio-Religious Approach

適正なゲート・コミュニテイ計画

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Abstract: "Livability" is a broad term with no precise or universally agreed-upon definition. The concept embraces the "character" and states of place arrangement considering broad human needs and wellbeing material and non-material. Out of these broad human needs and wellbeing, this paper focuses on shelter, known as housing or residential in a planning term where gated community (GC) residential scheme is a concern. The discussion revolves around GC guidelines in Malaysia and other related laws and regulations. It studies the fourteen physical guidelines embodied in GP022 Gated Community and Guarded Neighbourhood, Using content analysis, the study found that elements of livability planning have been embedded in GC spatiality. On social dimension, Strata Management Act 2013 helps to facilitate the management and maintenance of GC residential scheme effectively. However, GC has still been labelled as social exclusion and homogeneity and crime fear. For such critic, the paper proposes a spiritual content embodied in religion that everybody must possess to ensure we are becoming beneficial not only to our self but to the society also. By this religious virtue, it could bring down the social problems in community that sometimes failed to be addressed through spatial planning.

1. Gated community in the context of housing development in Malaysia

Housing development in Malaysia has evolved from traditional village house to simple semi-permanent housing in 1950s and 1960s in the agrarian economy era. A formal housing began to emerge when the Government undertook planned housing estate intended to cater employed public servant (David, 2013,p.117). Ministry to oversee housing matters was established in 1964 followed by Housing Developers (Control and Licensing) Act in 1966. The housing industry is developing until now and became a phenomenon that requires government intervention especially on the issue of house price and affordability. With regard to gated community residential scheme, it emerged in 1980s rising from the safety and security reason. Other factors contribute to the advent of this residential scheme are prestige and status, privacy, lifestyle, facilities provided, sense of community and supply and demand. This kind of residential scheme are known as gated community (GC) or guarded neighbourhood (GN) mainly depending on the legal title at the point of its planning submission. GC is submitted under strata title while GN is submitted under individual title but later evolved like GC in term of its safety and security measure that is guarding.

No	States	Number of GC		Total	Number of GN		Total
		Highrise	Landed		With LPA approval	Without LPA approval	
1	Johore	16	-	16	100	8	108
2	Kedah	3	-	3	27	-	27
3	Kelantan	-	8	8	-	-	-
4	Melaka	2	2	4	3	-	3
5	N.Sembilan	4	-	4	3	-	3
6	Pahang	2	8	10	1	5	6
7	Perak	6	16	22	25	-	25
8	Perlis	-	-	-	-	-	-
9	Penang	32	-	32	6	-	6
10	Selangor	46	-	46	179	228	407
11	Terengganu	3	8	11	-	-	-
12	K.Lumpur	313	46	359	41	10	51
TOTAL		427	88	515	385	251	636

Table 1: Data on GC and GN in Peninsular Malaysia
(Source: States' JPBD and LPA as of February 2011)

2. Laws and guidelines governing gated community development in Malaysia

Housing industry including gated community is complex. It relates to homeownership, affordability, financing, design and layout, delivery system, technology, policies as well as social dimension of community cohesion, livability and quality of life. Its complexity is reflected in variety of laws governing housing industry notably (1) Housing Development (Control and Licensing) Act 1966, (2) Town and Country Planning Act 1976, (3) Street, Drainage and Building Act 1974, (4) Uniform Building By-Laws 1984, (5) Strata Management Act 2013, (6) National Land Code 1965, (7) Strata Titles Act 1985, (8) Environmental Quality Act 1974. The first four laws are under the Ministry of Urban Wellbeing, Housing and Local Government whereby the last four laws are under the Ministry of Natural Resources and Environment, Malaysia (Salleh, 2013). These laws are supplemented by other subsidiary laws, rules and guidelines including National Urbanization Policy, National Social Policy, National Physical Plan and many more.

Out of matters related to housing aforesaid mentioned, this paper is addressing livability planning of gated community through its guideline named GP022 Gated Community and Guarded Neighbourhood issued by the Federal Town and Country Planning, Ministry of Housing and Local Government, Malaysia (renamed Ministry of Urban Wellbeing, Housing and Local Government in 2013).

3. Livability planning in gated community in Malaysia

Literature shows that livability is a broad term encompassing a number of characteristics (Saeid et.al.,2015,p.264), a difficult concept to define and measure (Carlos,2004,p.101), it means something different to different people (Adam,2012,p.1), abstract concept in urban planning (Alireza and Azadeh,2012,p.1063), and requiring a locally-focused approach rather than having a 'one-size fits all' arrangement (Philips,2010,p.5). Studying several definitions given, the authors attemptedan overarching interpretation of livability as a situation that is able to fulfill specified level of material and non-material human needs and wellbeing. This situation might varies according to different scale of planning, culture, climate and etc. to the extent people in Atlantic Station commented that livability is walkability (Katherine,2009).

With regard to livability planning in gated community in Malaysia, GP022 defines gated community asresidential scheme enclosed with walls and fences surrounding the entire residential with restricted access and equipped with common property facilities. It lays down fourteen physical guidelines to gated community development in Malaysia in which the livability aspect will be seen through;

3.1 Development size

Allowable development size is 1 hectare to 10 hectares or 200 to 500 units of house for each scheme. If it is more than 10 hectares, it must be divided into several schemes. The justifications are easy management, apt for facilities and convenient access.

3.2 Site planning

Definitely it must be environmentally friendly and its spatial planning must encourage healthy interaction among residents inside and outside GC community.

3.3 Location of development

In line with its main reason of safety and security, GC is only recommended in areas with high crime rate according to Malaysia Royal Police. Its approval also is subject to having good accessibility and road networking with the existing development.

3.4Road system and its hierarchy

At least 2 access roads in case of emergency, separate lanes for residents and visitors in order to recognize them, minimum width of main entrance road is 20 meter while minimum width of internal road is 12m specifying 7m for two ways vehicular movement, 2.5m for 2 ways pedestrian walkway and 2.5m for utility and drainage. Road hierarchy must abide planning standards of collector and local road.

3.5 Housing design and building setback

Not only highrise building, landed property like bungalow, semi-D, cluster and terrace

housing type is also eligible for strata title for the purpose of mixed development in GC residential scheme. The building setback must comply with Uniform Building by-Laws.

3.6 Construction of wall/fence

The construction of this salient feature of GC must be in harmony with the environment and cannot obstruct the through road. Maximum height of the fence is 2.75meter with 50% permeability. Permanent structure of private fence for each land parcel i.e. double gated is prohibited. Other than safety reason and mark of boundary, the design of the fence must not create sense of separation between gated and non-gated community.

3.7 Access

Safety measures like road hump, boom gate and CCTV are permissible to be located at the access road.

3.8 Guard post

Guard post can be constructed not exceeding 1.8m x 2.4m. Its setback from public road must not less than 6m. Any structure erection on reserve road must get approval of Temporary Occupational License (TOL) from Land Office and Local Planning Authority.

3.9 Landscape and tree planting

Elements of safety and permeability are vital in landscaping and tree planting. For that purpose, reference to National Landscape Guideline must be made.

3.10 Building height

Allowable building height for bungalow, semi-D, cluster, terrace is 18.5m otherwise it will be subjected to the conditions of highrise building type specified in UBBL 1984.

3.11Parking lot

Number of parking lots are calculated and provided based on the following formula;

3 parking lots plus 10% for visitors for each bungalow or semi-D or cluster house

2 parking lots plus 10% for visitors for each terrace houses

1 parking lot plus 10% for visitors for each low cost house

3.12Utilities

Referring to 3.4 i.e. road system and hierarchy, 2.5 meter width of utility passage is provided along the road for electricity, gas, water, telephone and sewerage.

3.13 Provision of social facilities

Low hierarchy of social facilities like children playground, gym, community hall, swimming pool may be provided in GC. Mosque, field, school and other big scale social facilities stated in public facilities guidelines must be shared with non-GC community.

3.14Naming the neighbourhood

To preserve local identity, culture and image, name of GC must be done accordingly.

Assessing the above fourteen physical aspects of GC in Malaysia, the authors opined that the livability element has already been embedded in the planning of GC. In addition, the Strata Management Act 2013 specified clearly rights and obligations of developer, joint management body, Management Corporation and residents ensuring management and maintenance of their living place are at acceptable level so that residents can live harmoniously. Sharing big scale of social facilities like school, mosque, field etc with non-GC is an effort to address social exclusion of GC as claimed. The design of the houses for GC and non-GC is almost same. The differences lies on fences surrounded the residential scheme and the gate, restricted and control access, safety measures, facilities and amenities, autonomous management and strata homeownership title. Below are examples of GC development in Malaysia.

GC Development	Type of houses	Facilities provided
Valencia Damansara	Bungalow Garden terrace Semi-detached Maisonette Link bungalow	Personalised smart tag, perimeter fencing with 24-hour hour patrolling guards and CCTV, 9-hole-residents-only golf course, community club, 50m olympic size swimming pool, children wading pool, outdoor and indoor spa, restaurant, gymnasium, tennis court, games room and reading room.
Sierramas Sungai Buluh	Bungalow	24-hours security, club house, swimming pool, nursery, playground, multipurpose hall, gymnasium, pedestrian walkway and jogging track.
Signal Hill Park	Semi-detached Link bungalow	24-hours security, high perimeter fence, private landscape and park complete with a garden footpath and benches.

Source: Azlinor, 2006, p.102.

Hitherto, GC has received good comments in term of higher density, maintenance of amenities, provision of community facilities, increased vehicle and pedestrian safety and sense of community. However, it is also not free from critics such as exclusion and homogeneity, reduction in street connectivity, crime and fear of crime. Hence, the authors propose a religious insight of livability planning in GC addressing partially the critics made.

4. Livability planning: religious impetus

There is a meeting point between religion and contemporary matters. This is evident enough through literatures when many scholars believed that technical solutions have not been resulting in satisfactory outcomes in addressing environmental crisis[…]religions have been getting more recognized to define proper environmental ethics (Abedi and Shahvali, 2008,p.609).Odeh (2009,p.41) asserted that talking about development without considering

the spiritual side of people is meaningless; development must preserve the essence of our humanity. Shaharir (2012,p 91) commented that the definitions of sustainability are not comprehensive enough to cover the many important factors which include the spiritual and cultural dimensions of man and knowledge, meanwhile Kamaruzaman and SitiAkmar (2011,p.46) claimed that a characteristic of the modern industrialized world is that it places total separation between science and religion[…]foreign to the Islamic tradition. Thus, Niaz (2001) and Ansari (1979) believed that Islam offers a broad based moral agenda for sustainable development and the issue deserves to be explored extensively in face of the present crises of development and environmental degradation. Nonetheless, this approach could be extended to the searching of the true livability concept.

Socially, human beings are collective in nature consisting male and female, tribes and nations for them to know each other but the best among them is the most pious to his Creator that Allah the Almighty (Al-Quran,49:13). This serves an underlying principle of the Islamic social construct .Islam develops Muslims' personality gradually from one individual that embodied in the teaching of *fiqhibadah*(Islamic personal law), and then evolves into family institution under the purview of *fiqhmunakahat*(Islamic family law), eventually *fiqhmuamalat*(Islamic transaction law) that governs human interactions or dealings with fellow man. Other than these individual, family and communal aspects, Islam prescribes punishment for wrongdoings committed under the essence of *fiqhjinayat*(Islamic criminal law). This is how Islam educates its followers spiritually and practice in the pursuit of material and non-material human livability attainment.

The idea of livability in Islam could be further understood in the context of city planning from the prayer read by Mawlay Idris al-Azhar in the opening of Faz city in Northern Africa (Farid, 1986, p.6);"Oh my lord, you know that I don't intend by building this city to gain pride of show off, nor do I intend hypocrisy or reputation or arrogance but I want you to be worshipped in it, your laws, limits and the principles of your Quran and the guidance of your Prophet to be upheld in it as long as the word exist". This prayer reflects the truly livability that could be achieved if man really upheld the teachings of Islam embodied in Al-Quran and Al-Sunnah. Then, city becomes a place where religion is practiced in every aspect of human life.

5. Conclusion

Apart from physical planning, spirituality content embodied in religion provides a social dimension of livability attainment. Islam for example placed strong emphasis on faith (*iman*) that is believe in the Creator, *Malaikat*, Messenger, Al-Quran, Day of Judgement and

Qada' qadar before submission of oneself to Allah through commendable practices and deeds. In term of practices, Muslims are governed by five tenets of Islam notably pronouncement of *shahadah*, prayer five times daily, charity, fasting and pilgrimage. In these six tenets of faith and five tenets of Islam embodied a mould and courage of Muslims' spirituality and practices. On top of that Islam also propagates the concept of *ihsan* whereby Muslims are urged to do good deeds as if Allah is looking at him though he is not able to see Allah physically but Allah's existence is felt. Having vertical and horizontal bondage concurrently and a correct approach of human relationship with the nature and fellow man offers another dimension of livability planning other than spatiality irrespective GC or non-GC.

6. References

[1]Saeid, N.,Simon, B., Seyed,H.,Mohsin, F.. (2015). Developing and testing a framework for the assessment of neighbourhood liveability in two contrasting countries:Iran and Estonia. *Ecological Indicators*, 48, 263-271.

[2]Carlos,J.L.B..(2004). Measuring the livability of an urban center:an exploratory study of key performance indicators. *Planning, Practice and Research*, Vol. 19,No.1, 101-110.

[3]Katherine, B. and Emily, M..(2009).The disappearance of the state from "livable' urban space. *Antipode,* Vol.41, No.5, 845-866.

[4]Adam,O. (2012). City life:Ranking (livability) vs Perceptions (satisfaction).

[5]Alireza, B. and Azadeh, S.. (2012). Livable street in urban environment:an adaptive design approach.*Advances in Environmental Biology*, 6(3), 1063-1067.

[6]Philips. (2010). Livable cities-health and wellbeing in the urban environment.

[7]Islam, G.,Hasan,Z.,Mohamed,K.,Mohamed,S..(2010).Against the great divide between theory and practice:gated communities versus urban liveability.*Real Corp Proceeding*.

[8]David, K.T. (2013). Housing Policies and Institutions: From Past to Present. In Cagamas, *Housing the Nations*. Kuala Lumpur: Cagamas Holding Berhad.

[9]Salleh, B. (2013). The Evolution of Housing Laws and Regulations. InCagamas, *Housing the Nations*. Kuala Lumpur: Cagamas Holding Berhad.

[10]Viola, L.C. (2013). Stratified Property Management and Housing Administration.InCagamas, *Housing the Nations*. Kuala Lumpur: Cagamas Holding Berhad.

[11]Ansari, M. I.. (1979). Islamic Perspectives on Sustainable Development. *The American Journal of Islamic Social Sciences*, 11:3, 394-401.

[12]Hasan, Z.. (2006).Sustainable Development from an Islamic Perspectices. Mp r a, (2784). http://mpra. ub. uni-muenchen.de/2784/

[13]Odeh, J.. (2009). Islamic Values and Rural Sustainable, *International Platform*, 39-41.

[14]Shaharir, M.Z.. (2011). A New Paradigm of Sustainability. *Journal of Sustainable Development*, *5*(1), 91–99.

[15]Azlinor. (2006). A legal perspective on gated community in Malaysia.*Law Journal*,Vol.14(1).

[16]Farid, M. (1986). Islamic values in contemporary urbanism. ISOMER, Australia.

2. Struggle to Maintain Living Environment of Suburban Districts in the "Depopulating Mega-city" in Japan

人口が縮減するメガシティ郊外における生活環境維持の取組みに関する研究

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Abstract: Various demographic projection on the population predict that metropolitan areas in Japan already or will soon enter into depopulating phase and most of researches and statistics insist in common that Kansai metropolitan area, centered by Osaka and the second largest in Japan, already started to depopulate. It can be regarded as the first depopulating Mega-city in the world, whose population is more than 10 million. Iga city in Mie prefecture locates in the fringe of Kansai and the population started to decrease since around 10 years ago. Living condition seems to be deteriorated in housing complexes developed in the era of high economic growth. Land speculation and absentee landowners also affects miserable living environment in several housing complexes. Residents' associations of some housing complexes struggle to cooperate to maintain or recover the living environment.

The paper firstly introduces the overall condition of Iga city, and then describes some case studies of housing complexes based on reference reviews and interviews survey to residents' associations conducted on March 2015.

The situation caused by aging and depopulation seems to be harsh and somewhat hopeless due to the pessimistic demographic trend of depopulating mega-city of Kansai. However, two cases in Iga city introduced here shows some measures to maintain and improve living condition of depopulating housing complex can work well if residents unite to tackle with problems and the city supports the activities and the local government support their activities.

1.The First "Depopulating Mega-city" in the World

Various demographic projection on the population predict that metropolitan areas in Japan already or will enter into depopulating phase. Most of researches and statistics insist in common that Kansai metropolitan area, centered by Osaka and the second largest in Japan, already started to depopulate. Kansai can be regarded as the first depopulating Mega-city in the world, whose population is more than 10 million (Figure1). Iga city in Mie prefecture locates in the fringe of Kansai and the population started to decrease since around 10 years ago. Living condition seems to be deteriorated in housing complexes developed in the era of high economic growth. Land speculation and absentee landowners also affects miserable living environment in several housing complexes. Residents' associations of some housing complexes struggle to cooperate to maintain or recover the living environment.

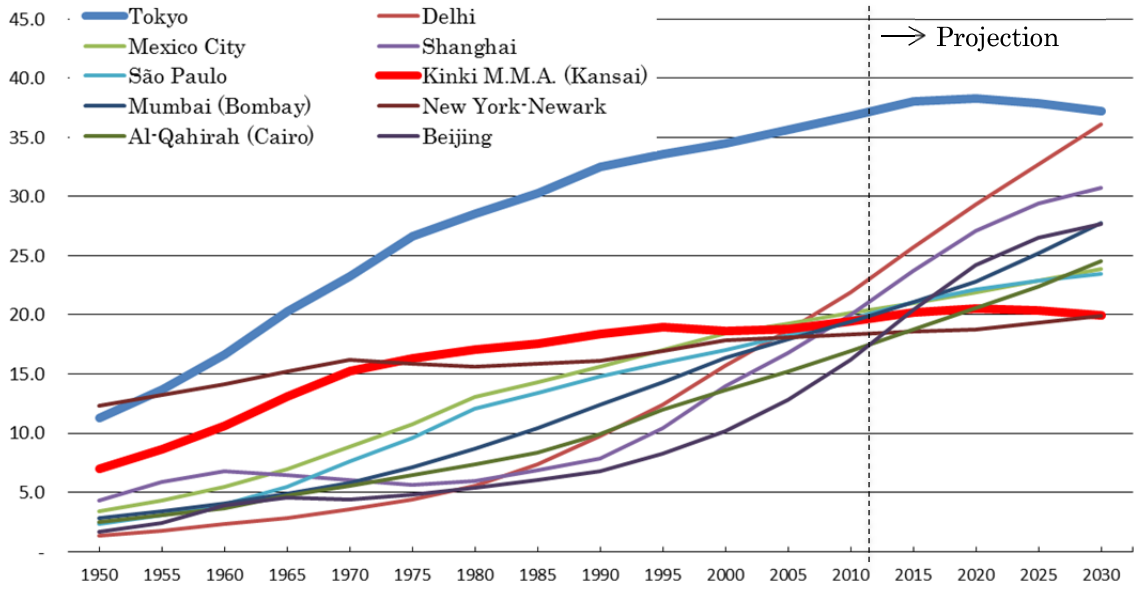

Figure 1. Movement and Projection of Population of the 10 Largest Metropolitan Areas in the World
Source: World Urbanization Prospect, 2014

The paper firstly introduces the overall condition of Iga city, and then describes some case studies of housing complexes based on reference reviews and interviews survey to residents' associations conducted on March 2015.

The studies on aging and depopulating phenomenon in Japan tend to focus on rural provinces and agricultural villages (e.g. Matanle et.al. 2011). Sorensen critically describes the development of housing complexes in metropolitan suburbs by some empirical studies (Sorensen, 2001; Sorensen, 2002), but there are only a few existing studies on depopulating metropolitan suburbs and housing complexes reported since the depopulating phase (e.g. Swerts and Denis, 2015). Most of existing researches written in Japanese pick up large scale housing complexes developed and supported for a long term by semi-government organizations. Here, small- or medium- size development conducted by private development companies who don't usually care after selling land and houses to residents or investors are picked up.

2.Depopulating Metropolitan Suburb: Iga City in Mie Prefecture

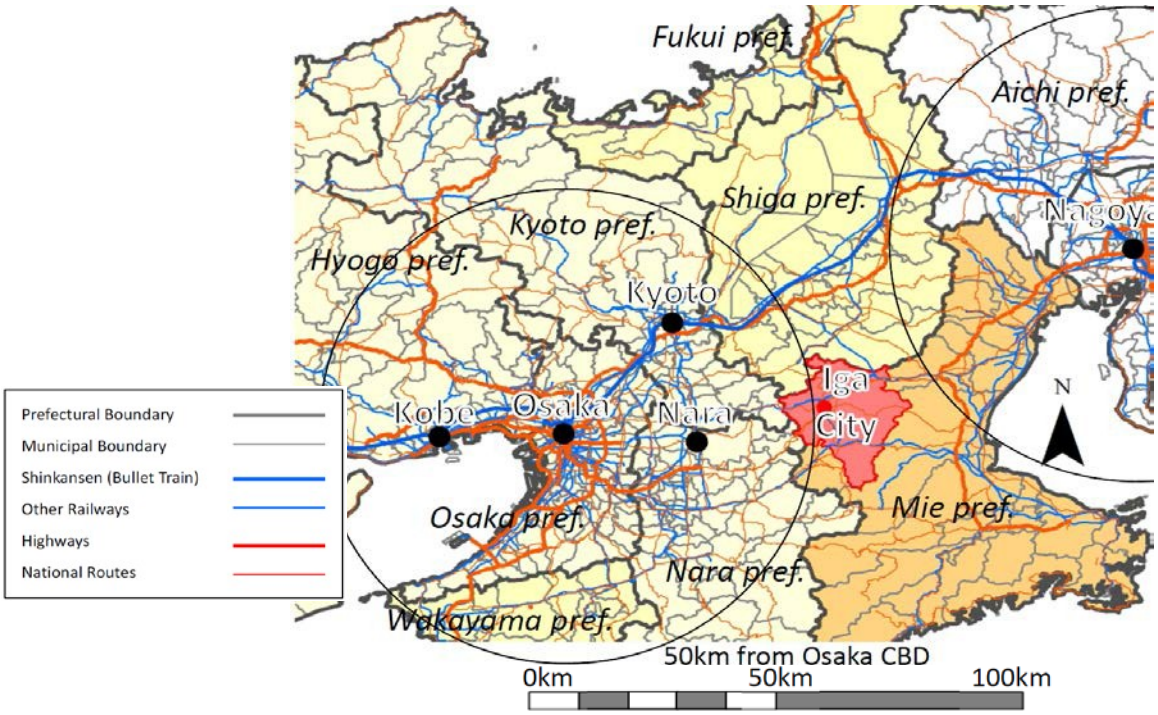

Figure 2. Kansai Metropolitan Area and the Location of Iga City

Iga City in Mie prefecture locates 60km east from the city center of Osaka (Figure 2). The jurisdiction area are originally covered by a town center, small villages, paddy fields and small forests. Following the progress of national economy especially after World War II, many manufacturing factories started to locate along the national route of railways. Real estate developers conducted housing development near suburban stations for commuters to Osaka, workers in the city and cottagers coming from Kansai metropolitan area. Land and housing prices continued to surge until 1990 when the bubble economy started to burst. People working in Osaka have no other choice but to buy a plot or a house far from their working places. Rapid surge of land price also incurred speculation of real estate and many people bought plots without considering any purposes to utilize.

But after the burst of bubble economy, the long term economic recession started. Due to decrease of land price, many houses in near suburb or even in the city center became affordable for commuters. The demand for the land in far suburb such as Iga city drastically decreased and many plots were derelict, leaving some residents who bought and started to live. The transition of demographic trend has accelerated the tendency to decrease demand. Birth rate became lower and lower throughout some decades of economic progress in the late 20th century, and even metropolitan areas are predicted to suffer from depopulation. Iga city depopulates continuously after from early 20th century (Figure 3) .

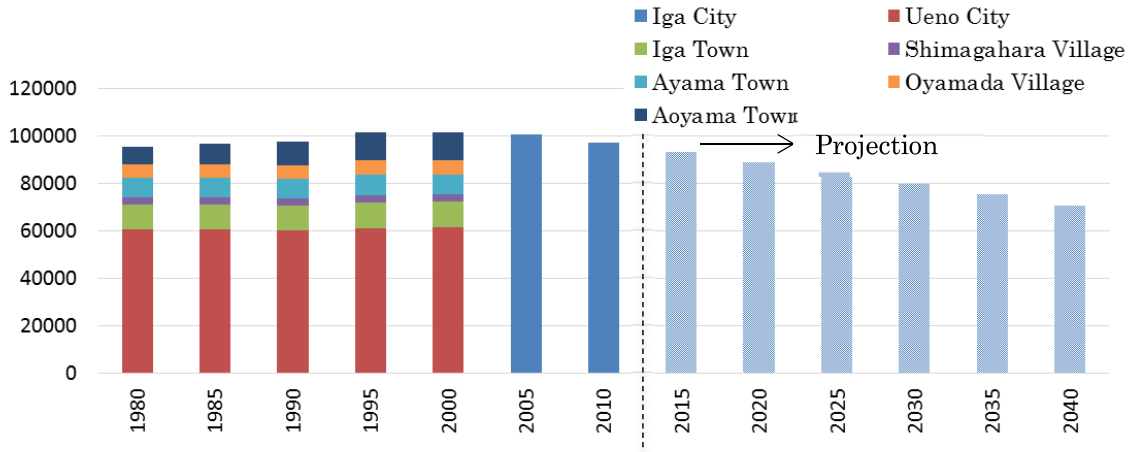

Figure 3. Movement and Projection of Population of Iga City
Source: National Census, 2010; Projection of National Institute of Population and Social Security Research, 2013

Now more than 40 small and medium-size housing complexes are identified in Iga city based on map survey and field investigation (Figure 4). Almost all of them have no small percentage of vacant plots and houses and residents are aged and decreased. Vacant housing complexes can be seen also in growing metropolitan areas such as *Gui Cheng* in Chinese, cases shown here have some different characteristics. They have spent some decades under the same situation, where residents have struggled to live there for long, and almost no hope to invite new residents in the future due to depopulating trend.

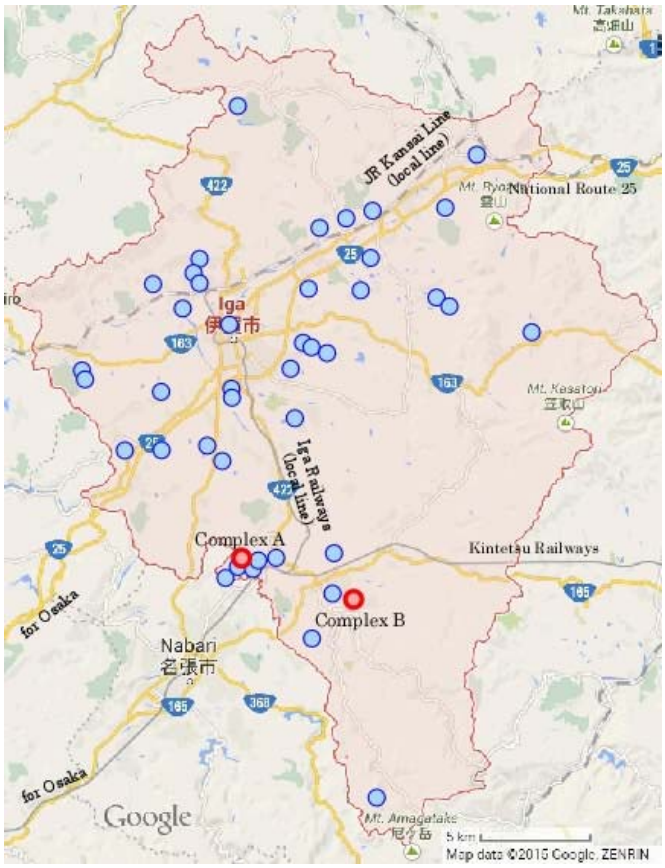

Figure 4. Locations of housing complexes in Iga city

3.Condition of Depopulating Housing Complexes and Countermeasures of Residents

3-1 Struggle of Residents in Depopulating Housing Complexes

Housing complex A is one of the typical small housing complexes in Iga city. It has an area of around 30 hectare and consists of about a thousand plots, where 777 people live as of March 2014. The aging rate is 28.4%, slightly lower than the average of the whole Iga city (29.3 %). Around half of plots in the complex are vacant as shown Figure 5.

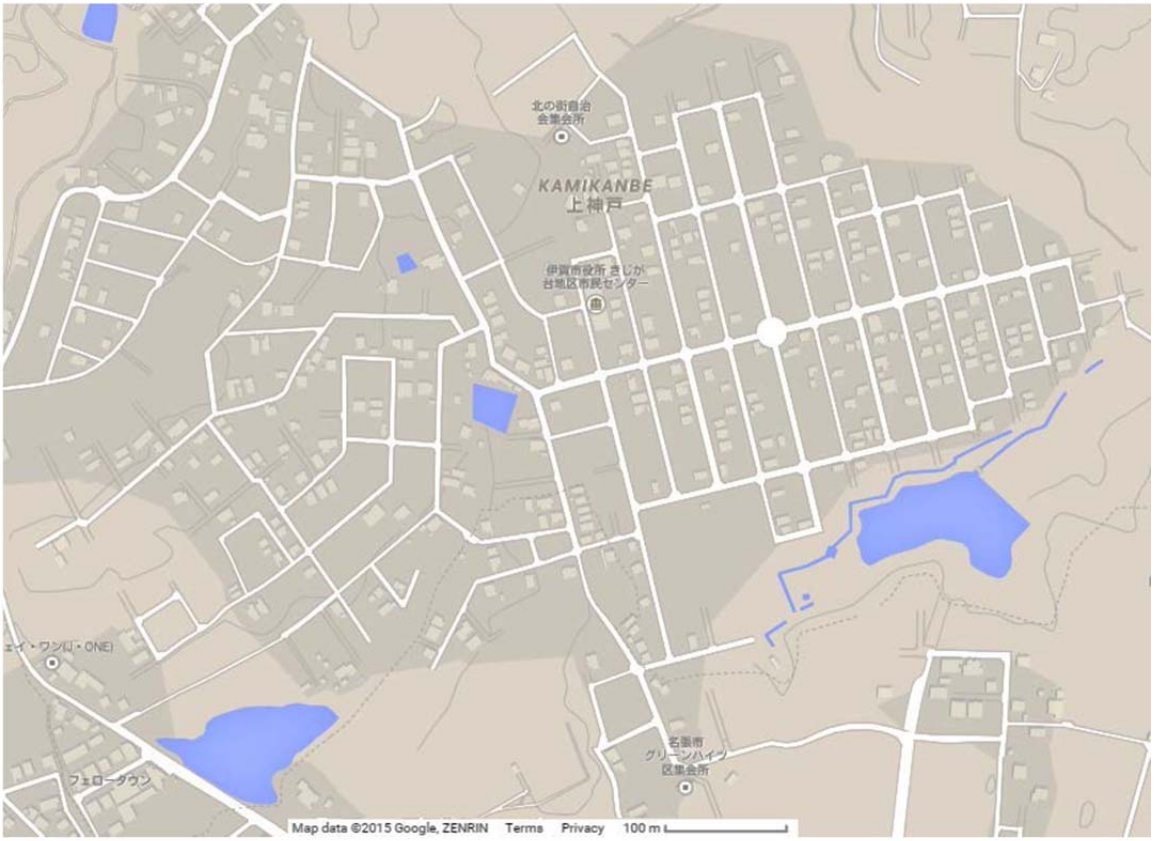

Figure 5. Residential Map of housing complex A

Source: Google Map (https://www.google.co.jp/maps/@34.6712057,136.1262694,17z)

The development of complex A started in 1970s as a cottage area, but few cottages had been developed in two decades. But after that, the number of households, who started to live there, increased from 30 on 1991 to 130 on 1994. Though all the plots were sold out at the term, some are left vacant since many buyers expected speculation, which leads to high vacancy rate. According to the National Census, the population decreased from 1,601 on 2000 to 1,429 on 2010 (10.7% decrease in 10 years). The transition of population pyramid clearly shows the district is aging and depopulating especially in younger generation (Figure 6). The main cause of depopulation is outflow of grown-up children who start to live outside to enter universities or start to work.

Depopulation deteriorates living environment of housing complexes by increasing number and ratio of vacant plots and houses, bad management of living infrastructure like water supply and treatment, drainages, district pathways, and so on.

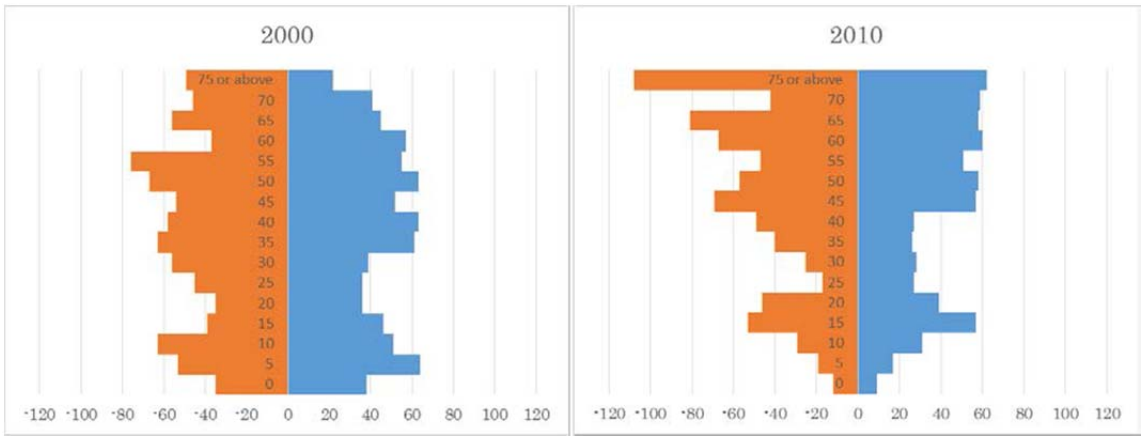

Figure 6. Transition of Population Pyramid in a district including complex A during 2000 and 2010 Source: The National Census 2000 and 2010

Regarding water supply, the municipal government has a duty to supply it for citizen in principle. But some newly-developed housing complexes in extended suburb like complex A are obliged to maintain their water facilities by themselves based on Water Supply Act. These new complexes usually leave the maintenance to management companies. If a management company in a complex is malicious like the case of complex A, she demand unreasonable water charge to residents, threaten to stop water supply or mix dirty water of storage reservoir to reduce their expense. Malicious management companies often neglect to cut weed against the contract with absentee landowners. Residents cannot cut weed of these vacant plots due to ownership and contract status, even if they have a will. Vacant plots of land have higher risk of fire because of grown weed (Photo 1 and 2).

Photo 1. Vacant land of the Complex A

Photo 2. The Center of the Complex A

Initially, residents of complex A cannot but obey rules of the management company. Some of them appealed to Iga municipal government to solve problems like shown above, however, the government didn't react to the appeal because they insist the maintenance should be

left to residents and management companies they hire.

But residents in complex A gradually shared recognition of their problems and strengthened activities of the residents' association. Workers who formerly commuted to Osaka had almost no interest to activities of complex A, but many residents started to participate activities in the complex after retirement. Some of them formed a local group for playing sports like ground golf. Some community festivals are held every two months. The cohesion of residents has led to practical activities to improve their living environment by better management. The association succeeded to change attitudes of the malicious management company which finally bankrupted and changed, and to persuade Iga municipal government to introduce public water supply. They informed the situation to absentee landowners and acquired new contracts to cut weed of vacant plots with them directly. The association also tackles with local public security by patrolling voluntarily with a small car with blue lamp on the roof. The activity is supported by Iga municipal government, which holds an annual contest on various activities to improve living environment of 38 residents' associations which cover the whole jurisdiction of Iga city. Associations compete each other to receive subsidy and disseminate better ways for improvement of their living environment to other associations.

3-2 Advanced Activities in the Housing Complex

A medium housing complex B is an advanced case where various activities are carried out to tackle with depopulation problems. The development of complex B started in 1983 and the population is 5,204 as of March 2014. Though the aging rate of complex B is low (16.2%), the pace of depopulation is faster (7.5% in 10 year between 2000 and 2010) than the average of the city (4.3%). The residents' association of complex B apply to annual contests of Iga city for several activities every year, and acquire subsidies which cover the gap of annual budgets for other activities (Table 1).

Table 1. Applied and Approved Activities of the Residents' Association of the Complex B
Source: Interviews to the Complex B, the Website of Iga municipal government

fiscal year	applied activities	evaluation results	rank	applicants
2007	voluntary prevention of disaster	approved	1	23
2008	voluntary prevention of crime	approved	3	22
2009	landscape improvement	approved	2	14
2010	mutual support system	approved	3	-
2011	information dissemination	approved	2	-
2012	activation of a local salon	approved	7	-
2013	local watch-over network	approved	1	-
2014	watch-over on children	approved	3	-

*note: the number of applicants is not open in the website of Iga city since 2010

Regarding the problem of grown weed in vacant plots, they identify almost all landowners and a local non-governmental organization makes contracts with landowners who want it to mow the weed on their land for small return. The organization has several other contracts to mow weed with companies or residential plots out of the complex B. The profit of these contracts are filled to costs of other activities

Another advanced activity is the original "watch-over" service. Aging and depopulating housing complexes often suffer from problems derived from isolation of one-person households. Compound causes such as depopulation, more personalized attitudes of residents, inactiveness of communities or exaggeration of personal information protection often affect negatively. Complex B tries to watch over residents by constructing their original database of almost all residents based on their approval.

The basic data of each household is restored in hard disks and revised through PC (Photo 3) or smart phone by residents as needed. Personal information including emergency contact person and number are gathered by sealed original envelops (Photo 4), on whose surface only names of residents and the address are written, and stored in locked cashbox in the office. In case one is in an emergent situation and none can be found to help him or her, plural staffs of the association open the envelop and inform the situation to the person written on the paper in the envelop.

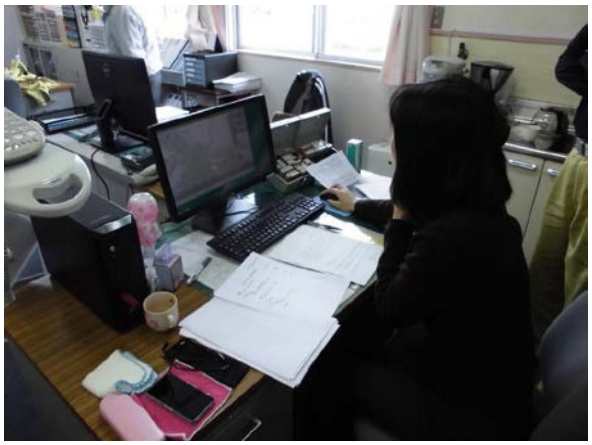

Photo 3. A PC to refer residents' information

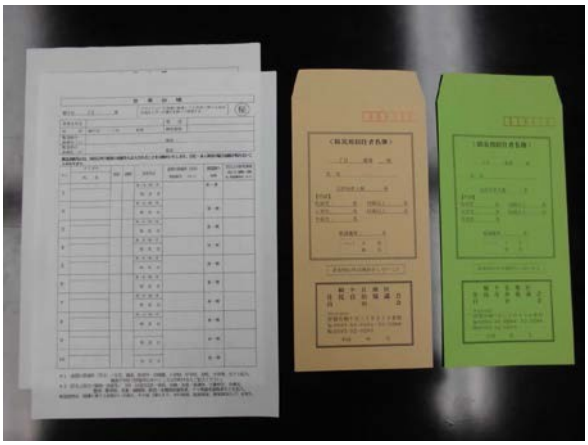

Photo 4. A Sheet and an Envelop of residents' information

4.Tentative Conclusion

The paper briefly described the situation of two old housing complexes in Iga city, which is on the fringe of Kansai metropolitan area. The situation caused by aging and depopulation seems to be harsh and somewhat hopeless due to the pessimistic demographic trend of depopulating mega-city of Kansai. However, two cases introduced here shows some measures to maintain and improve living condition of depopulating housing complex can work well if residents unite to tackle with problems and the city supports the activities.

On the paper, unique cases showing conspicuous phenomenon of the depopulating mega-city are just introduced, but neither generalized nor theorized. More systematic and comprehensive study will be needed to consider appropriate policies for depopulating mega-cities.

References

Matanle, Peter and Rausch, Anthony S. with the Shrinking Regions Research Group (2011) *Japan's Shrinking Regions in the 21st Century*, Cambria Press, Amherst, New York Sorensen, Andre (2001) Building suburbs in Japan continuous unplanned change on the urban fringe, *Town Planning Review*, 72.3, pp.247-273

Sorensen, Andre (2002) *The Making of Urban Japan*, Nissan Institute/ Routledge Japanese Studies Series, London

Swerts, Elfie and Denis, Eric (2015) Chapter 1 Megacities: the Asian Era, In R.B. Singh (ed.), *Urban Development Challenges, Risks and Resilience in Asian Mega Cities*, Springer Japan

3.Sustainable Design Approach for Indonesia Island Tourism Destination
Case Study: A Lesson learn from Japan for Developing Method and Proposal

日本とインドネシアの島嶼海岸における環境適応計画手法

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Abstract: This paper discuss a comprehensive method of landscape revitalization for coastal recreation area of Indonesia with learning from Japan as precedent. The coastal area is creative space attracting tourists with its site genius loci that raises problems related with landscape, management, city planning, that need economic, environmental, cultural and tourism consideration. This study aims to present the plan proposal that suggest the revitalization on Wakatobi marine destination in Indonesia. The projects begins with preparation study, observation, site analysis and comparative study that reveals design guidelines. The guidelines was developed by integrate precedent study analysis and CASBEE analysis result of the site and generated with 3D planning model. In conclusions, this paper assist the guidelines to create an ecologically responsible marine tourism destination.
Keyword: Tourism Destination Design and Planning, Sustainable, Island

1. The issue of Tourism and Landscape Architecture in urban island waterfront area

1.1. Condition of island tourism destination facility in Indonesia

Recreation area in island is now getting developed. Since the urban environment that seems to be crowded and lack of open space, the natural environment is become one alternative for people to make a travel and leisure time. On the other side as human we need to refresh and take vacation after daily activity. While urban environment now provide various kind of recreation in city that artificial mode, and more urban style, the nature provide various kind of positive advantage for health and wellbeing. With various kind of activity that we can do in various kind of nature setting.

One of natural landscape that tend to be developed in Indonesia as destination is island area. Indonesia has a lot of natural island that has beautiful scenery and natural biodiversity. Some of island has been developed to be destination, some of them still underdeveloped. Some of underdeveloped island has very beautiful nature and it has difficulty on infrastructure. This type of island is destination for adventurer and biologist to conduct tourism activity and research. One of the problem to develop natural island in Indonesia is financial funding, as the priority of the development is focused on city and its problem. Recently, many island is developed by foreign investors to become resort island destination. It brings a gap with local people and brings the nature impact

if it is not well organized. On the other side, coastal area is the vulnerable space in urban-rural environment as it vulnerable of coastal disaster can brings impact of global warming. So it need good management and balance between conservation and development. The sustainable approach can be the best solution to be developed for the island tourism destination.

1.2 The need of green design for tourism destination facility, Environment friendly design and social-economy acceptable.

Tourism must planned towards goals of enhanced visitor satisfaction, community integration, and above all, greater resource protection in order to reach better economic impact (Gunn-Var, 2002). Beside that, ecology considerable design that build good well being of the environment and social must be implemented (Brombek, 2009). Planning for the destination complex including the park, the resort and the leisure facility must consider the sustainability aspect, should accommodate social demand of local people while consider the environment. Good management of the landscape for the destination must be maintained to attract specific type of tourist, whether adventure or mass tourism. Related with it, successful of a themed attraction is combination of writing or storytelling, creative design, financial projections, audience analysis, and planning. The story can be unique, creative, complex, and extensive Milman (2007). As today many modern theme park and other themed hospitality facilities like hotels, restaurants, bars, and shopping malls have adopted the concept of theme or story-telling based.

In more private destination or theme based destination, it need to consider appropriate site planning. Land use and accessibility plan also need to be maintained depend on the size of the destination. In many destination area, tourist need overnight stay to enjoy many leisure activities. Furthermore, the home stay, hotel as the second home is needed to built within the area. Moreover, many activity of the tourist will higher and might bring effect to nature. In order to make the environmentally save resort, the tourist activity, built environment and its sewages should not endanger the nature resources. This research is studied how to manage the destination without bring negative impact to the nature resources, as the quality of nature resources is the main value of one destination.

1.3. Envisioning of Landscape and Tourism Destination planning

The global problems with the ozone depletion and with the climate change problem are the big problem that more increasing. The fact that built environment and human activity as the factor that affect the climate change is big problem that should take into

consideration. The recreation space is one of built environment that bring big impact to the human if it is not well maintained as it is located and manage on the natural source like beach, mountain, forest, lake, etc. It also consumes so much energy that produce a great impact in the environment. According to Baud-Bovy (1998) a resort is essentially a place developed for tourists, providing multiple facilities for their accommodation, recreation, entertainment, rest and other needs. Through the concentration of facilities the resort acquires an identity and character that it becomes a specific place to go to and to enjoy in its own right, in addition to serving as a gateway to other resources in the area. According to Mill (2001), there are several factor that affect the attractiveness of a beach resort: 1). Its actively develops its facilities, 2). It makes an effort to encourage visitors and provide varied recreational opportunities, 3). Located within easy access to commercial development, 4). It typically includes hotels, resorts, shops, toilets, public transportation, municipal supervision, first aid facilities, and public phones.

The eco based design is one of alternative of the architecture problem solving and treatment to minimize the impact to the nature. As tourist destination use the land and utilize the building, the ecology based design for the landscape arrangement, site planning, building should ecological based. According to the Bombrek (2009), to achieve the eco-resort design goals such as close fit, accurate responds, and highest possible efficiency. There is a range of services that need to be looked at: 1). Water supply, 2) Lighting, 3). Energy supply management, 4).Ventilation/air-conditioning, 5).Water heating, 6). Sewerage and waste management, 7).Pest control, 8).Telecommunication and information services, 9).Fire safety and security services, 10).Transportation. While according to IUCN, basic principles that nature resort based should have are follows: 1).Adopt an ecosystem-based approach in tourism developing planning, 2).Manage Impacts on biodiversity from hotel development and attempt to achieve an overall positive contribution, 3).Design with nature and adopt nature based solutions, 4) respect, involve and support local communities, 5).Build collaboration among stakeholders.

In order to access the condition of the site, we use CASBEE. According to CASBEE manual, this assessment method might suitable for four examples of work: 1).As a tool for the environmentally Conscious Planning in area development projects, 2).As an environmental labeling tool, 3).As a planning and assessment tool for energy-saving remodeling plans on the urban scale, 4).As a tool to support city planning.

1.4 Purpose of the research

This study aims to present the proposal that suggest the conservation and revitalization on Wakatobi Island in Indonesia. The projects begins with preparation study, observation, site analysis and comparative study that reveals design guidelines. The guidelines is developed by integrate data synthesis from literature study and site survey that identifying the issues, with analysis to make a proposal of coastal recreation in island. In conclusions, this paper assist the guidelines to create a better coastal area in socially and ecologically responsible.

2. Material and method

This research use qualitative base method and utilize architecture model to shows the scenario of tourism destination development. The study also use precedent. The use of precedent can bring some benefits: 1). It creates a reference between the design and another one, 2). It teach us about architecture of a place and help learn lessons for our own design work, 3). It can allow the designer and the client to see and walk through something similar to what they are designing.

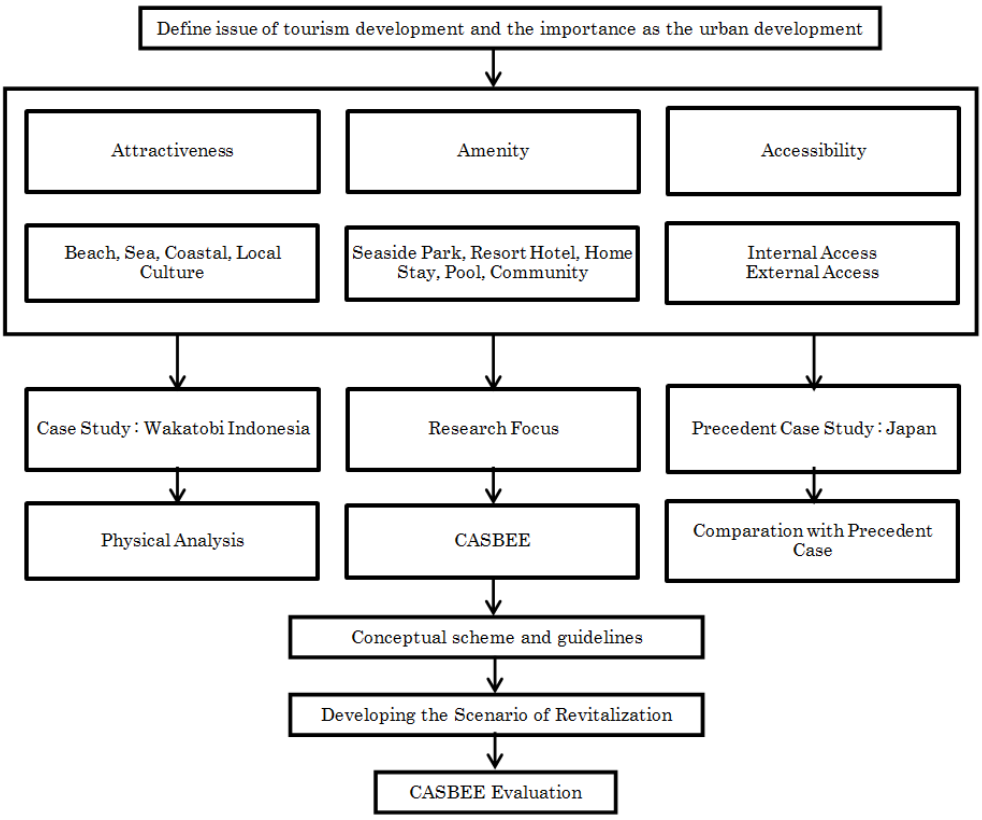


Figure 1. Research framework

3. Case study approach

3.1 Site existing approach for development

The site is located in Wangi-wangi island near with waha village and Patuno resort in Wakatobi. Wakatobi is Located on Four main islands of Wangi-Wangi, Kaledupa, Tomia, and Binongko, at the southeastern tip of Sulawesi Indonesia. The area is known for its coral reef diversity. Throughout Sulawesi, marine and coastal ecosystems are of high ecological and economic importance, particularly for fisheries and commercial use. The main problem in Wangi-wangi island is there is no space that can accommodate tourism activity, social and culture that can become tourist destination for visitor also for local people with environmentally friendly and social-economy acceptable. Besides that, the port for the accessibility still in low quality.

Figure 2. Map of Wangi-wangi island, Source: BPS Wakatobi 2105

The wide of land for site planning is around 9 Ha, with the calculation of the coefficient of building base is 20%, the height of building maximum 2 floors, the limit building line is 100 m from the sea.

3.2.Resort facility development issue

1). Lesson learn from Japan and other country

a. Beach park

The case study in Japan that can be reviewed as precedent are Ashikita seaside park and Minamata park. Minamata park located in Minamata bay. The ecopark has multiple facility, consist of riverfront park, a restaurant, a give shop, and more within its large esplanade with 41 hectares of total area.

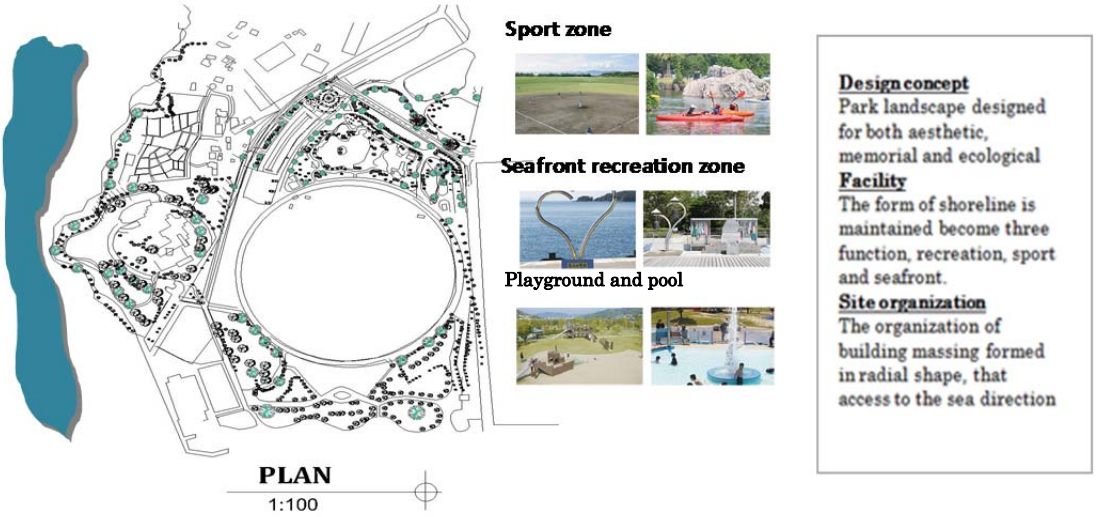


Figure 3. Minamata Eco park layout, Source: Visualized by Giriwati

The second site, Ashikita ecopark that located at place of mercury polluted area which turned into Ecopark. The site consist of various memorials and museum and green space that related with Minamata desease. The park consist of Children playground, Skatepark, Zorb, Roller rudge.

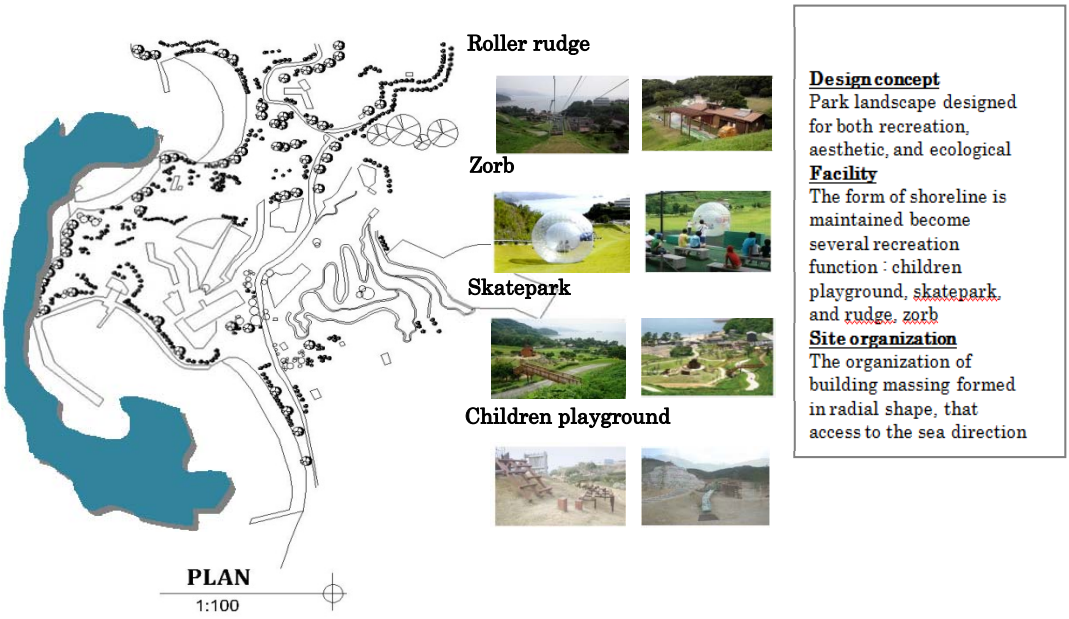


Figure 4. Ashikita seaside park layout, Source: Visualized by Giriwati (2015)

b. Resort

As the Japan case, Okinawa is famous diving destination in Japan. The province has several tourism island and provide tourist resort. The characteristic of resort is provide the open space for tourist activity and hospitality accommodation that is Japanese resort hotel for visitor to stay overnight on the destination. The example of island resort

hotel in Indonesia is in Ayer Island, and Raja Ampat as example of recreation accommodation in Indonesia.

Resort facility comparison	Ayer island resort, Indonesia	Hoshino Resort Risonare Kohamajima Okinawa
		
Massing building orientation	Seafront direction	Seafront direction
Massing organization/arrangement	Radial	Clustering
Ventilation system	Cross ventilation	Not cross ventilation
Lighting system	Artificial lighting	LED lighting
Material	Wood	Wood and concrete mix

Table1. Short Review of resort facility in Indonesia and Japan

4. Result and discussion

4.1. Assessment of demand of space based on number of visitor and maintain the carrying capacity

The planning and design of the Seafront of Wakatobi island must have architectural aspect that support the function of the building and open space that can accommodate visitor's need. With the assessment base on the amount of the visitor on the site, it can be calculate with linier regression that the annual amount of visitor is P= a+b (x) with x: the amount of additional year that counted by the last year of calculation and a/b: Constanta that get by the calculation model, P is the amount of visitor, ∑x is amount of independent variable value, ∑x2 is square number of independent variable, N=number of years observation and ∑Px is multiply of visitor amount and independent variable. This calculation is from simple regression model, and adopted from calculation of population prediction.

$$a = \frac{\sum Px.\sum x^2 - \sum x.\sum Px}{N.\sum x2 - (\sum x)2} \quad (1)$$

$$b = \frac{N.Px\ \sum x.\sum Px}{N.\sum x^2 - (\sum x)^2} \quad (2)$$

according to tourism visitor to Wangi-wangi island on 2013 that is 3239 people, so we can calculate the a= **4948** and b=**12370** so we can get the prediction of visitor number on 2020 as much as P= **91538**. That value represent the amount of daily visitor prediction on the site. Based on the calculation we can count the recapitulation of space programming for the site and the percentage of built environment that will built on the site or master plan scenario. With the percentage, it will maximize the open space and community place and minimize the built environment.

Space function	Percentage	Average
Built space	10-30%	20%
Street and facility	20-40	30%
Greenery belt/green open space	40-60%	50%

Table 2 Percentage of space programming capacity

4.2.CASBEE analysis as Japan base assessment for environment condition

According to the present condition of the existing, we use CASBEE to assess environment condition especially for the site chosen. The average mark in many items is low as the general value is 1 B-. As the assessment results of Major categories still low so need improvement on Q1, Q2, and Q3.

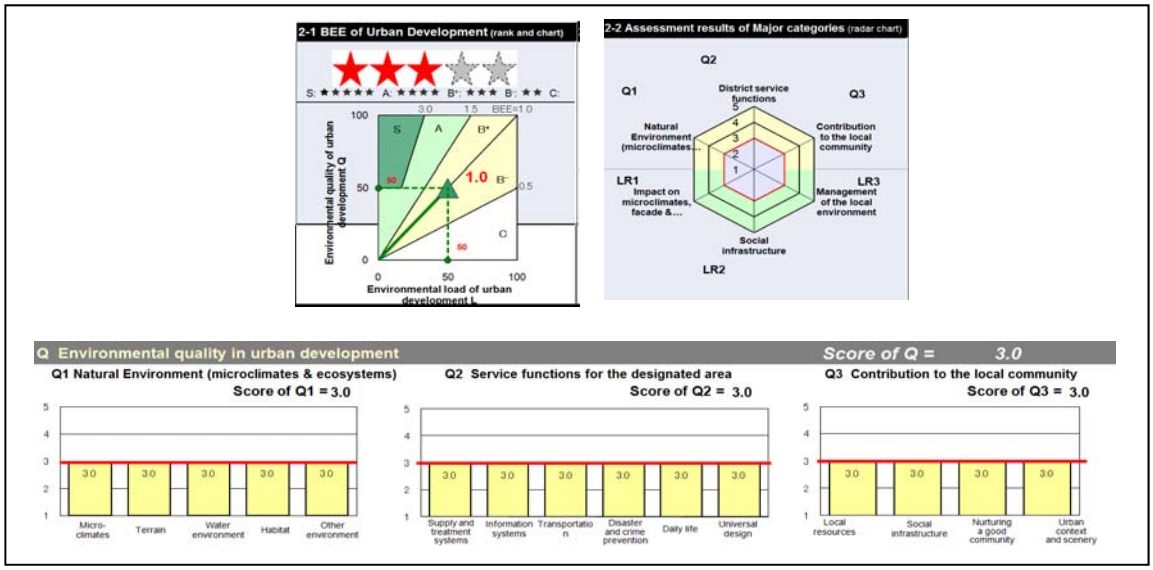


Figure 5. CASBEE analysis, Source: Author analysis using CASBEE UDE assessment sheet

4.3 Scenario of the landscape development

a . Concept of development

The master planning of the marine tourism landscape generally designed using three zone, private zone for resort cottage for overnight tourist, community and Agro tourism zone and public open space or leisure zone in the middle site. According to the calculation, the size of site is 97.350,00 m² or ± 10 ha, with building coverage is 19.470,00 m², green area 48.675,00 m² and street facility 29.205,00 m². According to theory approach and the analysis, design concept for Wakatobi marine island resort is proposed with several indicator

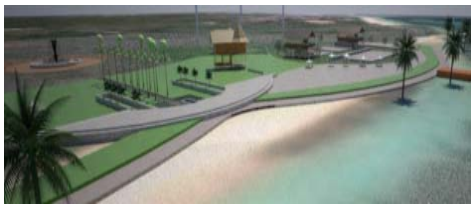
Indicator of landscape master planning	Criteria
Building organization and orientation	Maximize wind flow in site and buildings. Cluster type of building mass will have much wind flow and cross wind flow well. orientation of the building is maximizing the potential view of the beach that cross apart from the sun direction.
Vegetation	Use beach vegetation like Palm tree (*Cocos nucifera*), Akasia (*Acacia Auriculiformis)*, *Barringtonia Asiatica*, *Terminalia Catappa*, Jati (*Tectonia Grandis*)
Building material	Maximizing the local material like wood, brick, stone, and sand
Energy use	Maximizing natural energy for ventilation and utilize wind energy to support power
Social acceptable	Provide recreation space that affordable and can be reached by local people and tourist

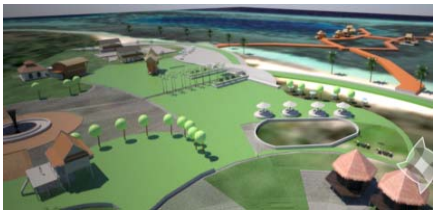
Table 3. Concept for Wangi-wangi seaside comprehensive park planning

b. Preliminary Master Plan

After initial concepts have been evaluated, the design direction is established. Adjustments by each discipline are incorporated into the plan. Below picture are recreation facility including plaza and promenade as open space on the beach, community center and cottage.

Beach recreation facility





Floating resort facility

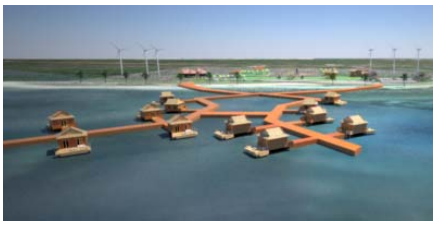


Figure 6. Preliminary master plan of Wakatobi Marine Destination

5. Conclusion and Recommendation

This research shows that to build sustainable resort planning and design need to consider aspect site management that consist of mass organization and orientation, energy efficiency implementation on the facility, lighting, social acceptability, building material and vegetation. In order to do the good planning and design, it need to conduct several assessment. One of best solution to measure the site condition related with environment sustainability is CASBEE method, beside assessment from site survey and questionnaire. In this research, we conduct CASBEE analysis and visibility of the site according to visitor number prediction before making the concept of destination development scenario.

The author suggest for the future research to make CASBEE calculation after development the scenario and assessment of the social acceptability by utilize public participative method by questionnaire and also can utilize online visual reality. The other method that might be useful to measure the sustainability of the destination is utilize the Autodesk simulation for the resort cottage building, as resort cottage is the important facility on the destination for the visitor. It can analyze and shows the visual impact, whole-building energy Analysis, carbon emission reporting, water usage and cost evaluation and also solar radiation. The sustainable design software such as Autodesk Ecotect will also useful to measure the sustainability on other facility within the site. The integration of different aspects like landscape architecture, environment conservation, city planning, and management to revitalize the coastal recreation space can generate a good environment as to sustain nature-culture landscape.

7. Reference

Autodesk. Autodesk Ecotect Analysis, Visualizae Sustainable Design. http://www.excitech.co.uk/resources/br/ecotect_analysis.pdf

Baud-Bovy, Manuel & Lawson, Fred,. 1998. Tourism and Recreation Handbook of Planning and Design. (2nd ed). Oxford: Architectural Press.

Bromberek, Zbigniew., 2009. Eco-Resorts Planning and Design for The Tropics. USA: Elsevier.

CASBEE. CASBEE for Urban Development (2007 Edition); Institute for Building Environment and Energy Conservation (IBEC): Tokyo, Japan.

Frack. Christine G.H. The use Precedent in Design. Paper Presentation

Gold, Seymor M., 1980, Recreation, Planning, and Design, New York, Mc. Graw Hill Book

Gunn, C, Varr T ., 1992. Tourism Planning, Basic, Concept, Cases, Routdledge

Milman, Ady., 2007, The Park Tourism and Management Strategy, Florida, University of Central Florida

Mill, Robert Christie., 2001. Resorts; Management and Operation, John Wiley and Sons, Canada

Siting and Design of Hotels and Resorts Principles and Case Studies for Biodiversity Conservation. IUCN.

4.A study on elements factors for emergency plan by using vulnerability analysis : a case of Khlong Bang Luang water district

歴史的地域における火災等の非常時弱点の分析

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Abstract: Nowadays, civilization and city development are speedy and rapid in the new modern city. The urbanism in modern life influence to the new way of life. If so, it doesn't mean the Quality of Life are increasing as same as the city development. The town of Khlong Bang Luang is a historical area that located in Thonburi area and residents believe in necessity of a traditional way of life, whilst also adapting to modern times. Though this area is located near the canal、water transportation is disappeared in the present. Most of the house turned face to the narrow street. So sometimes it is inconvenient for transportation. On the other hand, this area is vulnerable to fire disaster. Because of the limited accessibility leads residents in this area to vulnerability for evacuation and survival on emergency times. Furthermore, There are many wooden houses stand close together without any open spaces, the narrow street between house to house is inconvenient for evacuate and some of building materials are hazard for fire disaster. So this study seek elements factors that will impact to this area on emergency times by using GIS analysis and site survey to clarify the preparedness of the community planning for the best way of evacuation routes in fire time. So this research proposes to study and to be a guideline for design an emergency plan of fire situation phase.

Keyword : Evacuate, Fire emergency time, Vulnerable zone, Community

1.Introduction

1-1 Background of study

Nowadays, several previous studies have research about disaster emergency plan. Most of the historic preservation areas are very vulnerable to disasters rather than normal city areas because of their particular issues, for example, wooden structures, narrow streets, and many vulnerable residents like the old. The areas have many problems like high dense wooden city areas. On the other hand, especially in the preservation area, narrow streets are also important elements should be preserved even if they have problems at a large disaster. Therefore, it is at least necessary to find effective measures of evacuation for self-help or mutual aid of the vulnerable people in such a historic preservation area (Mishima et al., 2012).

Fire is a topic on which most people can comment. Fire is a widespread phenomenon. It can have damaging economic and social effects, can spoil forestry timber, can burn down houses and farms, and can kill people and animals, There has been increasing publicity given, since 1950s, to the active use of fire as a management tool. Particularly in protecting against severe wildfires (The ecology of fire, Whelan, 1995, p.1). However fire can be the one disaster that more severe for historic area.

Most of the historic areas in Thailand have sparsely few fire protection system. In addition, because of the need to protect the historic value, it is difficult to widen the narrow streets to prevent disaster. Such streets, which can be narrower than 4m and which are faced with a large number of old wooden houses, can easily be clogged or blocked during a large disaster (Mishima et al., 2014). Thus, residents who live in the historic area will not know how to survive or evacuate on that time. Because they don't know where is the best way for evacuation and the best destination to go through on that time. So, residents will need to know guidelines about how to survive, vulnerable zone and many evacuate routes on emergency times. While architecture elements and historical building must maintain and serve for residents to survive on emergency times.

1-2 Aim of study

Planning evacuation routes and designing an architecture element that can help residents to survive on emergency time. By using multimodal access, which are the potential of this site. There are community center and water transport. Thus, this study aims to find the element factors that can be effect for evacuate and blocking the route on emergency time.

2. Literature reviews

2-1 Critical factors for survival in case of fire

The first factor to have a direct influence on the degree of fire response performance is the nature of the fire itself. A fire is a process of the ignition and combustion of materials, which generates heat and smoke. Building characteristics also have a direct impact, since a building is a physically enclosed environment in which people are present and activities are carried out. Finally, human nature also has a direct and major influence on the degree of fire response performance, and to analyze this, behavior is examined both in terms of individuals (personal characteristics) and groups of people (social and situational characteristics).

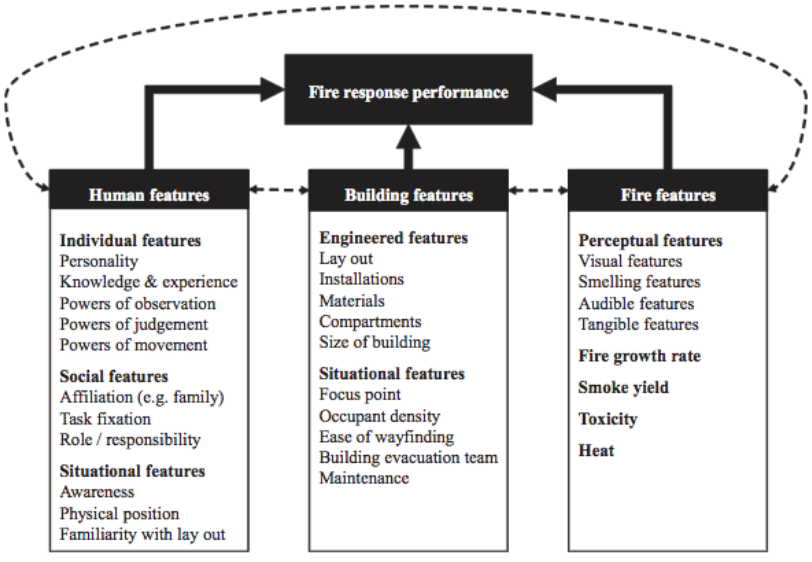

Fig. 1. A critical factors for survival in case of fire

2-1-1 The human factor

Apart from the danger element of the fire, the human factor also influences fire response performance, which does, after all, relate to how people behave in a fire. In terms of human characteristics, the critical elements are individual, social, and situational features.

2-1-2 The building factor

The second factor which affects the level of fire response performance in buildings is the environment. The physical characteristics of a construction constitute the setting in which people can exhibit their fire response performance, and it provides the primary conditions for the possibility of surviving a fire. In terms of building characteristics, the critical factors determining response in the event of a fire are the situational and the engineered features.

2-1-3 The fire factor

Fire and its effects on escape constitute the type of danger involved in response thereto. The critical factors are the perceptible characteristics of the fire, namely its growth rate, smoke yield, toxicity, and heat generated (Kobes, 2008, p.4-5)

2-2 Temporary safe place

A temporary safe place is defined as a neighboring place or site where the evacuee can be temporarily secure against a disaster at his or her own house.

2-3 Primary evacuation place

A primary evacuation place is defined as a location where evacuees should come together for safety as soon as possible after a disaster happens. In this study, 3 primary evacuation places were derived by gaining an understanding of the residents perceptions during meetings with resident representatives (Mishima et al., 2014).

2-4 Theory of constraints

The theory of constraint is a methodology for identifying the most important limiting factor that stands in the way of achieving a goal and then systematically improving that constraint until it is no longer the limiting factor.

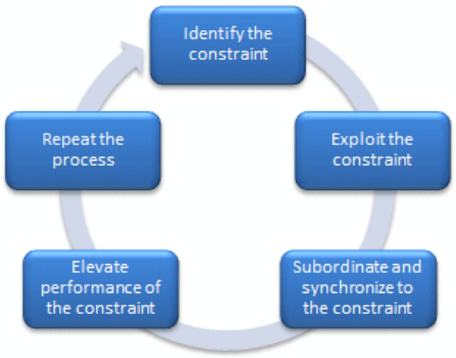

Fig. 2. 5 steps of theory of constraints

The core concept of the Theory of Constraints is that every process has a single constraint and that total process throughput can only be improved when the constraint is improved. A very important corollary to this is that spending time optimizing non-constraints will not provide significant benefits; only improvements to the constraint will further the goal.

The Theory of Constraints provides a specific methodology for identifying and eliminating constraints, referred to as the Five Focusing Steps. As shown in the following diagram, it is a cyclical process (Goldratt, 1984). This TOC theory and method is suitable for fire mitigation when combine with site in vestigate and evaluate by using ArcGIS. It may find profound limitation and solution for fire disaster in historical town.

3. Research methodology

3-1. Study area

The study location is a historical town called "Khlong Bang Luang" (Bang Luang canal). Which located in Thonburi area. Which was a prosperous city in the past. Thonburi is an area of modern Bangkok that located on the lowlands area. During the era of the kingdom of Ayutthaya, King Taksin established the kingdom of Thonburi in 1768. Thonburi was a capital until 1782. After that Bangkok was established in 1782 with the

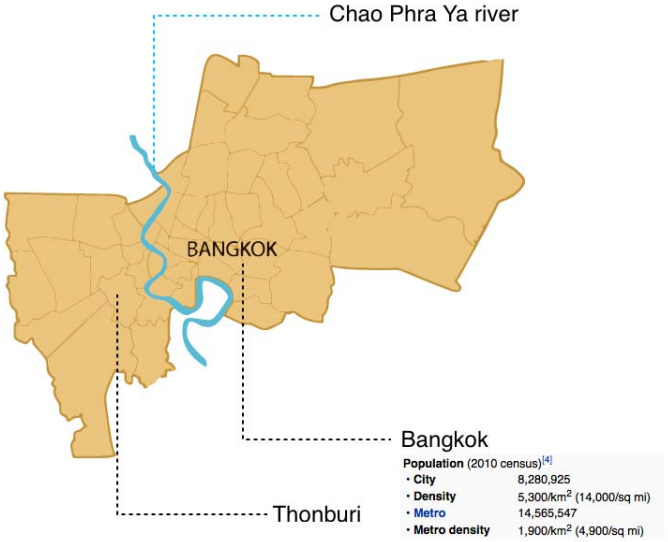

Fig. 3. Bangkok map and population

name of Rattanakosin. In Thonburi era, the land along the canal was set by King for the nobleman's residential area and also the canal have defensive function in the war time. After Thonburi era collapse, Rattanakosin era was established. This era settlement imitates the planning from Thonburi to opposite site of this area but separated by Chao Praya River. The new settlement area had mirror the water feature character of Bangkok Yai canal. The canal or Khlong is the connecting route to the existing river (a 'Khlong' is a canal in Thai). The Khlong accommodated many social, cultural,

commercial activities and it was also important for residents that lived near the waterway.

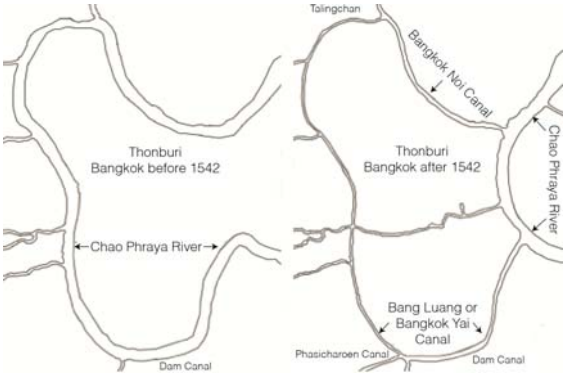

Fig. 4. Transition of Khlongs in the west side of Chao Phraya River

Nowadays, most of the Khlongs in Bangkok have been filled in and converted into streets, although the Thonburi side of Bangkok still retains several of its

3-2 Waterside area and community

Klong Bang Luang is the one of canals that still active today. It is the general name for the Khlong Bangkok Yai, which was actually part of Chao Phraya River until a canal dug in 1522, during Ayutthaya period, altered the flow of the river such that the canal became the main river and the section of the original river became the Khlong Bangkok Yai of today. This area located between 2 districts. There are Bangkok Yai district (A) and Phasi Charoen (B) district. The canal is 6 kilometers long and functions as a public transport route in the traffic-congested capital and it is easier to connect with the main capital city. So this area is the one of water community from past until now. Moreover, This area is located near religious temple. Temple in Thai is a community area not only for religious ceremony but also for meeting and serve as every day activity.

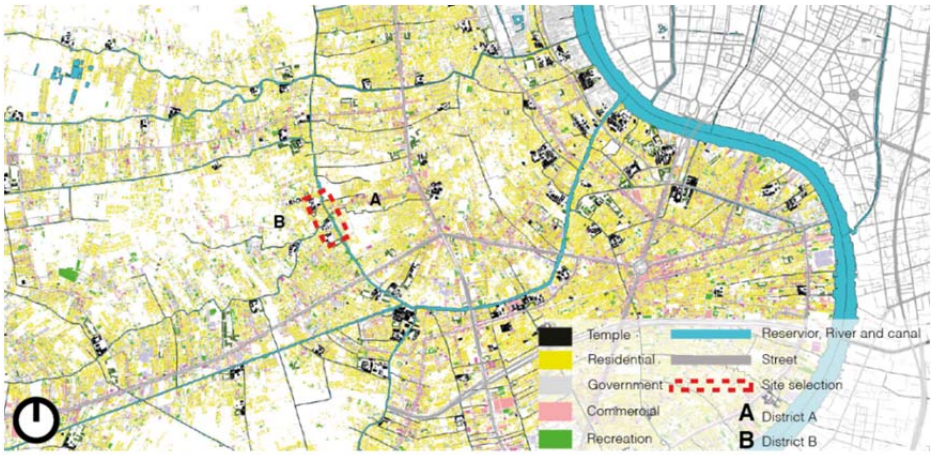

Fig. 5. Building use from around Thonburi area

On this map show the temple that located near the canal and river. Most of temples always located along the intersection of canals and become the community center for community area. One of the house in this area was selected by Association of Siamese Architect to conserve by using Vernadoc process. On the other hand, this area is risk of disaster such as fire or water flood situations because of the limited accessibility led to residents around this area are vulnerability for evacuate on emergency times.

3-3 Method of analysis

The methodology on this research is integrated literature reviews concept and potential of this site. We are focus on the vulnerable zone and evacuation way in this area. From theory of constraints, this review can scope and answer our research about what need to be changed? , What should it be change to? And what actions will cause the change? By using site survey and import to ArcGiS program to simulate and analyze elements factor on analysis part. After we find the result effect of this area that we called vulnerable zone. We will use these data to continue into conclusion part.

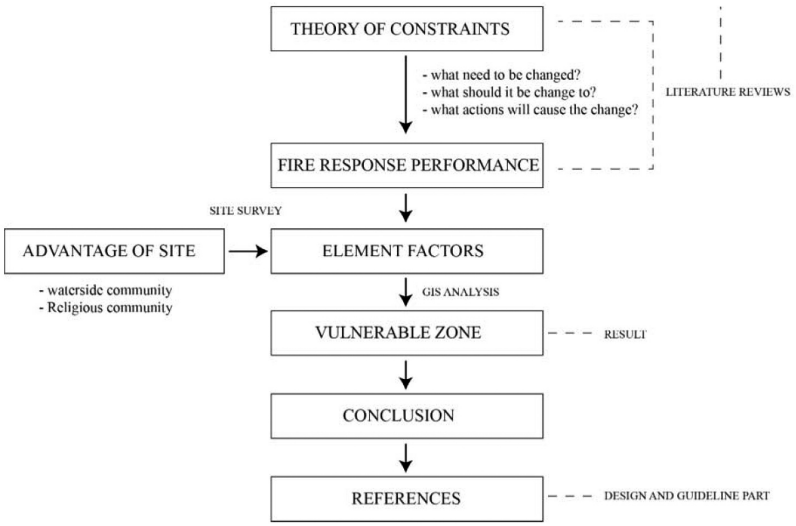

Fig. 6. Method of analysis

4. Analysis

4-1 Population

The population in this site that we used from data survey and calculate by using the living area requirement from international federation of Red Cross and Red Crescent societies. Building area / 45 while 45 is 1 person per 45 square meters for living area requirement. From 232 units, population of people in this area is approximately 371 peoples. This figure is a result that we ArcGIS to calculate data by using living area requirement of international federation of Red Cross and Red Crescent societies.

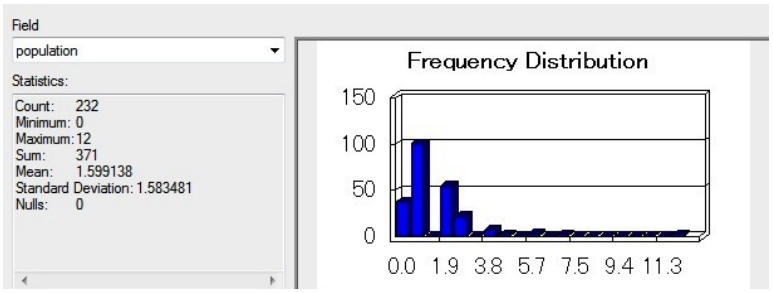

Fig. 7. Population chart

4-2 Street

Character of street in this area could divide into 3 types. First, "House - street - house" street in this type is width 1.5 meters. This type is the most character that we found in many place in this area. This type is the most narrow street and is poorly accessible to walk through to another area. Because of some vehicles such as bicycle, motorcycle and some architecture elements are located on the public street. Second, "Canal - deck - house" deck is width 3.5 meters. This type is served not only as walkway but also served as additional functions to support resident's

activities such as commercial, relaxing area, meeting space and also private port. Many people can connect to another zone by use deck for Public Street. Last, "Religious building - street - house" street in this type is width 5 meters. This type of street also known as Main Street. Car and some of public transport can use in this area. Space between religious building and house separated by high wall. So it impossible to connect to temple directly because it was blocked by

wall. Residents can go to temple by only pass the main temple gate.

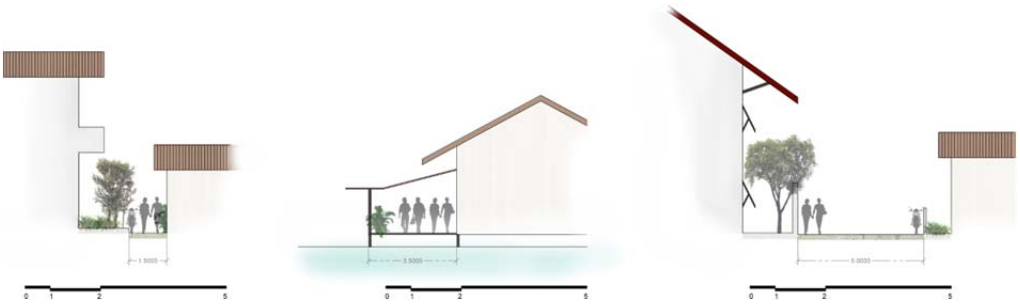

Fig. 8. The character of street

4-3 Physical elements and factors of Khlong Bang Luang

The physical elements and factors on this site are using ArcGIS application to analyze all data that was collect form this site. From this study, we explain 4 elements that will effect to this area. There are building use, floor storey, building condition and building material.

Fig. 9. Map of building use, floor storey, building condition and building material.

4-2-1 Building use

Most of buildings use in this area are residential, religious building and mixed use. There are 3 ports that still active and serve residents and tourists to get in and go out from this area. In term of community identity, water and temple community is character of this site.

4-2-2 Floor storey

Most of buildings storey in this area are wooden house with 2 storey. However, Most of the houses that along the canal are 1 story. Some of religious buildings are 1 storey but height of each building more than 5 meters and traditional building.

4-2-3 Building condition

Most of building condition in this area is moderate. Some of houses which are historical building are in the deteriorate range. In near future, It is a must to considerate how to preserve and restructuring these buildings because they contain historical value and precious knowledge about this area in the past and in term of quality of life it will be increasing if we consider this factor. Well-being of resident is important thing that we must focus on this area.

4-2-1 Building material

Most of building materials in this area are made from wood cause this area is historical area that many wooden house established in the past and still in use in present day. Concrete and wooden mix concrete is also used in this site especially religious building and some of modern house. From this map, we can see that this area is vulnerable zone for fire situation because of many wooden houses were built together and some part of their houses are connect each other.

5. Result

5-1 Building character

From analysis data, we simulated 3 factors of this site by ArcGIS to get the result of building character. The building character chart shows about comparison among building area, building use and material.

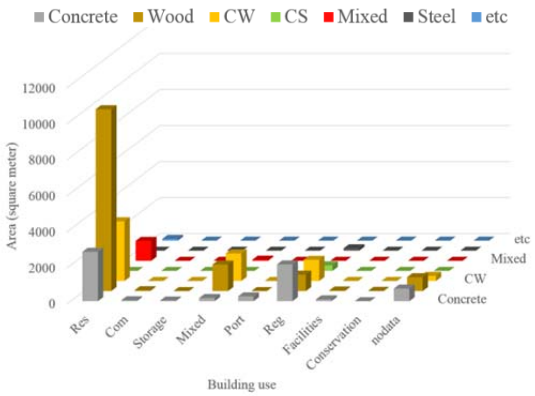

Fig. 10. The building character chart

From this result, we can separate the most building use that we found in this area. There are Residential, Mixed use and Religious building. We found that Residential type has highest value of area coverage and building use type in this area while the following of most material of residential type are wood, concrete-wood and concrete, respectively. In term of mixed use, 2 materials that popular in this type are wood and concrete-wood. Most of religious buildings type is were made by concrete and concrete-wood.

5-2 Vulnerable zone

By using ArcGIS to combined building condition and building material. We evaluate vulnerable in this area. As follow: Blue building means low vulnerable building. Orange building means Moderate vulnerable building and red building means high vulnerable building. Then, we offset 5 meters from all building. As shown on the map, light pink color and dark pink color means low fire spreading and high fire spreading. On map 2 shows about the offset zone from canal into the residential area and it's means advantage zone from canal. After overlayed 2 maps together, we found the area that is the most vulnerable zone and low vulnerable zone. There are 4 points that have the most risk for evacuate when fire emergency occured. Even though, some points is not located on the dark pink zone but some of surrounding element that we show on analysis part can cause this area to become a risk zone.

Fig. 11. Vulnerable zone

Point (A) is located near the narrow street and intersection point. Some of houses near point (A) are blocked to evacuate on emergency times. While this point is easy to connect to temple but residents can't escape through to primary evacuation place cause many high vulnerable building located around this point. Moreover, this area located far from canal. Point (B) is the area that located near a sub canal but some of architecture elements blocked resident's escape route to the canal and bridge that link 2 sides of communities are too small and not connect to the main canal. So residents must take along detour to another way to access the main canal. Also point (C) is located near a sub canal but has difficulty to access to canal. Moreover, temple's wall blocked all houses around this area to access to primary evacuation place. Point (D) is located near the temple and townhouses. Some of houses in this area contain vulnerable building and blocked by temple's wall that separated and make difficulty to access to the main street temporary safe place and primary evacuation place.

6. Discussion

In this study, which targets the historic town area in Khlong Bang Luang are finding the vulnerable zone and the blockage area. By using vulnerable factors and site's potential to analyze the vulnerable zone which could led to determination of the evacuation routes in multimodal ways in further study. We focus the vulnerable zone from each house and canal by survey data and simulate in ArcGIS application.

Here, we should mention the limitations of this study. Elements factor that we show on this paper are some of our survey data. During the time that we survey in this area, some of building still renovating and destroying to become a new building. Most of building material made from wood. Thus, we can understand this area that is easy for fire spread. Furthermore, Most of building use are residential type and difficult to access. Some of residential is use the same access to accommodation because they are relative family. So this increase difficulty for evacuation when fire emergency occurred. Moreover, Public Street is narrow way and was blocked by some of architecture element and parking space. Residents could find difficulty to escape through to temporary safe place or another area.

Lastly, this study was an exploratory survey that can be referred and showed the results of high vulnerable zone and blockage zone in primary stage. Another area, which is same character of this area can follows the methods of this study to be a guideline for finding element factor that can effect to their own area.

7. Conclusion

Recently, Khlong Bang Luang is an old historical town that basically initiate a fire emergency system. But in term of architecture and urban design is the one factor that could improve this area by designing, planning and increasing well being of people in this area to live with their traditional way and modern life on fire emergency times.

In this study, the result that shows is some of the part that we studied in this area. We found many results that can effect and estimate the vulnerability of this site. From this study, we focus on the physical issues consist of building use, building material, building area, building condition and building storey with the advantage of this site. So the results of this analysis could help in understanding the current situation and elements factor for residents to know the vulnerable and blockage zone. We will continue to further research by using this study as the one factor that can clarified the vulnerable zone to simulate with applications and find the best solution for evacuate on fire emergency time and guideline for living in this area by design architecture elements, safety zone and so on.

8. References

- Mishima, N., Miyamoto, N., Taguchi, Y., (2012), A Study on a Proposal-scheme for Evacuation Route Planning at Large-scale Disaster in a Historic Preservation Area, ISHED Conference 2012, Japan.
- Mishima, N., Miyamoto, N., Taguchi, Y., Kitagawa, K., (2014), Analysis of current two-way evacuation routes based on residents' perceptions in a historic preservation area, International Journal of Disaster Risk Reduction VOL.8, Japan.
- Mishima, N., Taguchi, Y., (2011), A study on a proposal and its evaluation of fire spreading prevention in a historic area, Journal of Architecture and Planning, Vol.76, No. 670, pp.2345-2351, Japan.
- http://www.123rf.com/photo_14896599_thailand-bangkok-province-map-isolated.html , retrieved on April 20, 2015
- David, P. and Steinberd, D., (1987). In search of Southeast Asia, U.S.A.
Preservation New Jersey, Inc. (2001). What is historic preservation. NJ, U.S.A.
- Lepp, A., (2001), Managing Building Conservation, Building Preservation and Maintenance in Practice Seminar in Riga, Sweden
- Worrasit, T., (2012). Thailand's neglected urban heritage: Challnges for preserving the cultural landscape of provincial towns of Thailand, Gothenburg, Sweden.
- Brian, H., (2001). Introduction. Lamu, Waterfront Revitalization in an East African Port-city Southampton, UK.: 297-313.
- Hodges, A., (1995). Emergency Risk Management., Australia
- McDonald, L., (2010). Using SMS in disaster response – and preparedness, South Africa.
- Pearce, L., (2002). Disaster Management and Community Planning, and Public Participation: How to Achieve Sustainable Hazard Mitigation. Canada
- Whelan, RJ., (1995). The ecology of fire.
- Kobes, M., Helsloot, I., Vries, B., Post, J., (2008), Building safety and human behavior in fire : A literature review, Netherlands.
- Goldratt, E., (1984), The Goal.

5. Study on urban morphology and public space location to identify Character of historic town; Case study of Chiang Mai.

歴史的資源に恵まれた都市における公共空間と都市形態

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Abstract: This paper presents toolset method by implemented both Geographic Information System with space syntax technic to understand urban morphology of historic town and emphasized concept of axis core relate to public spaces. Usually, historic town was planned with traditional belief and/or politic led to geometry shape and road of these cities be symmetry and easy to manage. These axes road frequently attached by public space to serve activities which this paper clarifies public spaces in historic town that clustering along axes and represent social understanding of urban morphology.

Methodology in this paper is results of syntax simulation that input as layers of GIS application to analyze with other urban items. Focus area in this study is Chiang Mai historic town. Situated in the most northern of Thailand, According with urban spatial condition, it planned with delicate consideration led to strong geometry shape and axis line of urban network.

The result of the study showed that Chiang Mai has low in intelligent coefficient which mean it could be easily get lost in historic town because complicate non-grid urban network however core and cross axes is working quite well. GIS application mapped with space syntax layer showed how highly global integration and connectivity value of axes and also showed clustered public space attach along these high integrated networks. Result of this study provide better understanding for urban design feature in historic town for further proper urban policies on activities in these spaces and also urban improvement priority for way-finding solution.

Keyword: Space syntax, Urban morphology, Historic town, Axis core, Chiang Mai

1. Introduction

1-1 Historic town and its existence

Historic town is one of human legacy on how it settle altogether with traditional, political and spatial aspect .It also considerable pressure for urban planner and designer or policy-maker to retain those characteristic of these historic town to residents and visitors (Strange, 1997).

This study seeks to understand how urban settlement belief in detail that response and retain to users in present-day. Due to rapid urbanization level especially in developing country this may led to proper policies in spatial improvement of historic town. Core Axis of city is one of city element that must be intentionally set-up with highly geographic consideration these axes usually served as war-time main channel, inherit cultural activities and way finding for inhabitants. In South East Asia historic cities settlement usually influenced from “Dtri-poom” or three world (Heaven, Earth, and Underworld) concept for prioritize important level of architectural elements in its core. This concept imply in main axis showed Chiang Mai historic town there used to has important route preserved for Devine king (Represent of heavenly demigod), religious and major cultural activities. For

present-day these core function of axes usually representing richness history of city which profound by its traditional architectural spaces, inherit cultural activities or even lively walking street that exhibit Chiang Mai products in these roads. Even though, there many studies discussed about sustainable historic town in socio-economic and spatial issues in modern era. However to identify inhabitants movement as urban morphology comprised with public spaces especially in traditional axis-oriented settlement in historic town is performing may still understudy.

In this study we will seek to interpreted core axis and cross axis of city that comprise to overall urban morphology and it's attach public spaces by space syntax approach. The questions considered in this study are issues as follow:

1) Are core axis and cross axle lines that represent primary road determined in historic belief highly integrated with overall urban network?
2) Are public spaces related to these axis or other highly integrated routes?

1-2 Purpose of study

This study is to identify important and its existence of urban axes in historic town. Nowadays these axes usually serve as core active of transportation or tourist attraction. It is most important to seek effective improvement through its natural linkage in proper directions especially in urban planning and design as conserve core and cross axis of historic town that concerned public space location. The methodology also developed to evaluated axes of city through GIS and space syntax toolsets in order to reaffirm of assumption that concerned in urban morphology and also provide relation of urban items through this method. Which may lead to new perspective in understanding character in flowing of natural movements and to provide design guideline that would response to implication of study.

2. Methodology

2-1 Space syntax and GIS application

Space syntax and Geographic Information System (GIS) applications are tools that seek to understand urban morphology and classify or analyze spatial part of cities. However, space syntax was usually explain how spatial configuration of city linked together and identifying social movement response to its. To study another components of city such as buildings, urban spaces, etc. might be use another toolset to linking between other variations beyond spaces. These tools are still developing to overcome limitation. Space syntax toolsets in this study will combine with GIS tool to reply issues.

2-2 Study procedure

To identify integration values and consistency urban axes and public spaces. This study proceeded through space syntax theory displayed as layer in GIS application. This focused on urban network in historical city which contain traditional axes. Firstly, this study reviewed and determined the core axis and cross axes of city as focus area then collected information layers and using GIS application to assort necessary layers of content and output layer of urban network to evaluate in space syntax tool. Secondly, to identify urban morphology of sites study integrated and conform to settlement

belief such as axis core concept through spatial syntactic toolset. To generated axial line within urban network's convex spaces. Thirdly, result of integration values will be display as layer in GIS application which overlay with other contents of site study to further analysis. Finally, these set of data will be discussed and concluded to verify axes of historical city that it still perform as main social element and also identify the most integrated of urban network which led to character of city that necessary to provide proper measure of planning and design to conserve this indigenous spatial-social spaces.

The essential outputs of the study are relationship between core axes in historic town of Chiang Mai and the most integrate axial line from urban network. Another output was also displayed the connection between road as urban morphology that overlay on different usage of public spaces. Finally, this result could be key of proper recommendation for urban axis core and public spaces improvement that will emphasize character of historic town.

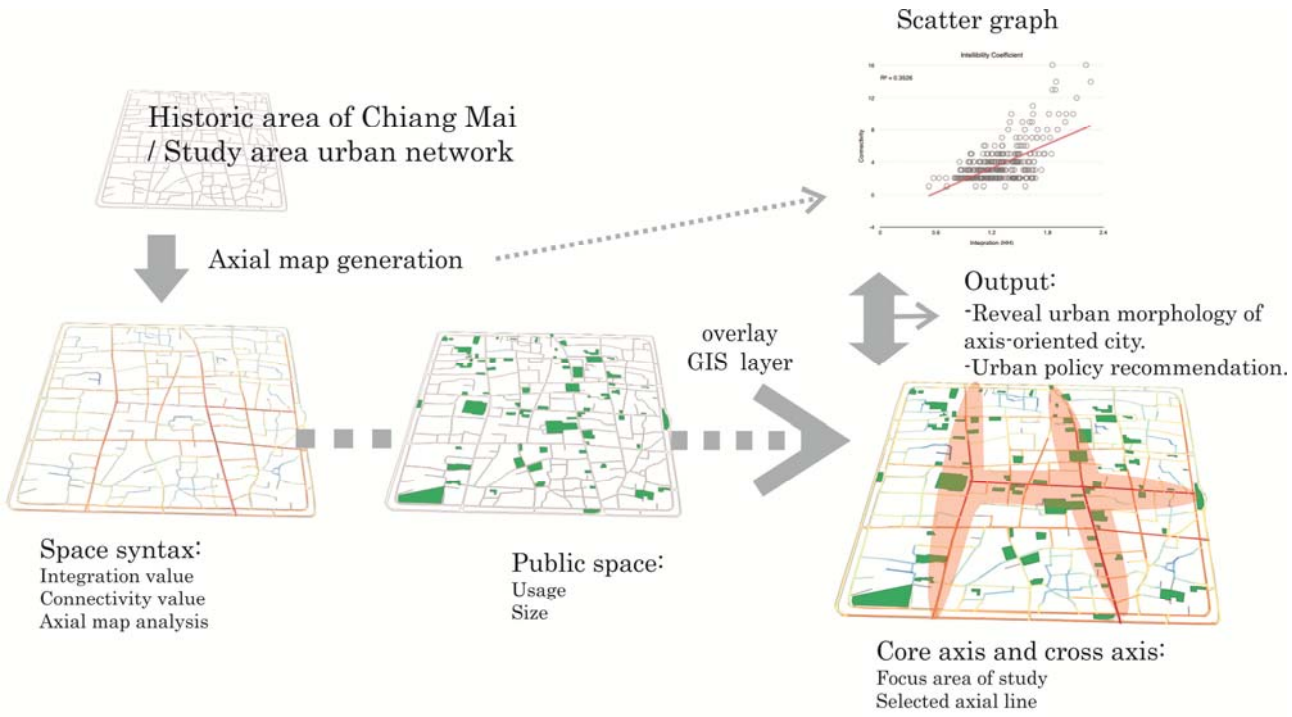

Figure 1. Study procedure and toolsets.

3. Result and Discussion

3-1 Study result and discussion

This study focused on spatial of Chiang Mai's historic town where concept of axes priority delicately applied since settlement period. Chiang Mai also provide multi spatial character from delicate shape of symmetry geometry to free-form natural pathway in residential area within historic town. Due to the fact that multi politic and cultures continually influence spatial character of Chiang Mai led to semi-grid system road network. As geometric shape of city received and intent to imitate concept of

others capital cities established during that period such as Sukhothai (Soraya, 1999). This geometric concept applied to perimeter shape of city wall and moat that would be useful in time of war.

The Axis of Chiang Mai can divide into two type; primary axis line is across from east to west this core axis was highly considerate to be the pathway for high-rank nobles or monarch (Ongsakul, 2010). This axial line lead to destination which is 'Wat Phra Singha' the main temple of Chiang Mai represent that this city has high respect in Buddhism and also temple determine to situate in end of core line intentionally collocation to break axis force of visibility and prevent it from penetrate throughout east-west axis. Moreover, This Axle line also directly leading sight to background of City which is mountainous area that connect to another important temple at top of mountain of Chiang Mai called 'Wat Phrathat Doi Suthep'. In this core space is also area to perform major inherit cultural or religion activities. Another cores that also partially intentional applied into city geometry are cross axle line which consist of two road across from north to south. These roads are function as primary pathway for civilians living in city align with the line of river nearby which reflect richness of resource of agriculture that connect northern and southern part however these roads significantly deviate from centroid of city perimeter which differ from core axis to the fact that the east-west axis is distinctly across centroid of city and also perpendicular align with city moat perimeter.

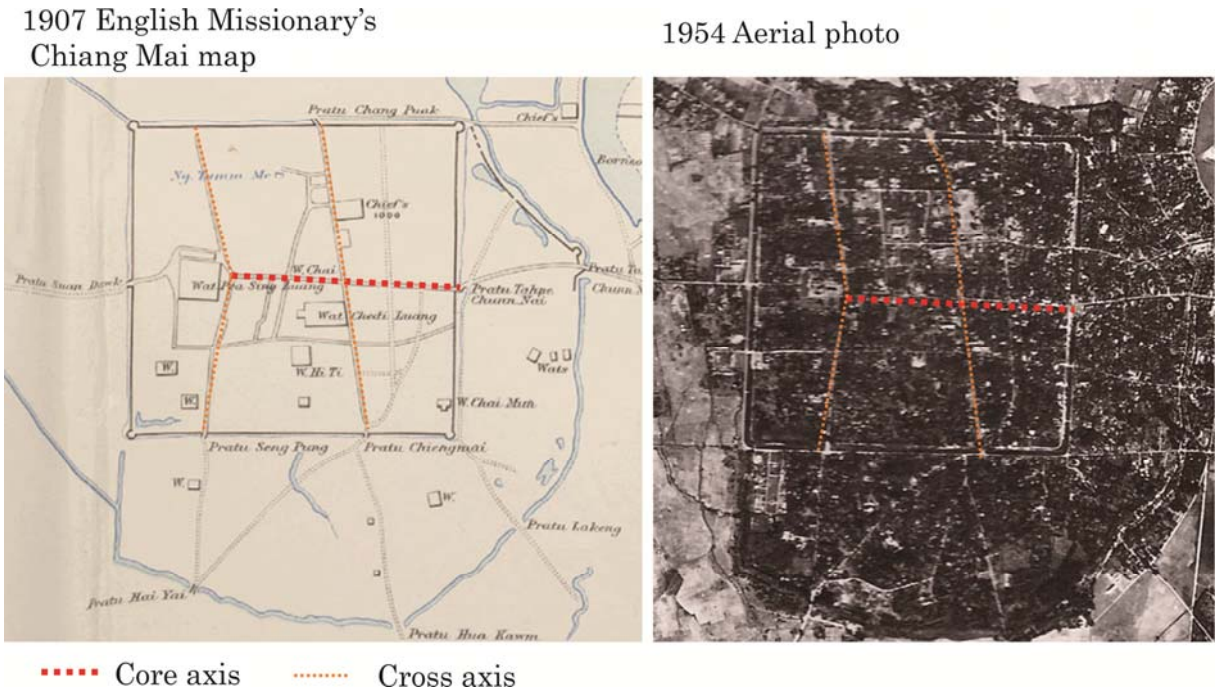

Figure 2. Chiang Mai historic town and core, cross axis

As for public space, Chiang Mai had inherit tradition that concerned to public space called 'Kuang' which is public space that defined by its attachment and function. In this historical town of Chiang Mai has public spaces that usually attach to temple and distribute throughout area. These temple public space partially determine road network direction from residential area to temple which non-grid system might derive from this cause. From these reason 'Kuang' in Lanna culture is quite

relate to its road network due the center of communities are temples where contain community cultural, social and even education activities inherit from past to present-day.

Result of syntactic analysis of Chiang Mai urban network are as follow. As for integration value of street it obviously showed that the most integrate axial line is the core axis of city has value of global integration (r=n) at 2.264(A1), 2.113(A2) while cross axis lines are 2.213(B1), 2.075(B2), 1.757(B3), 1.500(B4) and 1.815(C1), 2.000(C2), 1.900(C3), 1.600(C4), respectively as show in **figure 3** However from global integration also displayed discontinuous of axial lines which mean natural movement may had to deviate from core axis of city into cross axis because connectivity value of cross axis (B1) that had highest value (connectivity=16). Despite of discontinuity of movement, both core axis and cross axes lines distinctively showed important role as main network of city. For Intelligibility coefficient of city showed that Chiang Mai has low intelligibility value (R^2=0.3526, Mean integrate=1.27) which mean urban configuration may cause tourists or outsiders in moderate incident of lostness. Primary cause of lostness also showed in syntactic map that it has complicate sub-networks however core and cross axes of city have high value of intelligibility (axes R^2=0.7346, Mean integrate=1.93). As for spatial integrate value of Chiang Mai, it is significance conform to non-grid subnetwork of road system which is quite complicate refer to intelligibility value or lostness however all axes of city are highly integrate which can represent that axes of Chiang Mai have highly function as main cognitive spatial core and simultaneously reaffirm the complex urban network of historic town of Chiang Mai.

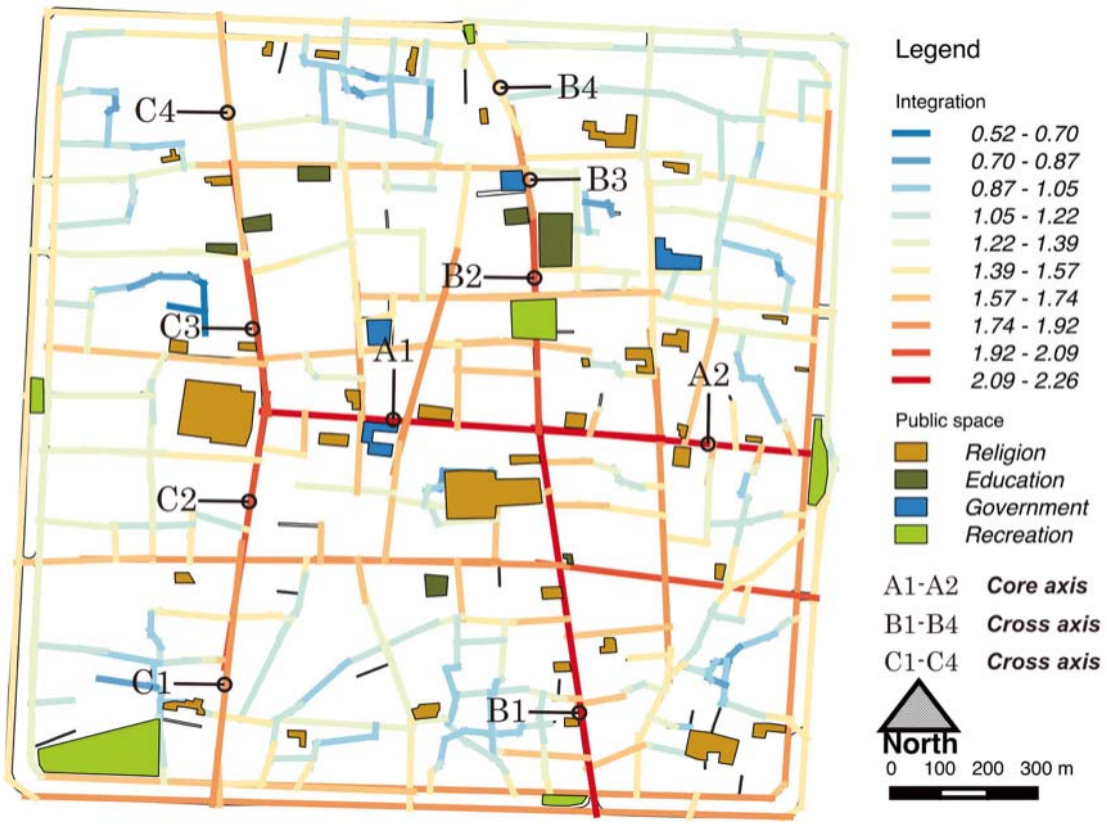

Figure 3. Syntactic Integration analysis and public spaces.

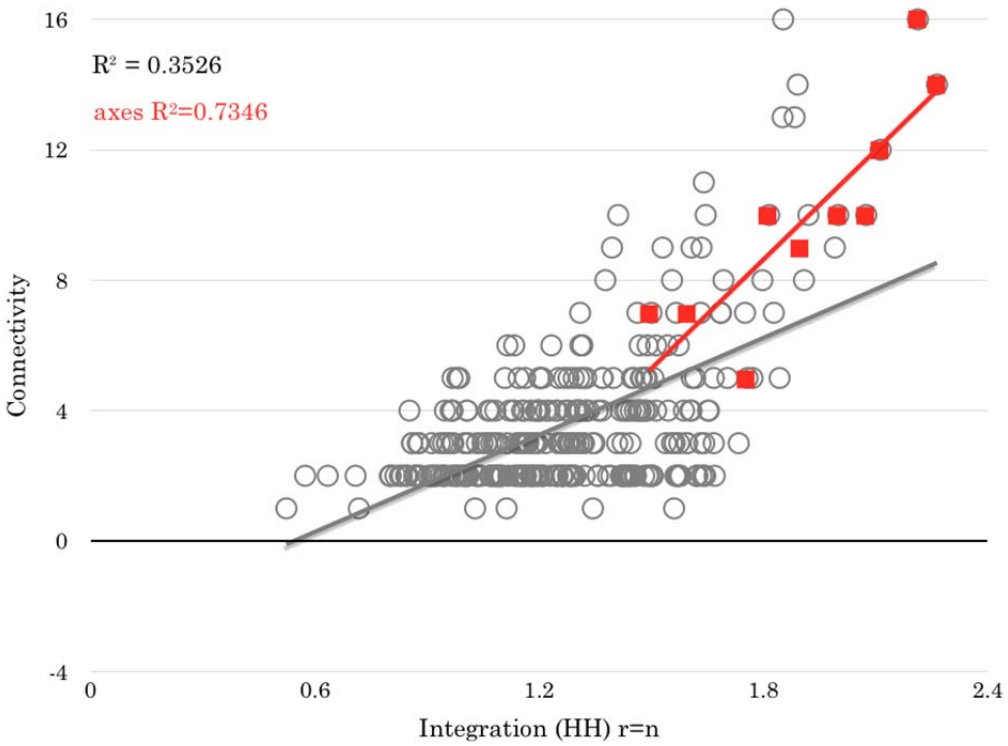

Figure 4. Intelligibility Coefficient graph.

Table 1. Axial line syntactic value

id	Connectivity	Integration HH, (r=n)
a1	14	2.264
a2	12	2.113
b1	16	2.213
b2	10	2.075
b3	5	1.757
b4	7	1.500
c1	10	1.815
c2	10	2.0
c3	9	1.9
c4	7	1.6

For public spaces in Chiang Mai could be classify by it usage type as follow; Religion, Education, Government and recreation. By Empirical survey, mostly public spaces in Chiang Mai are religion spaces due to Buddhism belief since settlement period however when overlay items of layer, this study found that most of public space cluster and attach to highly integrate roads as showed in **figure 3.** Especially first and second largest area of public space are significantly attached to both highest integrated of roads in A1 and B1 as found by space syntax tool, respectively.

3-2 Conclusion and policy recommendation

From this study showed that space syntax interpreted urban morphology of core and cross axes appears in significantly different from general roads as displayed by integration(r=n) map within historic urban network meaning that axes determined to be main function in site of study are exceptionally performing as primary road by this spatial analysis however core axis of city appear to be discontinuous in term of axial line generated by syntax tool which resulted as the most integrate are A1 and B1 line. These surprisingly prediction result of integration value of city axis. When these highest integrated axial lines overlay with public space layer, it showed prominently related to the largest public space of Chiang Mai. This can be conclude that public spaces and axis of Chiang Mai that intentionally collocation are related and eventually might affected sub-network that linked to these roads afterward. As spatial configuration, Chiang Mai historic town has quite low intelligibility coefficient cause users of roads easily lost due to non-grid and complicate system. Result and conclusion of study may lead to urban policies recommendation especially design guide to emphasize pedestrian-oriented concept to reduce lostness in study area simultaneously with public spaces activities promotion which could be prioritize or phrasing by result of this study.

References

Bin, J., M, B., & C, C. (1999). Geometric accessibility and geographic information: Extending desktop GIS to space syntax. *Computer, Environment and Urban system*, 127-146.

Chiang Mai Municipality Office. (2013). *Chiang Mai city policy 2013.* Chiang Mai: Chiang Mai Municipality office.

Guntang, I. (1990). *The study on Characteristic and development of Transportation network and built-up area in Chiang mai.* Bangkok: Chulalongkorn University.

Hilllier, B. (2007). *Space is the machine: a configurational theory of architecture.* London: Space Syntax.

Hilllier, B., Penn, A., & Hanson, J. (1993). Natural movement or configuration and attarction in urban pedestrian movement. *Environment and Planning*, 29-60.

Lee, S., & Kyung , w. (2013). Combining space syntax with GIS-based built environment measures in pedestrian walking activity. *Proceeding of the Ninth International space syntax symposium* (p. 098). Seoul: Sejong University.

Ongsakul, S. (2010). *History of Lanna.* Bangkok: Ammarin.

Parfect, M. (1997). *People, park and the urban green: A study of Popular meaning and Value for Open spaces in the city.* London: Routledge.

Rapoport, A. (1990). *History and Precedent in Environmental Design.* New York: Plenum.

Soraya, T. (1999). *Becoming Thai.* Bangkok: Chulalongkorn University.

Strange, I. (1997). Planning for change, conserving the past: towards sustainalble development policy in historic cities? *Cities*, 227-233.

Tantsukanunt, P. (2014). *Urban Conservation.* Chiang Mai: Maejo University.

Pranom Tansukanant, W. D. (2013). *The multi layers district of Chiang Mai city.* Chiang Mai: Maejo University.

6. The Housing Welfare Policy for Housing Poverty and Unstable Housing: The Case of Korea

居住困窮者に対する住宅福祉政策のあり方

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Abstract: There are two distinctive types of housing problems. One is a housing poverty problem characterized by sub-standard housing conditions. Another is an unstable housing problem due to high housing costs relative to income. Korean government tried to reduce housing poverty with various policies. The policy effort is quite successful by reducing national housing poverty ratio dramatically from 23.1% in 2000 to 10.6% in 2010. In most cases, all households under sub-standard conditions are assumed to be policy target. But real targets of housing policy are households in rental status with low income.

Beside housing poverty problem, many urban households suffer from unstable housing conditions due to high burden of housing costs. Housing costs represent the affordability or availability of housing service, especially for those who have not their own houses. High housing costs drive low and middle income households into unstable housing condition. In fact, not all of the sub-standard households are in unstable housing conditions, vice versa. Large portions of households above national housing poverty standards are suffering from unstable housing conditions.

The government strategy had emphasized on providing more houses without considering who occupy these houses. Recently, housing policy by the central government focuses on promotion of housing market by releasing regulations designed to control speculation on houses and lands. These policy approaches are not proper in the era of housing welfare. Housing policy should focus on alleviation of housing poverty as well as unstable housing problem, rather than on promotion of housing (construction) industry. Besides low income housing, policy attention for middle income households under unstable housing conditions due to high burden of housing costs should not be ignored. For example, some types of rental housing which enable low and middle income households to reduce their housing problems are required.

This research is designed to analyze the current status of housing problems -- both sub-standard housing and unstable housing conditions by using binary logit model, and to suggest policy implications in the case of Korea. The findings suggest two crucial policy implications. First, government housing policy should focus on solving both housing poverty and instability problems simultaneously. Second, the differences in housing conditions are severe among regions, and thus housing policy priority should be given differently between rural and urban area, as well as among regions. Therefore, housing policy implementation should be led by local governments who better knows local situation and conditions.

Keywords: Housing poverty, unstable housing condition, binary logit model

Ⅰ. Introduction

Housing service is a necessity for decent human life. There are two distinctive types of housing problems. One is a housing poverty problem characterized by sub-standard

housing conditions. Another is housing instability problem due to high housing costs relative to income.

According to Housing Act of Korea, the State and local governments shall endeavor to achieve the people's residential stabilization and the elevation of residential standards in formulating or implementing the housing policy. Korean government tried to reduce housing poverty with various policies. The policy effort is quite successful by reducing national housing poverty ratio dramatically from 23.1% in 2000 to 10.6% in 2010.

Beside the housing poverty problem, many urban households suffer from unstable housing conditions due to high burden of housing costs. Housing costs represent the affordability or availability of housing service, especially for those who have not their own houses. High housing costs drive low and middle income households into unstable housing condition. In fact, not all of the sub-standard households are in unstable housing conditions, *vice versa*. Large portions of households above national housing poverty standards are suffering from unstable housing conditions. This is especially true for households in large cities. However, the government efforts concentrate on supply-side only. The government strategy had emphasized on providing more houses without considering who occupy these houses. Recently, housing policy by the central government focuses on promotion of housing market by releasing regulations designed to control speculation on houses and lands. These policy approaches are not proper in the era of housing welfare.

In this perspective, this research is designed to analyze the current status of housing problems -- both sub-standard housing and unstable housing conditions by using binary logit model, and to suggest policy implications in the case of Korea.

Ⅱ. Housing Conditions of Korea

Housing conditions can be measured by housing indexes. There are many kinds of housing condition indexes adopted by countries around world. This research shows Korean housing conditions with three critical indexes - Number of rooms per person (Person per room) and living area per person as housing crowding indexes and rent-to-income ratio (RIR) as a housing instability index.

Data were collected from various sources. Population and housing data were obtained from National Census (2000 and 2010) and Korea Housing Survey (2010), provided by National Statistic Office of Korea. Software utilized were ArcGIS for geographical information system and SAS 9.3 for statistical analysis

1.Housing supply

The housing supply ratio reached 112.9% in year 2010 as shown in Table-1, and it implied that the age of supply-side policy came to an end. The housing supply ratio is a relative ratio of number of houses to that of households. Therefore, Korean housing policy should consider demand side more seriously than supply side.

<Table-1> The housing supply ratio

	2000	2010	Change(%)
population	46,136,101	48,580,293	+ 5.30
No. of households	14,311,807	17,339,422	+ 21.15
No. of house	13,767,958	19,576,207	+ 42.19
Housing supply ratio	96.2	112.9	

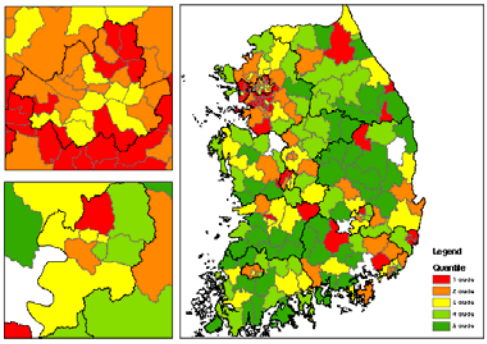
2.Housing Crowding Condition

Housing crowding can be measured by the number of rooms per person. Number of room per person sometimes is converted to persons per room. Another crowding index is a living area per person. International standard of the number of rooms per person is one room per person in general. In this sense, number of rooms per person is well above of international standard in all provinces as shown in Table-2. However, among cities and provinces of Korea, Seoul, along with provinces of capital region, is in the worst condition for all housing crowding conditions. On the contrary, non-metropolitan provinces show relatively better housing conditions, except Gyeonggi province (of the capital region).

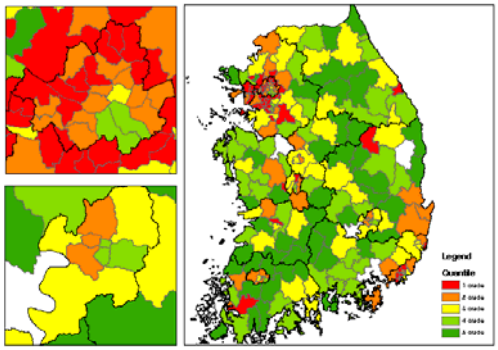
<Table-2> Housing Crowding Condition

		Room per person	Area per person
Metropolitan City	Seoul*	1.19	22.78
	Busan	1.26	23.31
	Daegu	1.26	25.12
	Incheon*	1.19	22.09
	Gwangju	1.22	24.44
	Daejeon	1.19	25.38
	Ulsan	1.20	24.23
Province	Gyeonggi*	1.19	23.28
	Gangwon	1.32	27.91
	Chungbuk	1.28	27.10
	Chungnam	1.30	26.83
	Jeonbuk	1.32	27.41
	Jeonnam	1.38	27.32
	Gyeongbuk	1.37	27.22
	Gyeongnam	1.27	25.26
	Jeju	1.33	25.33
	Nation	1.24	24.58

*: capital region



<Figure-1> Number of Room per Person



<Figure-2> Living Area per Person

Note: Uncolored zones represent data not available zones. Solid black lines represent the administration boundary of cities/provinces.

The two figures show that living area per person shows a similar pattern with room per person. Number of room per person and living area per person are low in large cities, especially capital region and south-eastern region, The figures also illustrate that people in the ring of Seoul live in fewer rooms and narrower living area than those of inner Seoul.

Ⅲ. The Characteristics of Housing Problems

1.Housing poverty

Housing poverty can be defined by various standards. In Korea, four types of the minimum housing standards were set by the ministry of land, infrastructure and transport. They are number of room standard, living area standard, facility standard, and structure/environment standard. More detailed classification can be found in <Table-3>.

<Table-3> Minimum Housing Standards

Number of household members	①Number of rooms used*	②Total living area(㎡)
1	1 K	14
2	1 DK	26
3	2 DK	36
4	3 DK	43
5	3 DK	46
6	4 DK	55
③Facility Standard	Modern kitchen, Flush bathroom, Hot water bathing facility	
④Structure Standard	Boiler, Structural stability, Windshield, Waterproof , Fire detector, Leakage breaker, Ventilation	

* K : Kitchen, D : Dining kitchen, Number : Number of bedroom.
Source : Ministry of Land, Infrastructure and Transport of Korea

Based on the Housing Survey of 2010, the housing poverty ratios by standard were calculated as shown in Table-4.

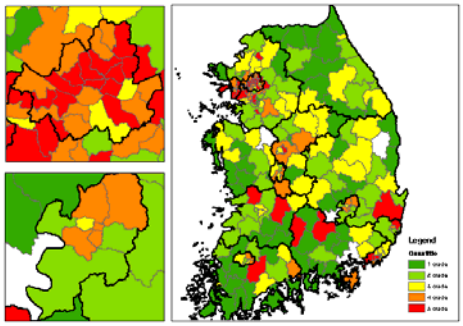
<Table-4> Housing Poverty Ratios by Standard

		① Area	② Room	③ Facility	①+②+③	④ Structure	①+②+③+④
Metropolitan City	Seoul	8.30	1.34	3.32	10.65	10.62	18.86
	Busan	6.87	0.86	8.38	14.19	6.57	17.63
	Daegu	4.94	1.26	10.34	14.25	10.52	20.17
	Incheon	8.19	1.11	5.23	13.19	10.00	19.77
	Gwangju	4.65	0.83	5.07	9.38	5.90	13.75
	Daejeon	4.10	0.42	2.71	6.94	6.81	12.50
	Ulsan	3.25	1.40	5.09	8.33	5.88	11.40
Province	Gyeonggi	4.74	0.84	6.05	10.28	11.93	17.85
	Gangwon	2.24	0.77	15.77	17.69	18.78	28.08
	Chungbuk	4.51	1.46	15.00	19.65	16.04	29.24
	Chungnam	2.37	1.03	16.22	18.65	16.99	28.59
	Jeonbuk	3.33	1.86	16.60	19.74	22.76	31.79
	Jeonnam	2.47	0.86	26.23	28.70	21.91	38.77
	Gyeongbuk	2.35	1.21	21.78	23.24	21.59	31.81
	Gyeongna	3.23	1.55	14.48	17.85	18.25	26.87
	Jeju	3.33	0.95	14.64	17.14	31.43	39.64
	Nation	5.05	1.11	9.80	14.37	13.45	22.44

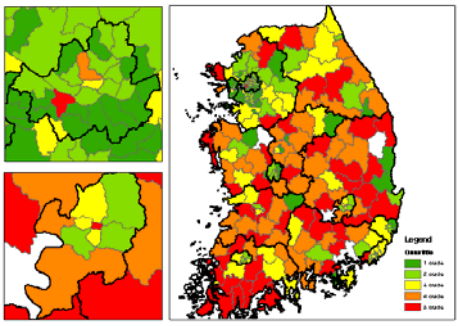
Source: Korea Housing Survey, 2010,

National housing poverty ratio by any one of area/room/facility standards was 14.37%, and overall ratio - the ratio of households in any one of the housing poverty standards - was 22.4%. This ratio expresses that though improved compare to past, 22.4% of households are suffering from sub-standard housing, characterized by one of the problem of narrow living space, poor facilities, old and dangerous building structures.

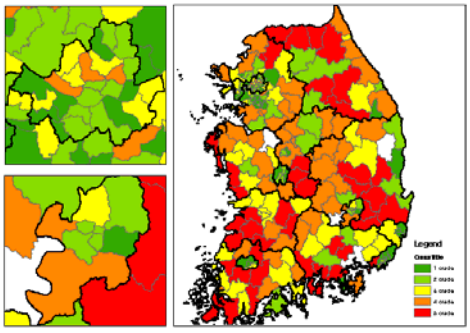
There were distinctive characteristics of housing poverty among cities and provinces. M etropolitan cities revealed living area and room problems while non-metropolitan region s illustrated facility and structural problems as shown in Figure 3-6.



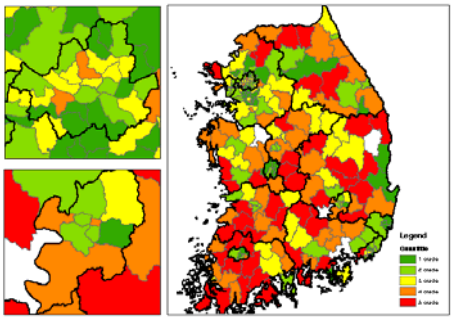
<Figure-3>Housing Poverty - Living Area Standard



<Figure-4>Housing Poverty: Facility Standard



<Figure-5> Housing Poverty: Structure Standard



<Figure-6>Housing Poverty: Overall

2.Housing instability

This study employs rent to income ratio (RIR) as a housing stability index. RIR can be measured by the following formula.

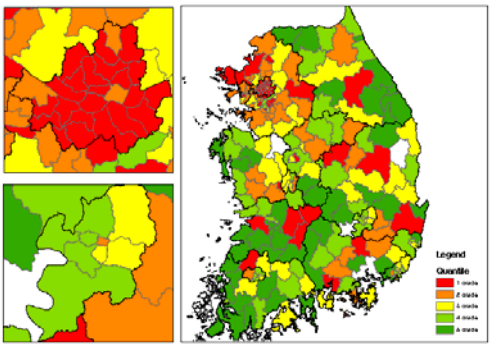
$$RIR(\%)=\frac{\text{median housing cost}}{\text{median income}} \times 100$$

Housing cost in the formula includes rental cost and maintenance cost. In general, households pay more than 30% of income are considered to be in unstable housing conditions. Table 5 shows very high burden of housing cost in the capital region. High housing costs drive low and middle income households into unstable housing condition. In particular, the housing burden of Seoul is extremely high compare to other cities

<Table-5> RIR by Tenure Type (Metropolitan Cities) (unit : %)

Metropolitan City	Jeonse rent	Monthly rent with deposit	Monthly rent w/o deposit
Seoul	27.22	28.33	41.67
Busan	19.39	25.78	20.10
Daegu	20.83	26.89	28.50
Incheon	25.00	33.33	40.00
Gwangju	19.33	25.56	26.00
Daejeon	21.33	31.22	22.67
Ulsan	19.64	22.17	26.09

※ 1) RIR(%)=(median housing cost/median income)×100 (housing cost = rent + maintenance cost)
2) Jeonse (monthly) rent is calculated by applying 8% of interest rate to the amount of Jeonse deposit.



<Figure-7>Housing Instability: RIR

Housing costs represent the affordability or availability of housing service, especially fo r those who have not their own houses.

<Table-6> Average Housing Price/Costs by Metropolitan City (unit : 1,000won/㎡)

City	Owner (single house)	Owner (apartment)	Jeonse	Monthly Rent with Deposit		Monthly Rent without Deposit
				Deposit	Rent	
Seoul	7,436 (280)	5,488 (231)	1,766 (187)	411 (165)	11 (164)	18 (170)
Busan	1,955 (74)	1,831 (77)	801 (85)	294 (118)	6 (89)	7 (66)
Daegu	1,574 (59)	1,635 (69)	763 (81)	200 (80)	6 (89)	7 (66)
Incheon	2,404 (90)	2,537 (107)	853 (90)	214 (86)	8 (119)	9 (85)
Gwangju	1,095 (41)	1,420 (60)	632 (67)	212 (85)	5 (74)	12 (114)
Daejeon	2,045 (77)	1,872 (79)	841 (89)	169 (68)	6 (89)	15 (142)
Ulsan	2,101 (79)	1,848 (78)	959(101)	248 (99)	5 (74)	6 (57)

※ Source: National Housing Condition Survey, 2010
Values in parentheses is calculated by putting mean value of 7cities =100.

In Table 7, housing poverty and housing instability by income level are presented. Housing poverty by income level proves that not all of the sub-standard households are in unstable housing conditions. *vice versa*. Large portions of households above national housing poverty standards are suffering from unstable housing conditions.

Tables and figures showed that the differences in housing conditions are severe among regions

<Table-7> Housing Poverty and Housing Instability by Income Level

Metropolitan City	Income level	Poverty=No Instability=No	Poverty=No Instability=Yes	Poverty=Yes Instability=No	Poverty=Yes Instability=Yes
Seoul	1	29.6	49.1	5.5	15.8
	2	44.3	34.0	10.0	11.7
	3	43.7	30.9	15.5	9.9
	4	51.4	33.6	9.5	5.5
	5	74.6	19.8	4.7	0.9
Busan	1	39.9	30.7	17.3	12.0
	2	49.2	23.0	15.9	11.9
	3	65.1	13.0	18.8	3.1
	4	70.0	15.7	12.2	2.1
	5	89.1	4.5	6.2	0.2
Daegu	1	42.2	28.0	19.3	10.5
	2	60.7	19.3	15.7	4.3
	3	68.9	10.9	18.6	1.6
	4	69.6	11.1	17.6	1.7
	5	90.5	4.5	4.7	0.2
Incheon	1	41.0	31.7	16.7	10.7
	2	57.3	24.5	15.4	2.8
	3	57.5	23.8	14.5	4.1
	4	67.5	22.3	7.2	3.0
	5	86.8	5.8	6.6	0.9
Gwangju	1	50.6	26.8	12.6	10.0
	2	64.1	22.8	5.4	7.6
	3	81.7	9.2	7.5	1.7
	4	83.7	10.9	4.1	1.4
	5	91.2	3.7	5.0	0.1
Daejeon	1	45.6	42.6	5.3	6.5
	2	50.9	37.3	6.4	5.5
	3	70.7	20.3	5.7	3.3
	4	73.3	17.6	7.1	1.9
	5	89.2	6.9	3.4	0.5
Ulsan	1	45.9	27.5	19.3	7.3
	2	55.7	26.2	11.5	6.6
	3	71.4	11.9	13.1	3.6
	4	81.0	14.4	3.9	0.7
	5	93.5	2.9	3.1	0.5

Note 1) Housing Poverty No=not included any standard, Yes= included any one of the standards.

2) Housing Instability No= RIR below 30%, Yes= RIR above 30%.

3) Income Level 1: below 100% of the minimum cost of living

2: 100~120% of the minimum cost of living

3: 120~150% of the minimum cost of living

4: 150~200% of the minimum cost of living

5: above 200% of the minimum cost of living

Ⅳ.The Characteristics of housing problems: The binary logit model

1.Model: The binary logit model

This study adopted a multiple logistic regression model. The logistic relation was used, since the dependent variable is binary, that is, any household is in either housing poverty or not (poverty household=1, non-poverty household=0). The probability of housing poverty household can be calculated by the following equation,

$$p_i = \frac{e^u}{(1+e^u)} \quad \cdots\cdots (1)$$

where p_i is the estimated probability that the i^{th} household (i=1, 2, 3,…n) is poverty household, and u is the utility function, usually defined as a linear regression equation as follows.

$$u = \alpha + \sum \beta_j X_{ij} \quad \cdots\cdots (2)$$

From Equations (1) and (2),

$$\text{logit } P_i = \ln\left(\frac{P_i}{1-P_i}\right) \quad \cdots\cdots (3)$$

where α and β_j are the model parameters to be estimated.

2.Results of estimation

Table-8 shows the results of binary logit analysis. The characteristics of each standard can be described as follows.

<Table-8> The Results of Binary Logit Analysis

Parameter		Living Area Standard			Facility Standard			Housing Instability		
		Estimate	Pr> ChiSq	Odd ratio	Estimate	Pr> ChiSq	Odd ratio	Estimate	Pr> ChiSq	Odd ratio
Intercept		-4.252	<.0001		-4.247	<.0001		-0.601	<.0001	
Age of house head	young	0.306	<.0001	1.578	-0.570	<.0001	0.697	0.227	<.0001	1.379
	old	-0.594	<.0001	0.667	0.009	0.8692	1.127	-0.502	<.0001	0.672
Gender(male=1, female=0)		-0.012	0.8815	1.161	0.431	<.0001	1.754	-0.363	<.0001	0.763
Marital status(1=living together)		-0.067	0.4333	1.105	-0.481	<.0001	0.708	-0.295	<.0001	0.824
Employed=1		-0.129	0.0943	1.022	-0.253	<.0001	0.820	-0.344	<.0001	0.775
Schooling		-0.232	<.0001	0.848	3.545	<.0001	45.527	0.247	<.0001	1.334
Housing type	Apartment	0.091	0.2999	1.302	-	-	-	0.563	<.0001	1.953
	Single family	-	-	-	2.398	<.0001	14.613	-	-	-
	Multi-family	0.914	<.0001	2.929	2.912	<.0001	25.542	0.954	<.0001	2.901
	Business building	0.380	0.0070	1.927	4.166	<.0001	91.863	1.125	<.0001	3.662
	Others	1.654	<.0001	7.114	-0.090	0.1045	1.019	1.165	<.0001	4.188
Tenure(owner occupied=1)		-1.442	<.0001	0.270	0.157	<.0001	1.188	-0.053	<.0001	0.961
Building age		0.091	<.0001	1.118	-0.008	<.0001	0.994	-0.006	<.0001	0.996
No. of household members		0.543	<.0001	1.804	-0.056	0.0152	0.989	0.063	0.0005	1.103
Income		-0.003	<.0001	0.997	-0.001	<.0001	0.999	-0.007	<.0001	0.993
Urban/rural(urban=1)		0.773	<.0001	2.728	-0.971	<.0001	0.418	0.767	<.0001	2.440
Likelihood ratio		2239.1809(<.0001)			5279.91 (<.0001)			4235.05 (<.0001)		
Pseudo R-Square		0.0657			0.15			0.12		
Max-rescaled R-Square		0.1993			0.31			0.22		

1) Living area standard

Housing poverty in living area standard shows the following characteristics. First, it is a problem of young households, renters, unemployed household heads. Second, housing poor live in other type of house (non-house shelter), and multi-family house. Third, it is a problem of households with high number of family member. Fourth, it is an urban problem, rather than rural areas.

2) Facility standard

Housing poverty in facility standard reveals the following characteristics. First, it is a problem of old, male, and living alone households. Second, households under housing poverty at facility standard, similar with area standard, live in old single family house, others (non-house shelter), and multi-family house. Third, it is a problem of households with small number of family member. Fourth, it is a problem of rural area, rather than urban areas.

3) Housing instability

Households in unstable living conditions have following characteristics. First, it is a pro blem of young households, renters, unemployed households. Second, it is a problem of h ouseholds living in other type of house (non-house shelter) and multi-family house. Thir d, it is a problem of households with high number of family member. Fourth, it is an urb an problem where cost of living is very high. Fifth, households with higher education ar e more likely to be in housing poverty. Finally, the burden of housing cost is severe to ur ban low income households.

Ⅴ.Conclusions

Housing policy should focus on alleviation of housing poverty and instability, rather than on promotion of housing (construction) industry. Besides low income housing, policy attention for middle income households under instable housing conditions due to high burden of housing costs, especially in urban areas, should not be ignored. For example, some types of rental housing which enable low and middle income households to reduce their housing problems are required. In most cases, all households under substandard conditions are assumed to be policy target. In fact, households in rental status with low income are real targets of housing policy. Furthermore, in supply side, the availability of affordable housing is not considered. In order to provide proper

housing service for them, affordable housing should be available within range of income. The analysis suggests that the differences in housing conditions are severe among regions. Therefore, housing policy priority should be given differently between rural and urban area, as well as among regions. In this sense, housing policy implementation should be led by a local government who better knows local situation and conditions.

References

Bramley, Glen, (2012), "Affordability, poverty and housing need: Triangulating measures and standards," *Journal of Housing and the Built Environment* 27(2): 133-151.

Cai, Wenjie and Xinhai Lu, (2015), " Housing affordability: Beyond the income and price terms, using China as a case study," *Habitat International* 47: 169-175.

Chiu, Rebecca L. H., (2013), "A Comparison of housing welfare policies among major Asian countries in the modern era," *LHI Journal*: 4(1):23-31.

Amy S. Bogdon, Ayse Can, (1997), "Indicators of local housing affordability: Comparative and spatial approaches," *Real Estate Economics, 25*(1), 43-801.

Bangtsson, B., (2002), Housing as a social right: implications for welfare state theory. *Scandinavian Political Studies, 24*(4), 255-275.

Barratt, C., Kitcher, C. and Stewart, J., (2012), "Beyond safety to wellbeing: how local authorities can mitigate the mental health risks of living in houses in multiple occupation," *Journal of Environmental Health Reserch, 12*(1), 39-50.

Blackmar, E., (1989), *Manhattan for Rent 1785-1850.* Cornell University Press. Ithaca.

Burnett, J., (1986), *A Social History of Housing 1815-1985.* Methuen, London.

Mirie, A. Niner P. and Watson, C., (1976), *Housing Policy and the Housing System*, George Allen & Unwin, London.

Stone, M. E., (1993), *Shelter Poverty, Philadelphia*, Temple University Press.

7.Adaptability Evaluation of the Pure Energy Public Transportation Network and Optimization Measures Applying to Hangzhou Scenic Area

中国における環境に優しい交通機関の導入とその普及促進方策

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Abstract: Pure Energy(PE) Public Transportation are gaining much focus and popularity when its technology is getting more advanced. The pros and cons of PE Public Transportation are obvious, for the advantages, it possesses environmentally friendly attributes compared to its overt limitation, in which it could only run a short time. To fully make use PE vehicle, the most important issue is to coordinate the bus routes and PE buses. This paper provides an adaptability method of bus route, which calculates the adaptability of the current bus routes in West Lake scenic zone, locating in Hangzhou City of Zhejiang Province in China, to decide which route is suitable to the PE vehicle. And then, optimization will be taken to modify current scenic public transportation network based on several modification criterion.
Key Words: PE Bus; Adaptability Evaluation

1. Background

As the high-speed urbanization is proceeding, Chinese transportation have been through boom development, with a series of problems as energy consumption, air pollution, etc. PE(pure energy) public transportation has been regarded as ultimate destination of modern transportation because of its advantages of low energy consume, low emission, no-noise, low working condition, high efficiency in short route. In 2009, Chinese government started the project of TCTV, ten cities thousand vehicles, to popularize new energy automobile, including PE bus, in 25 cities.

PE bus could be a trend for future urban transportation, but the limitation of current technology must be considered when it come into use. Its low battery capacity and long charging time will make it hard adapt to the current bus route. It is a need for an adaptability evaluation system for the usage of PE bus

Hangzhou city was on the first round cities list of project of TCTV, five pure energy buses were used in June 2012, whose route mainly situates in scenic area of District of Western Lake, one of eight districts diving Hangzhou city, obtaining area 49 square miles, having 71.81 million visitors in 2012[1]. Since 2013, there are 9 bus routes in scenic area of District of Western Lake, totally 154.86 miles. The scenic area itself is the most famous tourism site in Hangzhou city, as a historical and human landscape. However, the tremendous amount of visitors everyday stagnate the current road traffic, which is a utmost test for urban operation and environment. PE bus could be a sound

solution for scenic area in Western Lake District, for its limited area and environmental pressure. But directly using current bus lines might not be suitable for the electric bus. Therefore, this paper takes scenic area in Western Lake District of Hangzhou City as a case study, selecting several indicators to be an analyzing model as a adaptability model, calculating in GIS (Geographic Information System), bringing up measures according to optimization codes.

2. Method

The most advanced PE bus can continuously run for around 15 miles before getting charged[2]. To analyze adaptability, seven indicators will be selected according to the bus operating condition, each of which has the standardized or most appropriate value. Getting weights of all indicators by AHP (analytic hierarchy process), then calculating distance between actual value and standardized value and figuring out the comprehensive calculating model can finally analyze the adaptability of PE buses to current bus routes.The calculating of indicators could be done in GIS based on the network, which is from binaryzation of satellite map.(Figure 1)

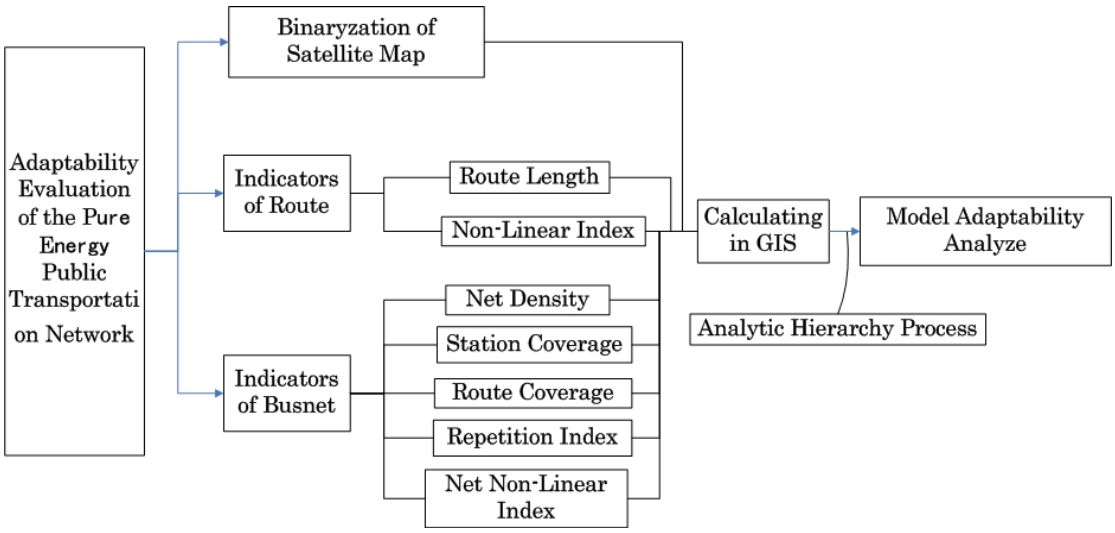

Figure 1 Framework

2-1 Indicators

In the whole seven indicators, Route Length and Non-Linear Index indicates how long the bus could run in one way and how circuitous the itinerary is; Indicators like Net Density, Station Coverage, Route Coverage are showing the accessibility of public transports in scenic area; Repetition Index is the degree of repeating for all the bus lines in the scenic area. Net Non-Linear Index is reflecting the degree of winding for the whole bus net.

According to the Code for Transport Planning and Urban Road[3], in which there are discussions and requirement for standardized value range of each indicators,

combining the characteristics of PE buses, producing mean value or maximum value[3-4] for different indicators(Table 1).

Table 1 Adaptability Indicators

Indicators	Calculation Method	Standardized Range	Best Value
Route Length	One Way Distance	13-16 Miles[2]	14.5
Non-Linear Index	Head-End Actual Distance / Head-End Spatial Distance	<1.4[3]	1[5]
Station Coverage	Station Service Area / Total Area of Scenic District	500m Radius Service Area Coverage not smaller than 90%[4]	1
Repetition Index	Road Length Having Bus Route / Total Net Length	1.8-2.5 Miles[3]	2.15
Net Density	Total Net Length / Total Area of Scenic District	3-4 Miles / Square Miles[4]	3.5
Net Non-Linear Index	Sum of Head-End Actual Distance / Sum of Head-End Spatial Distance	1.15-1.2[3]	1.175
Route Coverage	Road Length Having Bus Route / Total Road Length	/	1

2-2 Weights

Different indicators have various manifestation for bus network, according to which weights should be evaluated differently. After standardization of values (formula 1), AHP will be used to get all the weights for indicators(Table 2).

$$x_i(k) = [x_{i'}(k) - \bar{x}] / S_i \quad (1)$$

$x_i(k)$ is for standardized value, $x_{i'}(k)$ is original value, $\bar{x}$ is mean value of the same volume of value, S_i is standard deviation of the same volume of value.

Table 2 Weights of Evaluation Indicators

Indicators	Route Coverage	Station Coverage	Net Density	Net Non-Linear Index	Repetition Index	Route Length	Non-Linear Index
Weights	0.125	0.143	0.132	0.114	0.143	0.189	0.153

2-3 Evaluation Model

According to the difference between current value and best value, the adaptability model is established. Bigger the gap is, closer to the best value, meaning that PE bus will be better suitable in the current lines and the final value will be closer to 0 (formula 2).

$$S = \sum_{n=1}^{7} x_n w_n$$
$$x_n = \sum_{n=1}^{7} \left| 1 - \frac{X_N}{X_M} \right| \quad (2)$$

X_n is the degree of gap, W_n is weights of each indicator, X_N is the actual value, X_M is the best value of each indicator.

3. Adaptability Situation in Scenic Area

Inputting point layer for bus stations in GIS, combine with the network roads to create nine current bus lines (G8, J1, Y2, Y3, Y4, Y5, Y6, Y7, Y9) automatically by the tool of Network Analyst(Figure 1) and calculate the indicators(Table 3).

Figure 1 Current Bus Lines

Table 3 Indicators for Adaptability Analysis

Name of Bus	Route Length	Non-Linear Index	Station Coverage	Repetition Index	Net Density	Net Non-Linear Index	Route Coverage
G8	25.883	2.441					
J1	20.672	1.341					
Y2	10.788	1.552					
Y3	16.676	2.447					
Y4	18.721	1.611	35.8%	0.374	1.770	1.708	0.676
Y5	23.186	1.280					
Y6	12.694	2.195					
Y7	12.630	1.343					
Y9	13.614	2.277					

Comparing the current and standard range indicators, there is some unfitted problem of PE bus.

In the aspect of route length, the average route length reaches 17.21 miles, up to par rate is just 30%. The longest bus line is G8, whose length is 25.88 miles, hard to adapt to standard require 13-16 miles[2]. 60% of the buses have the driving distance problem, long distance will overdo the battery, decreasing its life cycle, but short distance will be hard for bus management, leading low efficiency.

In the aspect of non-linear index, only three bus line up to the standard, the non-linear indexes of G8, Y3, Y6, Y9 are exceeding 2. The net non-linear index is 1.71 while the standard range is 1.15-1.2. In wingding roads, buses are intended to stop at intersection and turn direction frequently, which will consume larger fossil fuel and energy efficiency will be down consequently.

In the aspects of repetition index and route coverage, the current repetition index is completely less than the floor level of appropriate range and the route coverage is 0.67, which shows that public transportation facility is not convenient enough in the scenic area around Western Lake.

In the aspects of station coverage and net density, former is 35% and latter is 1.77 miles per square miles, far away from the par. With the consideration of landform shape in scenic area, it is normal to see low values in large area.

4. Optimization and Model Analysis

4-1 Optimization

Aiming at solving the adaptability problems, adjustments should be taken according to some optimization codes, which will be as followed:

(1) mainly adjust route length up to proper longness;

(2) change the direction of some bus line to decrease non-linear index but increase the coverage at the meantime;

(3) merge repeated bus lines;

(4) for tourism area, coverage should be accord to the actual geographic situation.

Thus the optimization measures will be like this, diving five bus route into two parts (G8, Y3, Y4, Y5, Y6), deleting two stops in J1, adding three stops in Y9 and for Y6, deleting one but adding other three stops (Figure 2).

All the 13 bus routes are satisfying general criterion in route length, non-linear index are decreased but below par from 1.83 to 1.67, and net non linear index from 1.70 to 1.58. Station coverage and net density have small range of increase and repetition index small range of decrease. Otherwise, route coverage have a kind of decrease (Table 4).

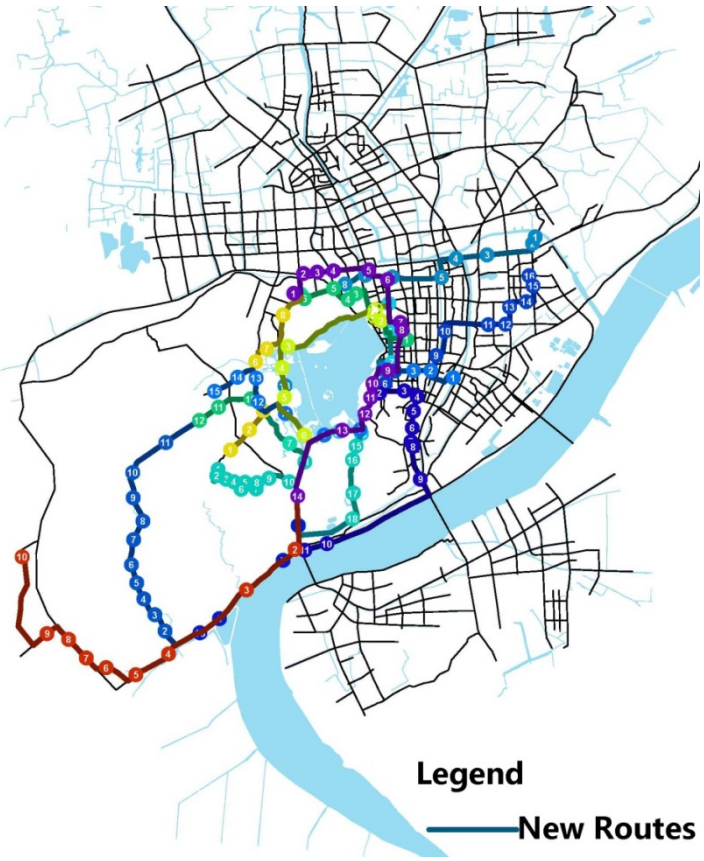

Figure 2 Routes After Optimization

Table 4 Indicators after Optimization

Name of Bus	Route Length	Non-Linear Index	Station Coverage	Repetition Index	Net Density	Net Non-Linear Index	Route Coverage
G8-1	12.249	2.049	36.19%	0.352	1.7879	1.5858	0.644
G8-2	14.458	1.752					
J1	16.619	1.306					
Y2	10.788	1.552					
Y3-1	5.919	1.170					
Y3-2	9.921	2.364					
Y4-1	10.156	1.550					
Y4-2	8.564	1.238					
Y5-1	11.262	1.289					
Y5-2	12.114	1.273					
Y6-1	9.392	2.146					
Y6-2	8.726	2.188					
Y7	12.630	1.3423					
Y9	13.614	2.277					

4-2 Model Analysis

Using the adaptability model to calculate the comprehensive value of the current bus routes and bus routes after optimization. The adaptability decreases from 0.529 to 0.507, which means the route after adjustments will be much more adapt to PE public transportation and the optimization codes are taking effect. This could be a significant reference to the future popularization from scenic area into whole urban.

Pure Energy Public Transportation would be the ultimate destination in urban area because of its environmentally friendly characters. This paper could contributes at the beginning of spread new energy vehicles in the aspects of adjusting bus lines, making them more adapt to local public transportation networks. The future direction of this research would be further discussion of the best indicator values and most efficient optimization codes.

Reference

[1] National Bureau of Statistics. China Statistical Yearbook For Regional Economy 2012 [M]. China Statistical Press, 2012: 363.
[2] Lei Y. From Slow Charge to Quick Charge, The Tech-Jump of Pure Energy Bus[J]. Transportation World, 2011(10).
[3] GB 50220-95. Code for Transport Planning and Urban Road[S]. Beijing: Chinese Ministry of Construction, 1995.
[4] Li CK, Chen L, Li JL etc. The Discussion of Urban Public Transportation Evaluation Method in GIS, A Case Study of Xiangtan City[J]. Science of Surveying and Mapping, 2010, 35(5):98-100.
[5] Lu ZB, Huang W. Urban Public Transportation Guiding System in GIS[J]. Journal of Highway and TransportationResearch and Development, 2001,(5).

8. An Analysis of Location Characteristics and Activity Evaluation of the Local Community Centers for the Elderly in Omuta City

大牟田市における地域交流施設の立地特性と活動評価

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Abstract: Background: Relation by the area is becoming thin and the function of a community is falling when the population of Japan is aging rapidly. The area where people can gather freely is losing although the situation changes in different places. The community places for elderly people are becoming the important issue in Japan.
Introduction: LCC is only established community and care center for elderly in Omuta city that is organized by Non Profit Organization. This study is being conducted as part of the research into local care. The local community center (LCC) in Omuta City was established by a private organization like medical corporation, welfare corporation. It is subsidized by the local government as elderly community place. At there the elderly can do exercises, go to enjoy conversations and meals preventing from falling ill.
Objective: The objective of this study is to analyze and makes clear to understand the location feature of LCC and analyze the activation level of LCC from user's and suppliers' point of view.
Methodology: 1) Classify LCC into several groups according to population, land use and gradient of road. 2) Estimate the activation level of LCC by conducting surveys.
Results: The distribution of LCCs can be grasped. To classify the LCCs related to elderly people from different index can obtain the location characteristics.

1. Background

The rate of population aging in Japan is much greater than that in other developed countries. The aging process of Japan not only increased the ratio of the elderly (i.e. 65 years and older) in the population but also accompanied a fundamental change in family and community (Raikhola, Kuroki, 2009). Relation by the area is becoming thin and the function of a community is falling when the population of Japan is aging rapidly. The area where people can gather freely is losing although the situation changes in different places. It is not only that place where people cannot gather freely has disappeared, but also the problem of elderly people who are confined or death in isolation are becoming. The community places for elderly people are becoming the important issue in Japan.

In 2012, Ministry of Health, Labor, and Welfare in Japan proposed that community care system to live comfortably in the neighborhood should be constructed for the coming 2025. Japanese government advances community places where prevent healthy elderly people from falling ill (Ministry of Health, Labor, and Welfare in Japan, 2012). The aim of this paper is to introduce local community center (LCC)related to elderly care and community. Evaluate the location characteristics of LCC and analyze the activation level of LCC from the users' and suppliers' point of view.

2. Introduction

2-1. Omuta city and development of aging

Omuta city is located at the southern of Fukuoka Province. The total area is 81.55 kilometers. It was developed as a coal industry city and population had been decreased since declining of demand of coal in Japan. It was designated in depopulation area in 2010. The population is 123,638; the number of household is 49,936 in 2010 (Statistics Japan, 2010). The population tends to decrease, but the number of household tends to be increased so it means the trend toward the nuclear family and single person are progressing. Traffic access is good and welfare facility, commercial facility and community facility are well established in the center of city, but the situation of maintenance in land is not developed at mountain area. The elderly population is 37,418 and the elderly rate is 29.7% that greatly exceed average elderly rate 23.1% (Statistics Japan, 2010). Therefore elderly rate of Omuta city is said decade faster than average in Japan.

2-2. Outline of LCC

The National Institute of Public Health promulgated that community centers for the elderly are an important element in future local care. The local community center (LCC) in Omuta City was established by a private organization and subsidized by the local government as a place where the elderly can go to enjoy conversations and meals (Omuta city, 2014). There are fourty three LCCs in Omuta City in 2015 (Omuta city hall, 2015). The location of LCC is showed in figure 1 and table 1.Health gymnastics, intergenerational exchange which objective to healthy preventive were carried out. Mainly is gymnastics classroom, nutrition classroom, recreation classroom (Omuta city, 2014). LCC is different from public welfare facility for the elderly. Users of the welfare facility such as nursing-care insurance institution and community-based service are care-authorized elderly people and senile dementia people. It can be grasped that LCCs are distributed over the whole area in Omuta city. LCCs are distributed in 19 school districts among 21 school districts and the school district where there is no LCC is Jyoukann and Kamiuchi. LCCs are most distributed in Minato where there are 5 LCCs.

3. Methodology

The study area in this paper is Omuta city in Fukuoka Province. First, Classify 43 LCCs established in Omuta city according to location characteristics including elderly population, household, land use and gradient of road by cluster analysis. Second, the questionnaire survey was carried out in 2010 in 36 LCCs (Inoue, 2011).

Based on the result of survey, the activation level from users and suppliers of LCCs can be grasped. Finally, to extract the active LCCs and show which classified group it belongs to.

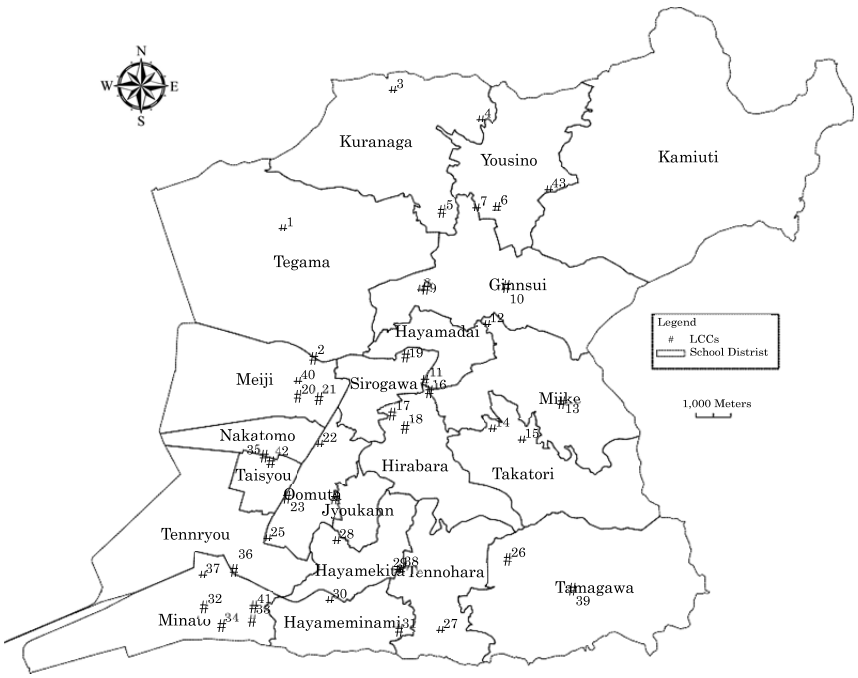

Fig.1. Location of LCC in Omuta City(2015).

Table 1. LCC list (2015)

Number	Name	School District	Number	Name	School District
1	Azarea	Tegama	22	Yorannkann	Omuta
2	Tetuo	Tegama	23	Medical Association	Omuta
3	Wataze	Kuranaga	24	Haruhi	Omuta
4	Kamezaki	Kuranaga	25	Living Aeru syouyama	Omuta
5	Yoshino	Kuranaga	26	Katarainomori HibarigaOka	Tamakawa
6	Nagomi	Yoshino	27	Sakuranamikisasahara	tennohara
7	Ojiri	Yoshino	28	Ikoi	Hayamekita
8	Komuune	Yoshino	29	Yabutubaki	Hayamekita
9	Saiseikai	Ginnsui	30	Kitemiteterasu	Hayameminami
10	Kubuki	Ginnsui	31	Salon・Suisenn	Hayameminami
11	Eburinori	Litsuhayamadai	32	Enjyu	Minato
12	Iroha	Miike	33	Misatohiroba	Minato
13	Ajisai	Miike	34	Asobo-i	Minato
14	Enjyuenn	Takatori	35	Kopann	Nakatomo
15	Takatori	Takatori	36	HohoEmiga-den	tenryou
16	Kunugi	Hirabaru	37	Ayumi	Minato
17	Hirabaru	Hirabaru	38	Parusu	Hayamekita
18	Tanpopo	Hirabaru	39	Miinorinoriitino	Tamakawa
19	Shirakawa	Sirakawa	40	Syaru-rukobann	Meiji
20	Jyangurujimu	Meiji	41	Nanfunezu	Minato
21	Sumairu	Meiji	42	Living Aeru Kohama	Taisyou
			43	Community Plaza yuima-ru	Yoshino

3-1. Questionnaire survey

As a part of the research of Omuta city, the two questionnaire survey had been carried out in 36 LCCs in October in 2010. First questionnaire survey is related to utilization in LCC and social capital target for person in charge of medical welfare in LCC. (Defining it as QI) Second questionnaire survey is related to utilization in LCC

Table 2. Data source

Name	Year	Source
Population and Housing Census	2010	Statistical Handbook of Japan
Land Use	2010	Omuta City Hall
School District Boundary	2010	Omuta City Hall
Road network	2010	Statistical Handbook of Japan
Road	2010	Omuta City Hall
QA	2010	National Institute of Public Health of Japan
QB	2010	National Institute of Public Health of Japan

and social capital target for staff in city hall, Ministry of Health and Welfare, Local Care Management Center.(Defining it as QII)

3-2. Activation level

In this article from users aspect in QI activation level is defined as the number of users in each LCC and frequency for activity in each LCC in one year. From suppliers aspect in QII activation level is directly evaluated by staff in city hall, Ministry of Health and Welfare, Local Care Management Center.

3-3. Index for cluster analysis and cluster analysis

We recommond the elderly people go to LCC on foot. The location characteristics index of LCC is considered as elderly population, number of household, land use (i.e. natural land, residence land, and commercial land) and gradient of road (i.e. flat road and sloping road), the average of elderly people is set up as 60m/min (Chen, 2012) , the standard of elderly people's walking distance is 5 minutes (Building Reaearch Institute,1994) from the LCC. GIS is being used to analyze the elderly population, number of household, land use and gradient of road within 300m from 43 LCCs. Data resources of population, household, land use and road are showed in table 2.

4.Result

4-1. Result of questionnaire survey

In QI, there contained 24 survey items. 36 LCCs without one suspended LCC have answered the QI. In QII, 80 questionnaire papers were distributed and 50 questionnaire papers were answered, the answering ratio was 73.8%.

The number of users and frequency of activity in one year can be grasped from the QI in table 3. From question six of activity results in 2009: How many users of LCC in 2009? According to the answer, average number of users is 1533.3 people. There are 9 LCCs (25%) that more than average value. 8024 people are using number 20 (Jyangurujimu) that is most active. Another question of question six is: How many times does activity in LCC be held? According to the

Table 3. Results of QI and QII

Number	Name	Number of users	Frequency	Activation Level
1	Azarea	288	35	2.83
2	Tetuo	951	121	2.33
3	Wataze	1272	170	3.00
4	Kamezaki	1562	166	2.45
5	Yoshino	526	71	2.67
6	Nagomi	680	54	2.91
7	Ojiri	826	57	1.50
8	Komuune	3705	504	3.27
9	Saiseikai	796	49	2.60
10	Kubuki	830	145	2.50
11	Eburinori	2898	224	3.00
12	Iroha	917	96	2.67
13	Ajisai	1458	122	3.10
14	Enjyuenn	609	167	2.50
15	Takatori	988	98	2.33
16	Kunugi	275	44	2.00
17	Hirabaru	1489	518	3.10
18	Tanpopo	2447	178	2.60
19	Shirakawa	5446	408	3.64
20	Jyangurujimu	8024	604	3.13
21	Sumairu	1212	190	2.80
22	Yorannkann	2294	271	3.00
23	Medical Association	0	0	1.75
24	Haruhi	260	17	2.00
25	Living Aeru syouyama	1300	217	2.67
26	Katarainomori HibarigaOka	3348	317	2.75
27	Sakuranamikisasahara	1520	188	2.00
28	Ikoi	1152	104	2.86
29	Yabutubaki	921	106	2.50
30	Kitemiteterasu	1427	214	3.21
31	Salon・Suisenn	180	12	2.00
32	Enjyu	782	114	2.00
33	Misatohiroba	2777	274	3.00
34	Asobo-i	488	52	2.33
35	Kopann	1390	212	2.60
36	HohoEmiga-den	162	23	3.00
	Average	1533.3	170.6	2.60

Result of number of users(person a year) and frequency(times a year) are obtained from QI.Result of activation level is obtained from QII.

answer, average frequency is 170.6 times. There are 14 LCCs (38.9%) that more than average value. The highest value is number 20 (Jyangurujimu) where number of users are also the most. The activation level from suppliers'

aspect has been chosen. In QII data on activation level of LCC was obtained from interviewees' (staff of in city hall, Ministry of Health and Welfare, Local Care Management Center) response to the question three: How do you think of activation level of LCC? Based on their answers, activation level is classified as very active, active, not so active, and not active. We define not active as 1 point, not so active as 2 points, active as 3 points and very active as 4 points. So the result is showed in table 4. From question three, average activation level is 2.6 points. It is between level not so active and active.LCC No.19 (Shirakawa) is most active which is 3.64 points. LCC number 7 (Ojiri) is least active which is 1.50 points. There are 11 LCCs over 3 points and 3 points which is active. On the other hand, there are 7 LCCs no more than 2 points which is not active in table 3.

4-2. Index result analyzed by GIS

Population and number of households within 300m of each LCC have been

Table 4. Index for cluster analysis

Number	Name	School District	Elerly Population	Households	Road (%)		Land(%)		
					Flat	Sloping	Natural	Residence	Commercial
1	Azarea	Tegama	171	151	88	12	21	47	0
2	Tetuo	Tegama	119	135	100	0	4	48	5
3	Wataze	Kuranaga	48	74	77	23	28	16	17
4	Kamezaki	Kuranaga	54	39	40	60	35	37	1
5	Yoshino	Kuranaga	103	109	89	11	22	41	8
6	Nagomi	Yoshino	193	285	48	52	6	68	3
7	Ojiri	Yoshino	220	292	74	26	25	48	5
8	Komuune	Yoshino	45	32	100	0	5	7	52
9	Saiseikai	Ginnsui	115	145	100	0	19	24	25
10	Kubuki	Ginnsui	117	139	83	17	18	55	8
11	Eburinori	Litsuhayamadai	131	164	95	5	1	46	6
12	Iroha	Miike	194	149	85	15	10	54	2
13	Ajisai	Miike	40	70	39	61	48	34	0
14	Enjyuenn	Takatori	274	332	76	24	5	52	4
15	Takatori	Takatori	78	108	58	42	35	36	1
16	Kunugi	Hirabaru	145	171	83	17	2	46	4
17	Hirabaru	Hirabaru	264	402	72	28	1	67	3
18	Tanpopo	Hirabaru	154	229	51	49	6	61	4
19	Shirakawa	Sirakawa	205	236	90	10	11	56	4
20	Jyangurujimu	Meiji	264	402	100	0	0	38	9
21	Sumairu	Meiji	294	429	100	0	0	42	7
22	Yorannkann	Omuta	257	401	93	7	0	17	30
23	Medical Association	Omuta	355	531	97	3	0	24	17
24	Haruhi	Omuta	283	431	61	39	1	44	9
25	Living Aeru syouyama	Omuta	209	290	83	17	0	59	4
26	Katarainomori HibarigaOka	Tamakawa	111	153	57	43	16	42	0
27	Sakuranamikisasahara	tennohara	159	134	58	42	42	32	3
28	Ikoi	Hayamekita	181	128	77	23	2	57	2
29	Yabutubaki	Hayamekita	144	159	43	57	2	49	0
30	Kitemiteterasu	Hayameminami	84	86	92	8	18	24	9
31	Salon･Suisenn	Hayameminami	125	123	43	57	38	19	1
32	Enjyu	Minato	172	258	100	0	0	58	6
33	Misatohiroba	Minato	193	225	100	0	3	43	5
34	Asobo-i	Minato	305	456	100	0	0	51	10
35	Kopann	Nakatomo	394	643	100	0	0	42	14
36	HohoEmiga-den	tenryou	148	220	100	0	2	43	1
37	Ayumi	Minato	228	351	100	0	0	58	8
38	Parusu	Hayamekita	47	91	43	57	5	43	1
39	Miinorinoriitino	Tamakawa	0	0	43	57	64	17	1
40	Syaru-rukobann	Meiji	200	284	100	0	0	61	4
41	Nanfunezu	Minato	59	81	100	0	10	39	6
42	Living Aeru Kohama	Taisyou	136	207	100	0	0	37	8
43	Community Plaza yuima-ru	Yoshino	112	126	75	25	41	39	2

analyzed by GIS. The elderly ratio is 29.7% in 2010. Then calculate the elderly population within 300m. The number of flat road and sloping road within 300m of each LCC can be analyzed by GIS (Yamashiro,2003). First calculate the proportion of flat road and sloping road within 300m of each LCC. The area of natural land, residence land and commercial land within 300m of each LCC can be analyzed by GIS. Then calculate the proportion of natural land, residence land and commercial land within 300m of each. The number of households, elderly population,and proportion of flat road, sloping road, natural land, residence land and commercial land within 300m is showed in table 4. These results are considered to be location characteristics index of cluster analysis. The analysis was carried in all school districts, The center area (Omuta school district) has been selected to show the result of elderly population, number of household in figure 2, land use in figure 3 (natural land, residence land, and commercial land) and gradient of road in figure 4 (flat road and sloping road) within 300m.

4-3. Result of cluster analysis

According to the result of location characteristics index, ward method in cluster analysis has been selected, six groups have been divided. The average value of elderly population, number of household, land use and gradient of road in each group have been calculate to see the feature. The group's features have been showed in table 5. Location of six groups of LCCs has been showed in GIS in figure 5.

Fig.2. Elderly population, number of household within 300m of LCC

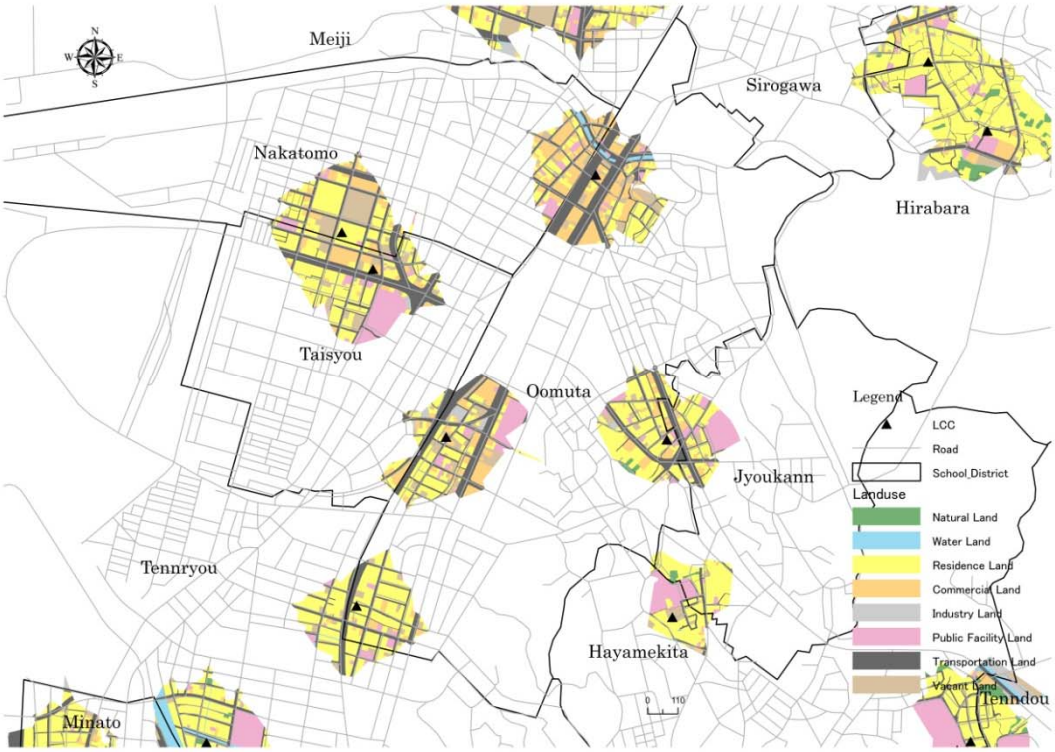

Fig.3. Land use within 300m of LCCs

Fig.4. Gradient of road within 300m of LCCs

Table 5. Results of cluster groups and six groups features within 300m

Cluster Classification	Elderly Populaiton (%)	Households Number (%)	Road(%) Flat	Sloping	Land(%) Natural	Residence	Commercial
Group1	49	47	88	12	5	51	4
Group2	7	7	90	10	19	33	12
Group3	8	6	51	49	43	31	1
Group4	9	10	48	52	7	53	2
Group5	1	0	100	0	5	7	52
Group6	26	30	98	2	0	36	15
Group1	Many Single Elderly,Apartment Area Type						
Group2	Few Single Elderly,Suburban Type						
Group3	Few Elderly,Farmland Type						
Group4	Few Single Elderly,Mountain Type						
Group5	Few Elderly,Commercial Type						
Group6	Single Elderly, Central City Type						

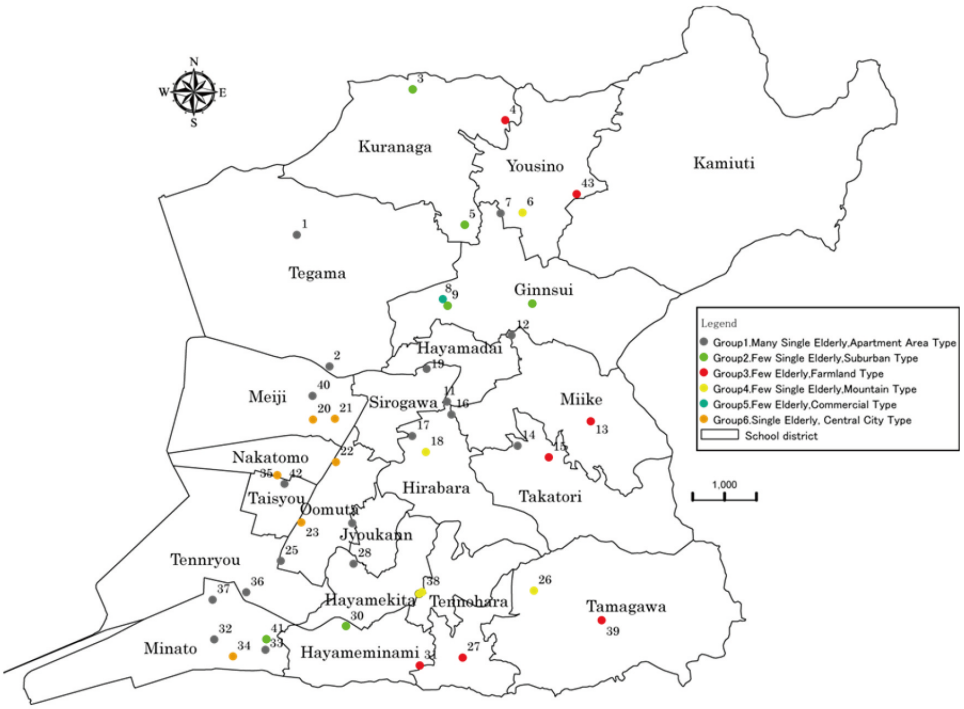

Fig.5. Location of six groups of LCCs

4-4. The distribution of active LCCs in classified groups

According to the result of activation level from users and suppliers, the active LCCs which exceed the average value of number of users, frequency of activity and activation level have been extracted. The distributions of active LCCs in classified group have been showed in radar chart in figure 6.

From the radar chart of number of users, 3 LCCs belong to group1 , 2 LCCs belong to group4 and 2 LCCs belong to group6 have most active LCCs. From the radar chart of frequency of activity, 4 LCCs belong to group1 and 4 LCCs belong to group6 have most active LCCs. From the radar chart of activation level, 8 LCCs belong to group1 and 3 LCCs belong to group6 have most active LCCs. Above

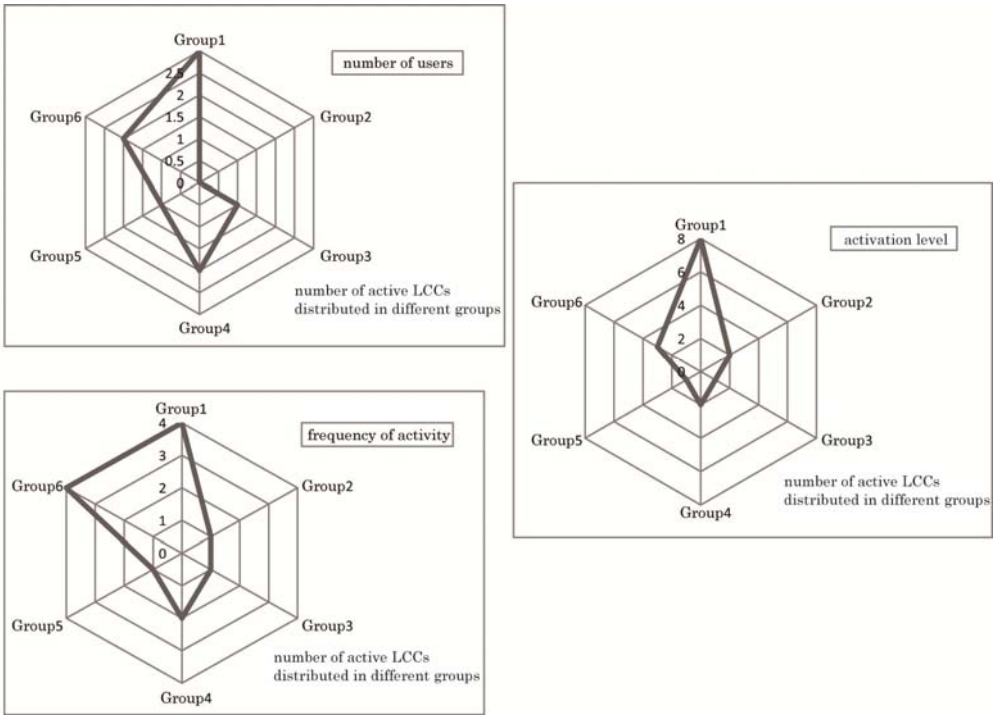

Fig.6. The distribution of active LCCs in classified group

all, group1: many single elderly people in public housing and group6: single elderly people in central city use LCCs actively.

5. Discussion

LCC is only established community and care center for elderly in Omuta city that is organized by Non Profit Organization. So it is few study that evaluated the classification for community centers of elderly people and relationship between location features and activation level from users' and suppliers' point of view, the activation level between users' and suppliers' point of view can grasp the situation of LCC. The elderly ratio is decade faster than average of Japan. Analysis of LCC can be referenced for the future situation in elderly society in Japan. The questionnaire surveyI and questionnaireII can learn the different visions from users and suppliers. It is the evaluation factors both from users' and suppliers' point of view, which relates to the efficiency and effectiveness as a system. The cluster analyze for LCC according to the elderly population, number of household, land use (natural land, residence land, and commercial land) and gradient of road (flat road and sloping road) within 300m makes it clear to understand the location feature of each group.

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References

Building Research Institute(1994).Epistula: Urban Planning for Elderly People Vol.6

Chen CHEN(2012). Study on the Local Community Centers and the Private Community Clubs in Omuta City -Analysis of Communication Facilities for Elderly People-,Shanghai, International Society of Habitat Engineering and Design 2012

Eiji YAMASHIRO(2003).A Study on the Planning of Residential Area on the Slope Ground.Vol.37,243-250

Ministry of Health, Labor, and Welfare in Japan(2015). Community Care System. http://www.mhlw.go.jp/stf/seisakunitsuite/bunya/hukushi_kaigo/kaigo_koureisha/chiiki-houkatsu/(accessed 2015-03-02)

Omuta city(2014).Introduction of LCC. http://www.city.omuta.lg.jp/hpKiji/pub/detail.aspx?c_id=5&id=2178&class_set_id=7&class_id=665(accessed 2015-03-03)

Omuta city hall(2014).Support the Life of Elderly People.34p

Pushkar Singh Raikhola&Yasuhiro Kuroki(2009). Aging and Elderly Care Practice in Japan: Main Issues, Policy and Program Perspective; What Lessons can be Learned from Japanese Experiences? Dhaulagiri Journal of Sociology and Anthropology Vol. 3,41-42

Statistics Japan (2010).Population and Households. http://www.e-stat.go.jp/SG1/estat/List.do?bid=000001037709&cycode=0(accessed 2015-03-02)

Yukiko INOUE(2011).Research on Social Capital and Community Care System.216p

9.The Property of Using Hot Spring Resources and Formation Landscape -A Study on Preserve and Exploit the Cultural Landscape –

人々の生活・生業に関わる温泉資源の利用と景観形成の特性 －文化的景観の保全と活用に関する研究－

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Abstract: The purpose of this study is to clarify the features of hot spring resources and landscape elements, the relationship between them, and how they influence in the formation of local landscape. To begin with, hot spring registration records are used to sort out distributions of hot spring resources and their major uses. By this method, the major uses turned out to be "extracting Yunohana (bath salt) "and "taking bath", with respective ratios of 72.1% and 26.5%. From the location map of hot spring resources, it can be seen that there are many Yunohana (bath salt) huts around the place where the hot spring resources are densely distributed. Then, the activities surrounded by the landscape elements are analyzed in order to identify characteristic landscape elements based on the use of hot spring resources. Therefore, "sightseeing" activities around Yunohana (bath salt) huts and “taking bath” activities around hotels are clarified as the characteristic activities in Myoban spa area. As a result, we can draw a conclusion that the characteristics of landscape elements are formed by the uses of hot spring resources as well as the activities around them which are related to life and livelihoods in Myoban spa area.

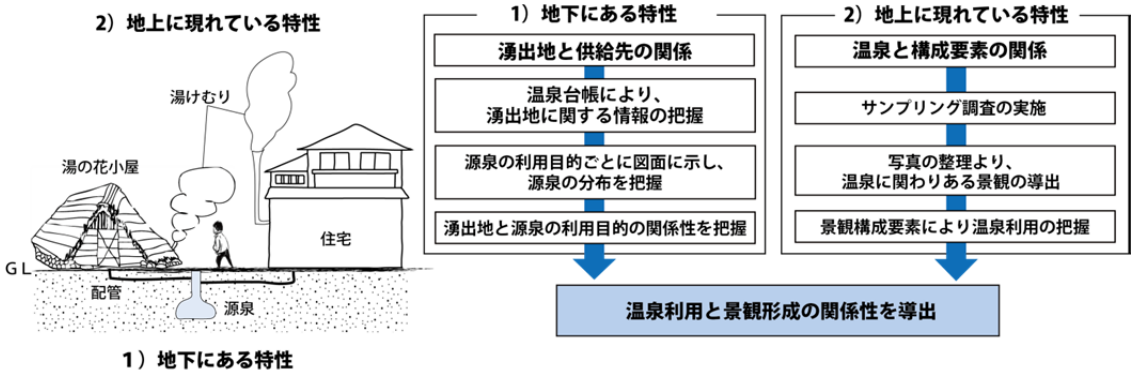
Keywords: Cultural Landscape, Landscape Element, Livelihoods, Activity, Hot Spring Resource

1　研究の背景と目的

2012 年 9 月，大分県別府市の鉄輪・明礬温泉地区（以下，鉄輪・明礬とする。）における世界的にも希有な湯けむり景観は温泉の多面的な利用の在り方が評価され，「重要文化的景観」として選定された。この地区を対象とした既往研究[1) 2)]より，この地区に関わる人々は湯治宿の経営，湯の花の製造販売といった生業や生活のために温泉資源を利用し，現在の「湯けむり景観」が成立していることが明らかとなっている。一方，「湯けむり景観」を創造する源である源泉に関する各種情報と景観構成要素の関係性は明らかになっていない。そこで，本研究では，文化的景観を構成し，人々の生活・生業において欠かすことのできない温泉の湧出地や利用目的と景観構成要素の関係を把握することにより，人の営みにまつわる如何なる景観が，同地区に存在するのかを明らかにする。また，その選定地区の文化的景観を構成する主要な要素について特定することを目的としている。

2　研究の方法

本研究では，鉄輪・明礬の温泉利用と景観形成の関係を明らかにするため，地下にある特性と地上に現れている特性の二つのアプローチから研究を進める。地下にある特性では，源泉位置図[注1)]と温泉台帳[注1)]を収集し，温泉の湧出地，利用用途の傾向を整理することにより，「温泉利用と景観形成の関係性」を把握する。地上に現れている特性では，温泉利用と人々の生活・生業に関係がある写真を分析することにより，「景観構成要素と景観構成の関係性」を明らかにする。本稿では，湯の花の製造が盛んな明礬について論述する。



研究フロー

3　対象地区

別府八湯の一つである明礬（図2）は，1281年の大戦後には共同温泉である地蔵泉が拓かれるなど，古くからの湯治場として発展を続けている地区であると同時に，1671年日本で最初の明礬製造が開始された。1885年，明礬製造から湯の花製造へと産業が変遷すると，現在の明礬温泉地区の特徴である湯の花小屋を含む景観が生まれた。湯の花技術は，現在も地区に伝承されており，平成18年3月には，国の重要無形民俗文化財に指定されている。

明礬温泉地区

4　源泉と景観構成要素の関係

4－1源泉の利用状況

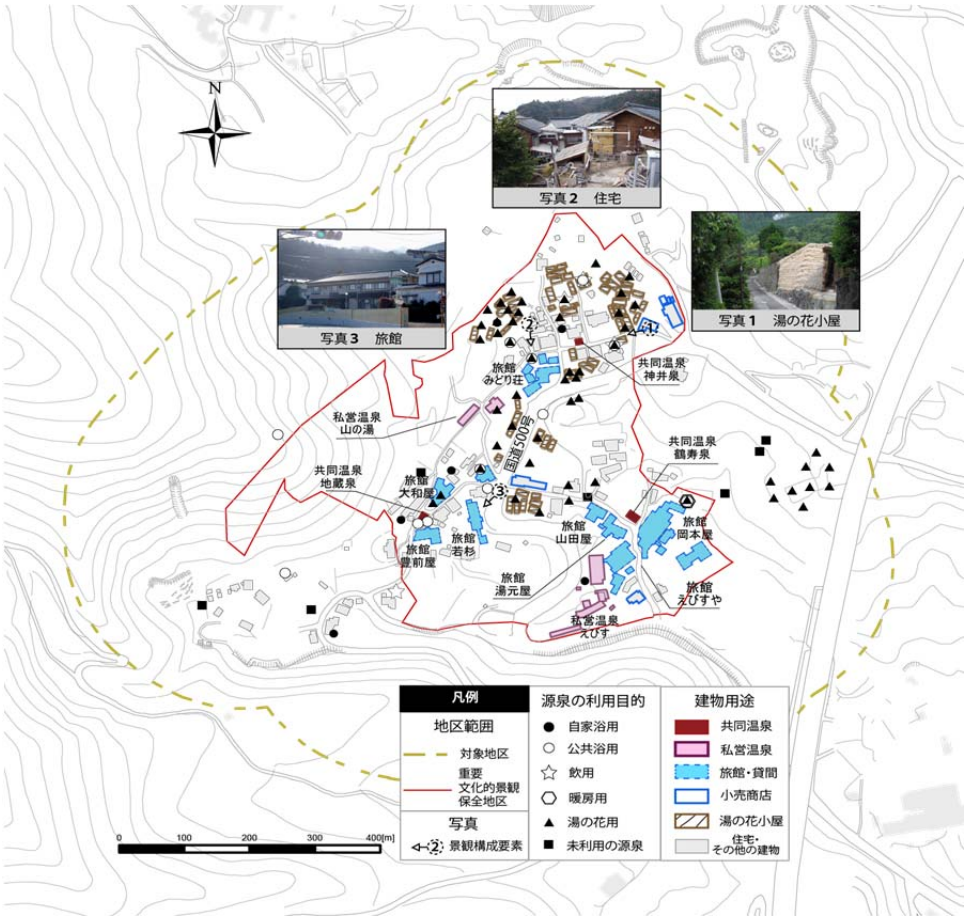
重要文化的景観の保全対象地区（2012年9月現在）の源泉の利用状況を把握するため，大分県環境審議会温泉部会内規[注2)]に定められている掘削最大規制距離[注3)]を参照し，保全対象範囲から150mのバッファを発生させ，それを調査範囲とする（図4）。調査範囲の源泉位置図，温泉台帳より，利用源泉の「数，湧出地，利用用途」を把握し，整理した（図3）。明礬には，現在利用されている源泉は68ヶ所ある。温泉台帳を参考に，利用目的を「自家浴用」，「公共浴用」，「飲用」，「暖房用」，「湯の花用」の5つに分類した。そのうち，最多は「湯の花用」72.1%で，次いで「浴用」が26.5%である。以上のことより，「湯の花用」や「浴用」は当該地区の特徴的な用途といえる。

（単位：ヶ所）

項目	利用用途＊					源泉総数
	浴用		飲用	暖房用	湯の花用	
						
	自家浴用	公共浴用				
源泉数（割合）	7（10.3%）	11（16.2%）	4（5.9%）	1（1.5%）	49（72.1%）	68

＊　一つの源泉は複数の利用用途が持つ場合がある。

利用源泉の利用目的別の源泉数・割合



明礬温泉地区・源泉位置図

４－２　源泉の分布特徴

「源泉の分布」及び「源泉と景観構成要素の位置関係」を明らかにするため，調査範囲の利用源泉を利用目的ごとに地図上に示した（図 4）。明礬では，「湯の花用」に利用されている源泉は国道 500 号沿いと地区の東部に分布している。「湯の花用」の源泉が高密度に分布している場所の周辺に湯の花小屋が設置されていることがわかる。ただし，地区外の東部にも「湯の花用」の源泉が高密度に分布しているが，湯の花小屋は現在存在していない。これは，湯の花の需要が減少したことや源泉利用を届出段階

の「湯の花用」から，現在もこの源泉を他の利用目的に変えて利用していることが推察できる。また，「自家浴用」に利用されている源泉は住宅の近く，「公共浴用」に利用されている源泉は「旅館」の近くに分布している。つまり，図3のような源泉の分布と特徴から，地区住民は源泉を利用して，生業である湯の花を生産し，旅館を経営している。また，生活するために，自家浴用の目的で源泉が利用されていることがわかる。

５　現存風景から見る温泉利用の傾向

５－１　写真に写り込む景観構成要素の把握

温泉利用による景観構成の特徴を明らかにするため，既往研究[1)]において，温泉地の特徴的な景観として抽出された温泉利用に関する明礬 の 75 枚の写真に写り込んだ景観構成要素[注4)]及びその周辺に起き得る行為を整理した（表1)。まず，地区住民の生活・生業に関する景観構成要素を既往研究[2)]に基づき抽出し，「自然現象」，「設備」，「宿泊施設」，「店舗」，「公共空間」，「湯治習俗」，「その他」の８つに分類した。また，それらの景観構成要素の数を把握し，整理した。75 枚の写真に写り込んでいる要素のうち，平均出現件数が１以上の要素は「湯の花小屋（1.33 件)」，「住宅（1.32 件)」，「旅館（1.23 件)」の三つの要素である。この三つの要素は明礬の温泉利用に基づいた景観を象徴しているといえる。さらに，「湯の花小屋」の総件数は最も多いが，出現率は45%と低くなっている。これは，前節で明らかになったように湯の花小屋は他の施設より，密集していることが影響していると考えられる。

５－２　景観構成要素に関する行為分析

景観構成要素の数・割合及びそれらの要素に関する行為

景観構成要素			明礬温泉地区（75枚）A				行為						利用目的
			総件数（B）	平均出現件数（B/A）	出現枚数（C）	出現率（C/A）%	住民				外来者		
							経営者		一般の人				
							直接	間接	直接	間接	直接	間接	
自然	自然現象	湯けむり	35	0.47	21	28	経営 気液分離 湯の花製造	経営 調理 配湯 雑談	入浴、調理 食事、観覧 足湯、購入 休憩、雑談 参拝、居住	観覧 雑談	入浴、調理 足湯、観覧 宿泊、購入 食事、休憩 雑談、参拝	湯治 食事 調理 休憩 雑談	公共浴用 自家浴用 観覧用 湯の花用 地獄蒸し用
人工	温泉	私営温泉	19	0.25	14	19	経営	—	入浴	雑談	入浴、雑談	休憩	公共浴用
		共同温泉	19	0.25	18	24	—	—	入浴	雑談	入浴	湯治 雑談	公共浴用
	設備	地獄	9	0.12	9	12	経営	—	観覧	—	観覧	—	観覧用
		湯の花小屋	100	1.33	34	45	湯の花製造	経営	観覧	—	観覧	—	湯の花用
		配湯設備	5	0.07	5	7	気液分離	配湯	—	—	観覧	—	—
	宿泊施設	旅館	92	1.23	46	61	経営	—	入浴	雑談	宿泊、入浴	—	—
	店舗	飲食店	17	0.23	17	23	経営	—	食事	雑談	食事	—	—
		小売商店	23	0.31	16	21	経営	雑談	購入	雑談	購入	調理	—
	公共空間	広場	1	0.01	1	1	—	—	休憩、雑談	—	休憩、雑談		—
	湯治習俗	寺社	2	0.03	2	3	—	—	参拝	—	参拝	—	—
		薬師	2	0.03	1	1	—	—	参拝	—	参拝	湯治	—
	そのほか	遺構	3	0.04	2	3	—	—	観覧	—	観覧	—	—
		別府石垣	25	0.33	18	24	—	—	観覧	—	観覧	—	—
		住宅	99	1.32	36	48	—	—	居住	—	—	—	自家浴用

まず，景観構成要素の周辺で起き得る行為を抽出した（表1)。行為を抽出する際，景観構成要素の周辺で実際に起きる，人の第一の目的行為を「直接行為」，直接行為以外で景観構成要素に関連して連想される行為を「間接行為」と定義した。また，それぞれの行為を地元住民による行為と外来者による行為に分けて整理し，行為（温泉利用）と景観構成の関係を表２に示した。

表２より，住民に関して最も起き得る直接行為は「経営」196 件（17%)，次いで「観覧」173 件（17%）である。間接行為は「雑談」206 件（40%)，次いで「経営」136 件（26%）であることがわか

った。また，「旅館」に対する「経営」は92件，経営行為の47%（92/196件）であり，「雑談」も92件，雑談行為の 45%である。このことから，「旅館」は住民の生業・生活を象徴する要素といえる。外来者に関して最も起き得る直接行為は「観覧」178件（23%），次いで「入浴」166件（21%）である。間接行為は「調理」59 件（22%），次いで「湯治」57 件（11%）である。さらに，「観覧」のうち，「湯の花小屋」に対する「観覧」は100件，観覧行為の56%（100/176件）である。「入浴」のうち，「旅館」における「入浴」は92件，入浴行為の55%である。以上のことから，「湯の花小屋」に対する「観覧」，「旅館」に対する「入浴」は明礬温泉地区の文化的景観構成を支える重要な行為といえる。また，表2から，すべての行為は「湯けむり」に関係があり，起き得る全行為の 45%（1224/2710 件）を占めていることがわかった。よって，「湯けむり」は不動産ではないが，文化的景観の要素と指定できる，明礬の重要文化的景観の構成において重要な要素であるといえる。

景観構成要素に関する行為の件数（住民）

行為				景観構成要素																合計		
				自然	人工																	
				自然現象	温泉		設備			宿泊施設	店舗		公共空間	湯治習俗		その他						
				湯けむり	私営温泉	共同温泉	地獄	湯の花小屋	配湯設備	旅館	飲食店	小売商店	広場	寺社	薬師	遺構	別府石垣	住宅				
直接行為	住民	経営者	気液分離装置	36					5										41			
			湯の花製造	36				100											136			
			経営	36	19		9			92	17	23							196			
		一般の人	観覧	36			9	100								3	25		173			
			購入	36								23							59			
			調理	36															36			
			食事	36							17								53	1145		
			足湯	36															36			
			入浴	36	19	19				92									166			
			休憩	36									1						37			
			雑談	36									1						37			
			参拝	36										2	2				40			1934
			居住	36														99	135			
	外来者		宿泊	36						92									128			
			入浴	36	19	19				92									166			
			足湯	36															36			
			購入	36								23							59			
			調理	36															36			
			食事	36							17								53	789		
			休憩	36									1						37			
			雑談	36	19								1						56			
			参拝	36										2	2				40			
			観覧	36			9	100	5							3	25		178			
間接行為	住民	経営者	調理	36															36			
			配湯	36					5										41			
			雑談	36								23							59	514		
			経営	36				100											136			
		一般の人	観覧	36															36			
			雑談	36	19	19				92	17	23							206			776
	外来者		湯治	36		19									2				57			
			調理	36								23							59			
			食事	36															36	262		
			休憩	36	19														55			
			雑談	36		19													55			

6　総括と今後の課題

本研究では，温泉台帳を用いて，源泉の分布と主な用途を整理した。明礬温泉地区では，全源泉の72.1%が「湯の花用」，26.5%が「浴用」であり，同地区の特徴的な用途といえる。源泉位置図からは「湯の花用」の源泉が高密度に分布する周辺に「湯の花小屋」が設置されていることと，「浴用」の源泉の近くには「旅館」と「住宅」が設置されていることを確認した。また，源泉の利用による特徴的な景観構成要素を特定するため，各景観構成要素の周囲で起き得る行為を分析した。「湯の花小屋」周囲の「観覧」

や，「旅館」周囲の「入浴」等の行為は，明礬温泉地区の景観構成上，重要な要素であり，行為であることがわかった。以上のことより，同地区の景観の特性を，地区の生活・生業に関連した行為や源泉用途に基づいて，明らかにすることができた。

今後は，住民及び外来者に対する温泉利用に関するヒアリングやアンケート調査により，両地区の温泉利用の実態を明らかにし，存在する各要素の問題点とそれらの改善方針を検討する必要があると考える。

【補注】

注 1）源泉位置図，温泉台帳「大分県東部保健所提供資料」

注 2）温泉法，第三条「温泉をゆう出させる目的で土地を掘削しようとする者は，都道府県知事に申請してその許可を受けなければならない。」- 大分県における諮問には，「大分県環境審議会温泉部会」が当たっている。また，掘削の基準は「大分県環境審議会温泉部会内規」として定められている。

注 3）大分県環境審議会温泉部会内規「一般的温泉湧出目的の土地 掘削は既設泉から 60m（噴気，沸騰泉から 150m）以内の地点では認めない」

注 4）写真に写り込む景観構成要素のイメージ写真は以下に示す。

【参考文献】

1）福井彩乃，佐藤誠治，姫野由香「古写真にみる景観変容と選考景観 の構図的特性 別府市鉄輪・明礬温泉地区の重要文化的景観指定に関する研究」日本建築学会大会学術講演梗概集 F-1分冊, pp.981～982, 2009.8

2）森下泰敬，佐藤誠治，姫野由香「景観構成要素と生活・生業の関係性の導出ー別府市鉄輪・明礬温泉地区の重要文化的景観指定に関する研究ー」日本建築学会九州支部研究報告第50号1，pp.309～316,2011.3

3）松本彩花，森下泰敬，姫野由香，佐藤誠治「生活・生業と温泉資源の関わりにより創造される景観の将来像の導出ー別府市明礬温泉地区湯けむり重点景観計画策定に関する研究ー」日本建築学会九州支部研究報告第 51 号 3，pp.485～488,2012.3

10.Effect of Markings, Signs and Messages on illegal parking in Saga University

佐賀大学における、不正駐車に対するマーク・看板・メッセージの有効性

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Zhejiang Sci-Tech University

Abstract: In Japan, disabled parking spaces are always set up in public places, such as libraries, municipal government offices, supermarket, shopping malls, etc.. However, regardless of the inconvenience for the disabled, many able-bodied people often use the disabled parking spaces, resulting in inconvenience and disappointment for the people who rely on the availability and use of these spaces. Generally, in order to address this issue, cone shaped objects are installed in the disabled parking spaces to stop other vehicles from improperly parking there, but this method increases the inconvenience for severely disabled vehicle owners such as wheelchair and crutch users

Saga prefecture firstly set about designing a framework named parking permit system to reduce the abuse of disabled parking in Japan since 2006. It has proven this system has somewhat effect on illegal parking by some researchers, however, the abuse of disabled parking still occurs in some public places, even in universities. The main reason that the illegal parking in disabled parking spaces by able-bodied drivers continually occurs in Japan may be because the Japanese government legislation had been silent on policing aspects of disabled parking although it has specified the minimum standards owners of traffic generators must uphold. In this situation that there is no penalty in the parking permit system, the main method to stop illegal parking is self-discipline by able-bodied people, based on a concept from social cognitive theory. Therefore, the marking or signage may play a very important role in parking permit system for that able-bodied drivers are likely to stop parking in reversed spaces when they realize the spots are disabled parking spaces.

In order to know the effect of markings, signs and messages on reducing illegal parking in disabled parking spaces, some investigations are done in Saga university. According to experimental and observational surveys, this paper mainly shows 1) the violation occurs frequently in places far from entrances and to which people would not pay attention to. 2) Setting warning messages and vertical signs are an effective way to protect the disabled parking spaces for disabled people. 3) The rate of illegal parking decreased rapidly when warning messages and vertical signs were added. Additionally, we also get the conclusion that the ratio of handicapped parking spaces in university may keep less than current 2% disabled parking rule which is different from ratios in shopping malls and hospitals.

1. Introduction

The handicapped parking spaces are significant and indispensable for the individuals with disabilities because approximately 72% of people with disabilities in the developed countries depends on private automobiles for transportation.[1] Due to the fact that spaces are wider than regular parking spaces and the distance from handicapped parking lots to entrances is nearer, the disabled people always obtain benefit of parking there. It is difficult or impossible to park if drivers who are wheelchair users cannot find handicapped parking spaces and they want to park in regular parking spaces.

However, in Japan, regulators are reluctant to criminalize petty offences and have not formed a legal framework to deal with handicapped parking lot usage by able-bodied individuals.[2] In additional, the local government expands its scope of application by including pregnant women and those having mildly trouble with walking without increasing the ratio of handicapped parking, and the ability for handicapped to park is decreased.[3]

Saga prefecture firstly set about designing a framework named parking permit system to reduce the abuse of disabled parking in Japan since 2006. It has proven this system has somewhat effect on illegal parking by some researchers[4], however, the abuse of disabled parking still occurs in some public places, even in universities. The main reason may be because the Japanese government legislation had been silent on policing aspects of disabled parking although it has specified the minimum standards owners of traffic generators must uphold, as mentioned before. In this situation that there is no penalty in the parking permit system, the main method to stop illegal parking is self-discipline by able-bodied people, based on a concept from social cognitive theory[5]. Therefore, the marking or signage may play a very important role in parking permit system for that able-bodied drivers are likely to stop parking in reversed spaces when they realize the spots are disabled parking spaces.

Based on this thought, one experimental investigation was implemented in Saga University, then some suggestion and advice are also proposed according to the results of the investigation.

2-1 The study

The experimental investigation starts in October, 2013 from when the fall semester began. The possibility of illegal parking is high because there are no enough parking spaces can be parked by an increasing number of vehicles by students. Lots of bicycles are parked in those spots when classes have begun. (shown as Fig. 1 and 2). Four popular handicapped parking lots are chosen by author.

Lots a and b are at the front of classroom block, which are easy to be seen by people (shown as Fig. 3 a and b). However, Lots c and d are somewhat far away from entrance of main building (shown as Fig. 3 c and d). Almost all students and teachers may not pay attention to whether there is violation occurred in these two handicapped parking lots or not.

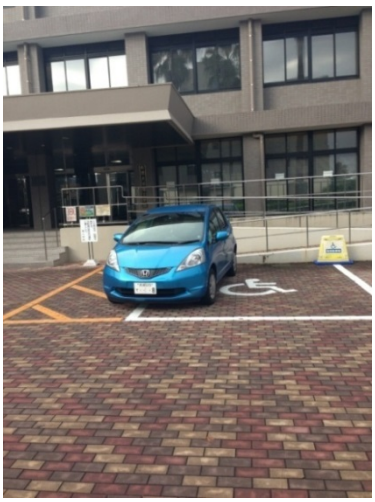


Fig. 1 The illegal parking at the front of entrance

Fig. 2 The illegal parking by bicycles at the front of handicap spaces

Fig. 3 Four handicapped parking spaces in university

This field survey was carried out for a 6-hour duration from 8:30 am to 10:00 am and 3:00 pm to 4:30 pm in four weeks. There was only an international wheelchair symbol painted on the ground at four handicapped parking lots in the first week (as Fig. 4 shows). In the next week, ground marking and prominent vertical sign were set up in these spots (as Fig. 5 shows). In the third week, ground marking, prominent vertical sign and warning messages were set up (as Fig. 6 shows). In the last week, authors repeated only ground marking showing as do in the first week (as Fig. 7 shows). The observation was not considered on the weekend because few students and teachers were at school. Trained observers were allocated and observed for each set of adjoining parking spaces in every 10 minutes. The observers were positioned away from the parking lot in an unobtrusive manner to avoid influencing the parking behavior of vehicle owners during the survey period and recorded information on paper about the approximate parking time in handicapped spaces and what type of the parking permits or other proof displayed (if the drivers had them.)

Fig. 4 First week

Fig.5 Second week

Fig. 6 Third week

Fig. 7 Fourth week

2-2 Survey results

a. Violations in each parking lot in observation period

Fig. 8 indicates the ratios of parking occupancy in the first week observation. (i.e. ground wheelchair symbol marking only)

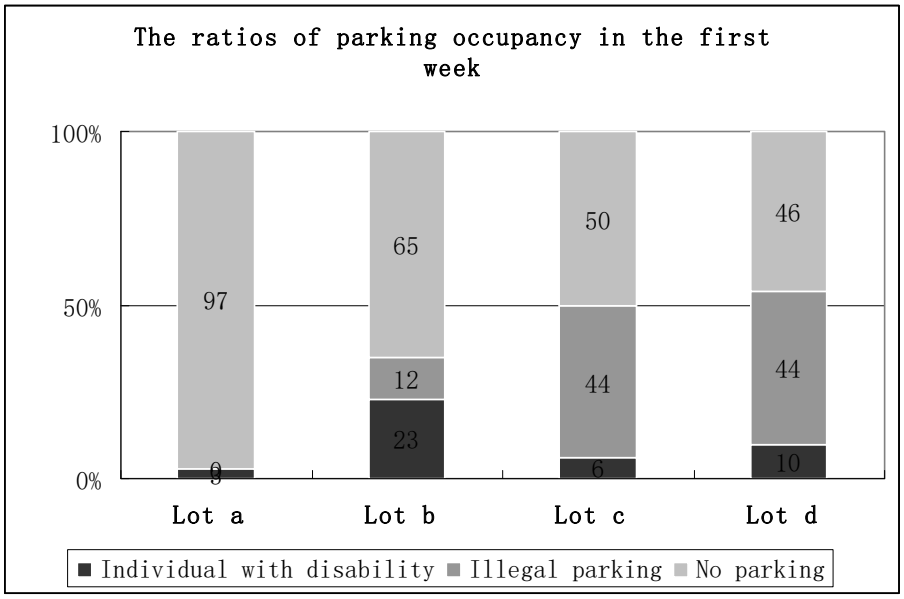


Fig. 8 The ratios of parking occupancy in the first week

important for handicapped parking. Additionally, the ground marking used alone was of limited effectiveness probably because ground markings are hidden by illegally parked cars and ground markings cannot be readily identified by able-bodied drivers.

Then, author did the survey continually as mentioned in section 2-1. The graphs of results are not shown but results are described as writing in next section due to the room of paper.

The violation ratios decrease when the ground wheelchair symbol marking and vertical sign were set up in both Lot c and d. The violation ratios went down to 27% and 20% respectively compared with previously violation ratios that were 44% and 44%. The violation ratios drop to the lowest level in the study when the warning message with baby picture and writing about 'the disabled people cannot park and will be in trouble if you park here' is added to the ground wheelchair symbol marking and vertical sign. Then, the violation ratios in Lot c and d become 2% and 10% respectively. The observers also reported that some able-bodied drivers began to park their vehicles illegally, then when they saw the signs and messages, and immediately left the handicapped parking spaces. That means a combination of ground marking, vertical sign and warning message plays a great role in handicapped parking system to prevent able-bodied drivers to park.

Similarly, in a fore The violations that occurred in Lot a and b are obviously less than c and d which are far away from the entrance based on the figure. Particularly, the violation ratios in both handicapped parking lot c and d are nearly 44%. That means almost half time, the disabled people cannot utilize these spots when they arrive at the bays. On the other hand, the ratios of use of handicapped parking by disabled people are respectively 6% and 10%. The low ratio of use of handicapped parking is probably related with violated parking by able-bodied drivers. It was concluded that the locations near to a main entrance or that were in a noticeable location, were ign study of demographics of violators, the lowest violation rates were recorded at the observation sites where parking spaces were marked with upright signs rather than ground signs.[6]

Lastly, removal of warning messages and vertical signs results in an increase in violation rate to 27% and 37% in Lot c and d. while the Lot a and b are not influenced much compared with the investigation mentioned. It proves that only ground marking still cannot influence able-bodied drivers and cannot decline violation much.

b. The time of violation in lot c and d

Based on the data, changes of time of violation in lot a and b are not noticeable. However, when it comes to lot c and lot d, there are some interesting result can be found. Fig. 9 indicates the change of time of violation by able-bodied drivers in handicapped parking lots which are not noticed by people, in the time at four weeks. The time of violation in lot c is from 400 minutes in the first week, which is the peak value in whole survey period, down to 225 in the second week and then continually down to only 15 in the third week. After removal of the vertical sign and message, the violation time increases to a high level of 240 minutes as Fig. 9 shows. It also shows the same trend of time of violation in Lot d. The time decreases from 297 to 190 minutes after adding a vertical sign, and then further down to a lowest of 90 minutes when a combination is set up. After removal of the vertical sign and message, violation time goes up to 330. Fig. 9 and Fig. 10 may imply that social sanctions have a great impact on violation rates, even it has occurred in an unnoticeable place.

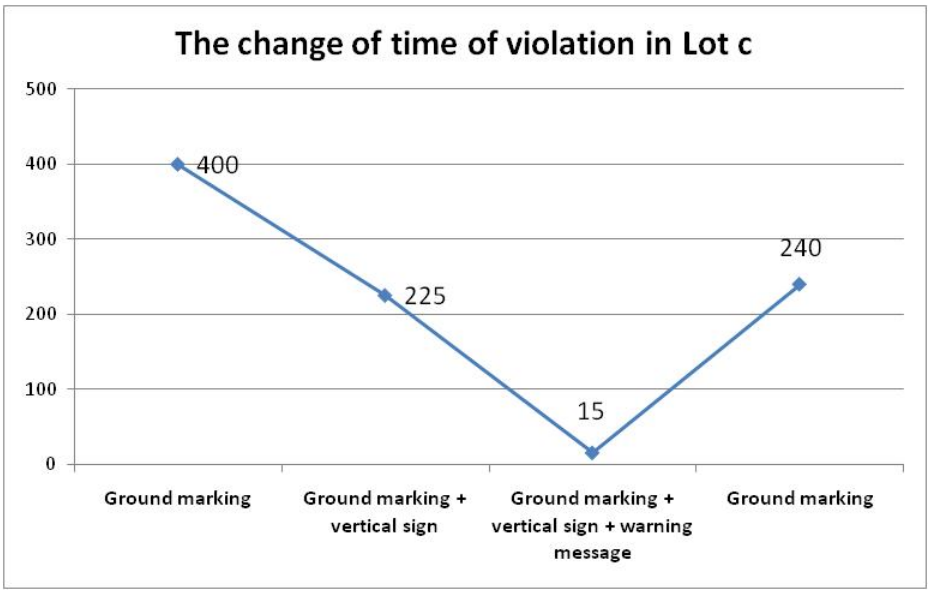


Fig. 9 The change of time of violation in Lot c

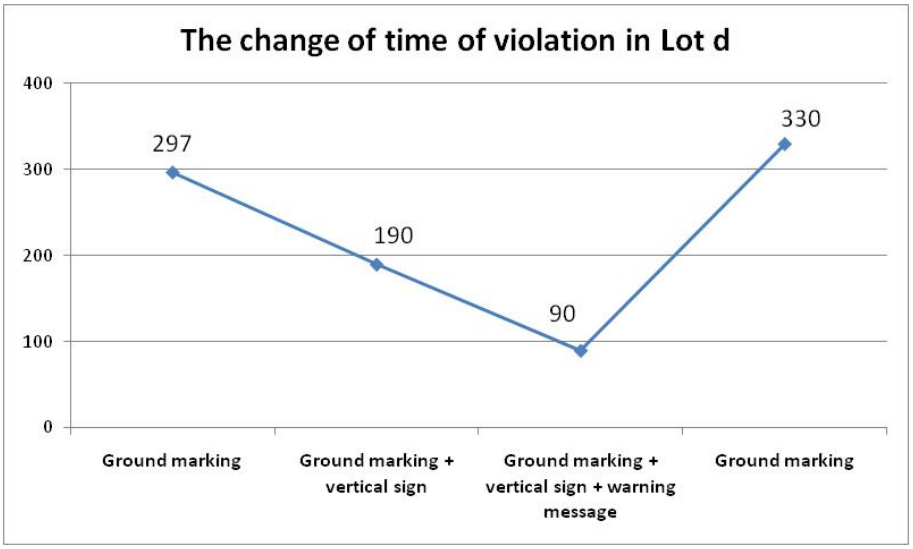
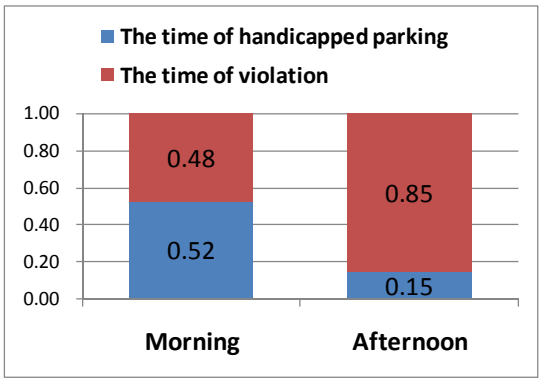


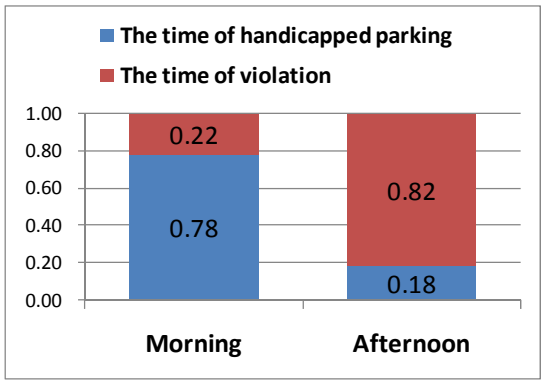
Fig. 10 The change of time of violation in Lot d

c. Change of violations between a.m. and p.m.

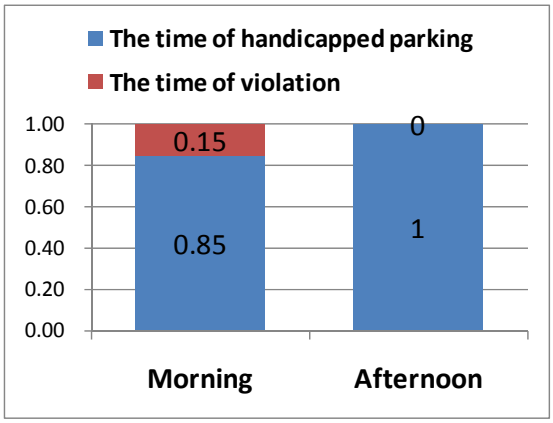
The last stage is about the difference in illegal parking between morning and afternoon. The percentages of time for handicap and violation including all four handicapped parking lots in four weeks are obviously different according to the fig. 11. In general, the ratio of time of handicapped parking by disabled people in morning is more than the ratio of parking by able-bodied people. Except for the first week, the ratios of handicapped parking in morning have reached 0.78, 0.85 and 0.79 which mean the handicapped parking spaces are utilized frequently by disabled people and the illegal parking behavior is less. However, when it comes to afternoon, the ratio of time of violation becomes higher than the ratio of individual with disability. The ratios of violation in the first, second and fourth week are 0.85, 0.82 and 0.88 respectively. The reason may is more able-bodied students choose classes in afternoon rather than in morning. Probably, for this reason, the violation in school trends to occur in the afternoon. Therefore, author comments that approaches to patrolling handicapped parking lots should be instituted in the afternoon to protect parking privilege of the disabled people.



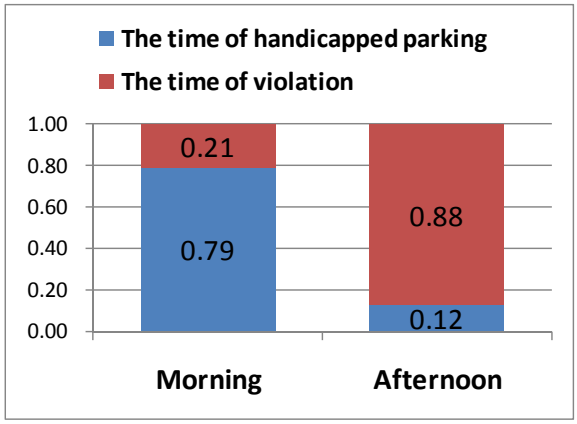
Ratio of violation based on time in four lots (the first week)



Ratio of violation based on time in four lots (the second week)



Ratio of violation based on time in four lots (the third week)



Ratio of violation based on time in four lots (the fourth week)

Fig. 11 Ratio of violation based on time in four lots

3. Conclusions and suggestions

It is proven that the violation occurs frequently in places far from entrances and to which people would not pay attention to. Setting warning messages and vertical signs are an effective way to protect the handicapped parking spaces for severely disabled people based on results surveyed in four lots. The rate of illegal parking decreased rapidly when warning messages and vertical signs were added. Meanwhile, it is indirectly proven that the concept from social cognitive theory by Bandura[7] is an effective way against illegal parking as well.

From results in previous sections, it shows that only one parking bay frequently used in handicapped parking lot a in the campus as well. It would be better if we remove one parking space and change it into ordinary parking spaces. It may reduce the ratio of illegal parking there.

One more handicapped parking space may be added in handicapped parking lot b, because the student center is nearby and is frequently visited by students and official staff. The possibility of an individual with disability coming is high. Moreover, the messages and signs in lot c and d should be set up as soon as possible. The patrol, particularly in the afternoon, by staff, is also recommended because the rate of violation in place which is far away from an entrance of a main building may be high, as results in the previous section show.

According to the investigation, handicapped parking spaces in school have not play a part in parking permit system in Saga city. The main point may be the current ratio of reserved spaces is not suitable in all public buildings, at least it is not fit for school as mentioned in previous section. Based on this study, the ratio of handicapped parking spaces in university may keep less than current 2% handicapped parking rule. The further study that how many handicapped parking spaces in school would be set up should be focused on.

Reference:

[1] Fletcher, D. (1996), Illegal Parking in Spaces Reserved for People with Disabilities: A Review of the Research. *Journal of Developmental and Physical Disabilities*, *Vol. 8*, No. 2, 1996, pp.151-159.

[2] Kiyota M., Hayashida Y. & Maeda A. (2009), Effectiveness of Disabled Parking Identification Card System without Penalty and its Issue. *Traffic Science, Vol. 40, No. 1,* 2009, pp. 69-76.

[3] Saga Universal Design Laboratory (2013). Copyright 2007 - 2013 Saga Prefecture. http://www.saga-ud.jp/keikaku/machi/parkingplusone.htm

[4] Kiyota, M., Hayashida, Y., Maeda, A. (2011), Issue of Disabled Parking Identification Card System without Penalty and Efforts toward Improving the System. *Traffic Science, Vol. 46,* No .4, 2011, pp. 66-76.

[5] Michael A. & Paula J. (1990), Handicap Parking: The Social Reasons for Its Abuse. *Journal of Police and Criminal Psychology, Vol. 6, No.2*, 1990, pp. 23-25.

[6] Cope and Allred (1990), Illegal parking in handicapped zones: Demographic observation and review of the literature. *Rehabil. Psychol. 35*, pp. 249-257.

[7] Bandura, A. (1986), *Social Foundations of Thought & Actions: A social cognitive theory. Englewood Cliffs*, NJ: Prentice-Hall Inc., US, 1986.

11. A study on decentralization of tourism elements by revitalizing vacant buildings in Ureshino hot springs town

嬉野温泉街における空き物件を活用した 食事・入浴・宿泊分散型回遊プログラムの導入可能性の検討

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Abstract: Hot springs tourism is one of the popular tourism in japan. These assets have great potential to revitalize local areas that have recently suffered economic decline. This great potential, however, 1) consolidating of tourism elements namely meal, bathing, staying, and so on by hot springs inn and 2) increasing of vacant building namely the inns or shops out of business has been a problem (due to the change of purpose of hot springs and style of tourism). Ureshino hot springs town that is the area of our study also have some vacant buildings in the center of the town. So, tourists do not go out for sightseeing. They only stay inside the inn because they can take hot springs, eat meals, sleep and can enjoy any activities there. In this study, we studied possibility of decentralizing the tourism elements through case study of the other hot springs town and propose of program; namely decentralizing tourism elements by renovating vacant buildings in Ureshino hot springs town. The results of our studies are as follow: 1) we have to consider about coexistence of inns existing and new even though this program has an effective to revitalize a local hot springs town; and 2) there are some regulations in terms of law when we renovate vacant buildings to the facility that have lodging. Thus, we argue that the local association of community development should take the initiative to improve vacant buildings using this program and consider decentralization of tourism elements to cope with changing social claim.

1. Introduction

1-1 Background

Hot springs (*onsen*) towns are major contributors to many local economies in Japan. These assets have great potential to revitalize local areas that have recently suffered economic decline. These potential, however, hot springs tourism elements; namely meal, lodging, bathing,

purchasing, and so on were consolidated into inn (ryokan) in the wake of Taisho era and high economic growth period in Japan. This tourism style that can enjoy only in the inn is nowadays out of step with the times.

Moreover, increasing the vacant building such as inns and shops out of business has been a problem. Ureshino hot springs town that is the area of our study also have such problems. In light of these problems, we study possibility of decentralizing the tourism elements by renovating vacant buildings in Ureshino hot springs town.

1-2 Aim

This study aims to propose and inspect the decentralizing the tourism elements by renovating vacant buildings in Ureshino hot springs town.

1-3 Study area

The study area is Ureshino hot springs town, located in the center of the city of Ureshino (see figure 1). The main street used to me lined with Japanese-style hotels or traditional inns (*ryokan)* in the Edo era. After World War Ⅱ, Ureshino hot springs town experienced a development boom due to Japan's rapid economic growth. New buildings were constructed and tourism elements were consolidated into inns. However, in recent years, Ureshino hot springs town has faced gradual economic decline. One of the reasons is that the present tourism style is out of step with times. Additionally, there are many vacant buildings in center of the town.

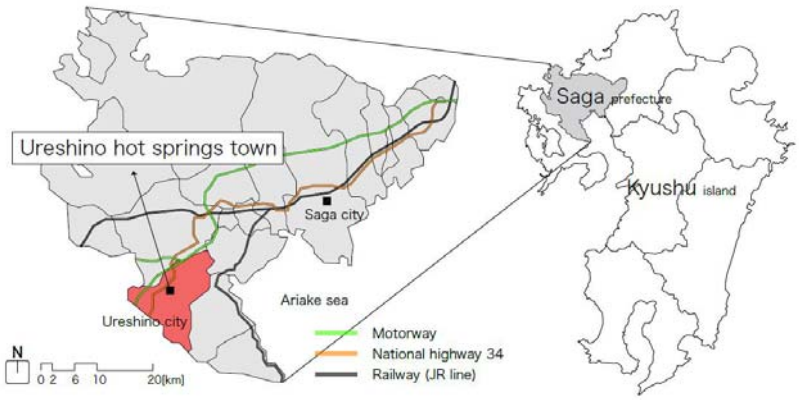
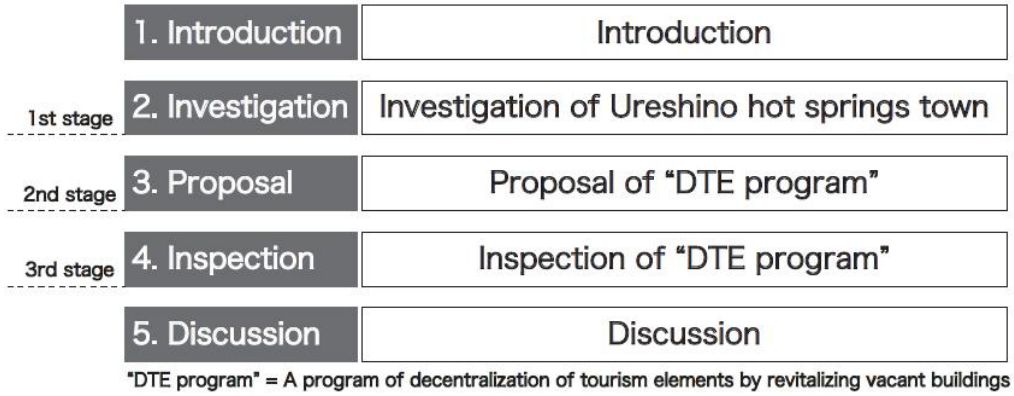


Figure 1: Location of the study area (Ureshino hot springs town).

1-4 Methodology

Figure 2 show flow of this study. First, we investigate Ureshino hot springs town focusing on the number of vacant buildings and the activities of local association of community in Ureshino (*Ureshino Onsen Nigiwai Lab.*) by a field survey and interview. Second, we propose the program; namely a program of decentralization of tourism elements by renovating vacant buildings. Finally, we inspect the program through interview the local residents who have relationship to this program to take their opinion.



gure 2: Flow of the study.

2. I

Fi

In this section, we survey the number of vacant buildings with intention of lending or selling and the activities of local association of community in Ureshino through field survey and interview to the building owners and local resident.

2-1 The number of vacant buildings

In our survey, we clarified that there were 56 vacant buildings in center of the town (see figure 3). Furthermore, most of second floor of these were used as a residence, storage, or some part of owner's life. And we also clarified that 2 of these building owners had intention of lending the buildings.

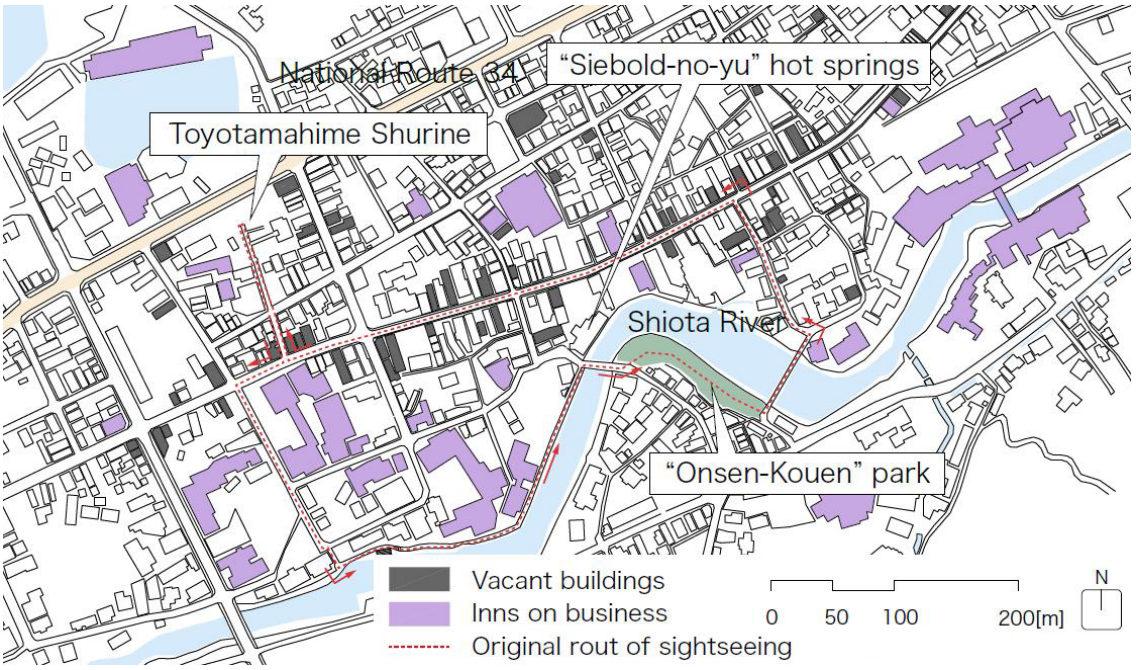


Figure 3: Vacant buildings in the center of Ureshino hot springs town and original route of sightseeing by Nigiwai Lab..

2-2 The activities of local association of community

Ureshino Onsen Nigiwai Lab. (hereafter referred to as Nigiwai Lab) is one of the local associations of community in Ureshino hot springs town. The owner of inn, one of the members of Ureshino tourism association, the officer of the Ureshino City Authority, and several professional people belongs to Nigiwai Lab as members. They institute an original route of sightseeing connecting some point of area; namely shopping district, shrine, park, esplanade along the river for the tourists (see figure 3). And they get this area ready for tourists revitalizing the park, renovating vacant buildings along the shopping district and so on.

2-3 Summary

Important findings from investigating the present situation of vacant buildings and the activities of Nigiwai Lab are as follow; 1) though it was center of the town and along the shopping district, there are many vacant buildings; 2) 2 of these buildings owners had intention of lending the buildings; and 3) the local association of community in Ureshino aims to let tourists enjoy the sightseeing not only inn but also the town.

3. Proposal of a program of decentralization of tourism elements by revitalizing vacant buildings

In this section, we propose a program of decentralization of tourism elements by revitalizing vacant buildings (hereafter referred to as DTE Program)

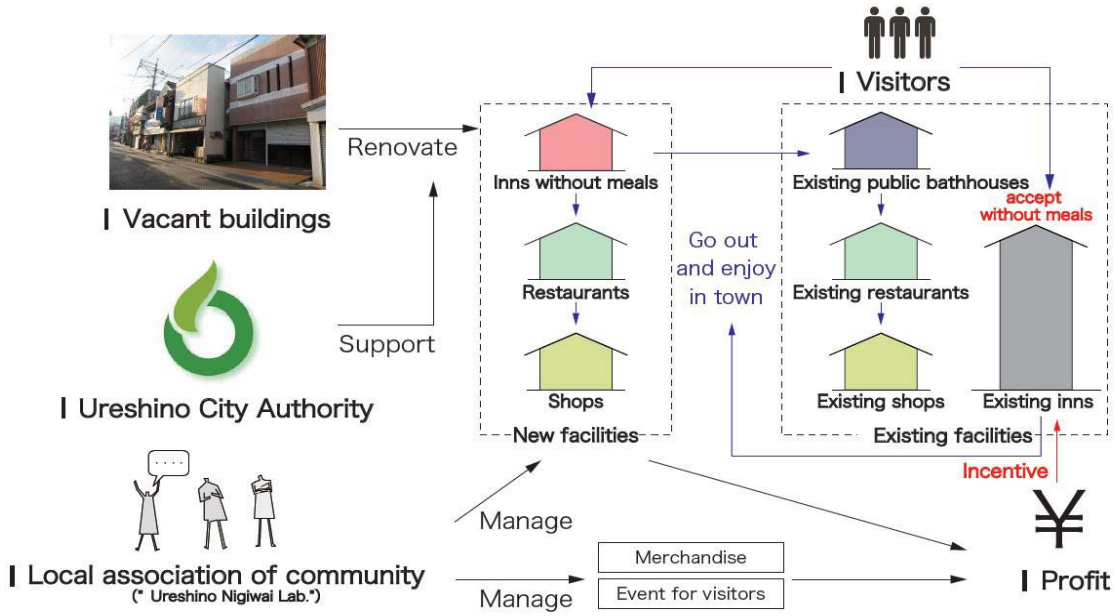


Figure 4: Basic policy of DTE program; "A Program of Decentralization of Tourism Elements by Renovating Vacant Buildings".

3-1 Basic policy of DTE program

Figure 4 show the basic policy of DTE program. We plan to build some facilities that have function of hot springs tourism elements; meal, bathing, lodging by renovating vacant buildings. And it makes tourists enjoy the sightseeing not only inn but also the town. As a result, we aim the dispersive tourism from intensive tourism.

3-2 Specific design proposal by actual vacant buildings

We propose the design draft of these facilities mentioned in 3-1 by 2 vacant buildings that we survey in 2-1 as a target.

3-2-1 Case 1 –shop for tourists–

Figure 5 show the outline of case 1; picture of current situation, plan of present and proposal, and image photo. The previous usage was bar and we propose to renovate as shop for tourists. We propose to provide vertical louver on the entrance and make the difference of level flat in the building to promote the policy of barrier-free facilities of Ureshino City.

3-2-2 Case 2 –café, multipurpose space, and lodge without meal–

Figure 6 show the outline of case 2; picture of current situation, plan of present and proposal, and image photo. Previous usage was souvenir shop and we design as café, multipurpose space, and lodge without meal. The lodge without meal is one of the important facilities on this proposal. The tourists who stay here will inevitably go out to take meal or take hot springs, and it will promote the tourists walking in the town.

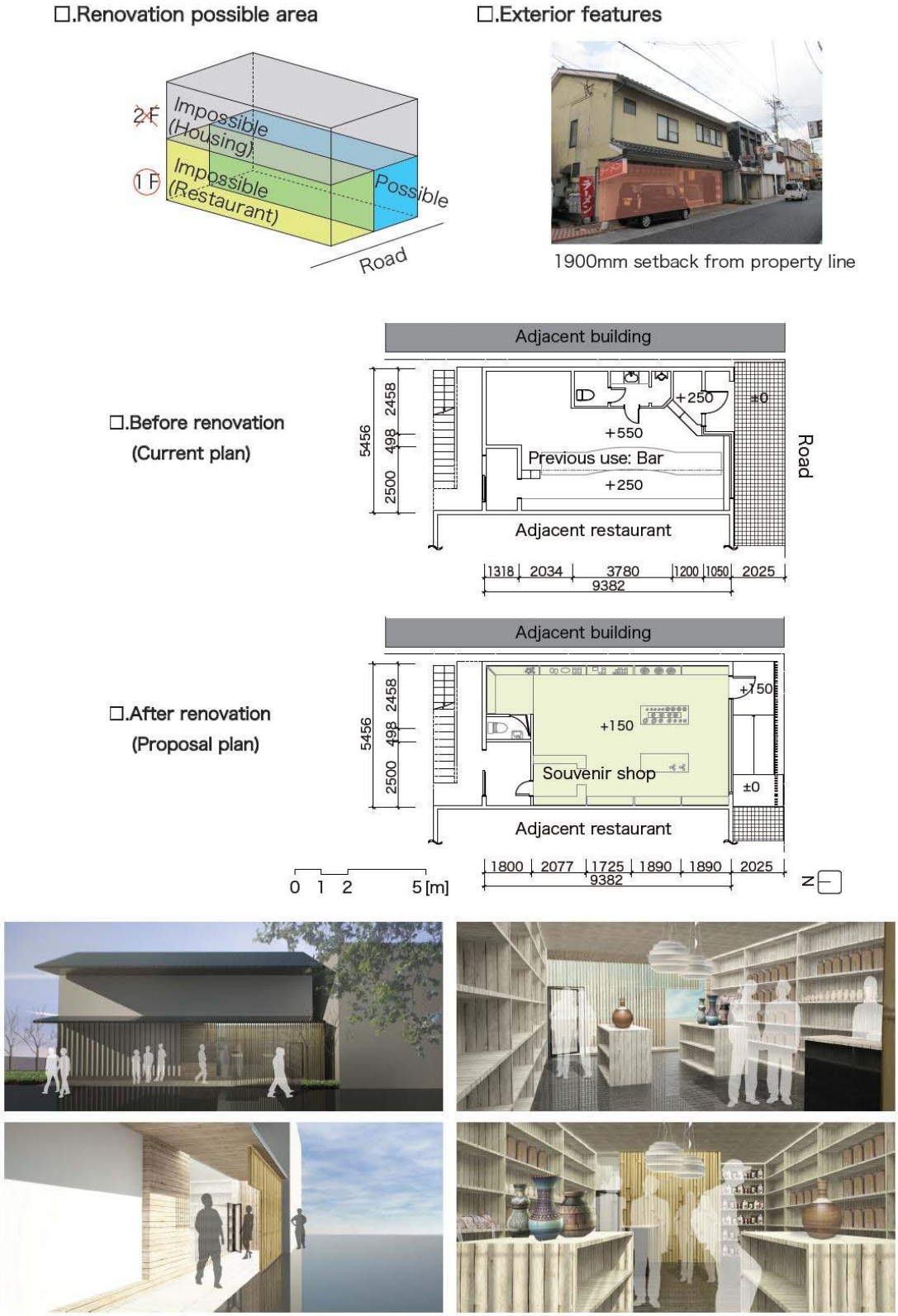


Figure 5: Outline of case1; current situation, plan of present and proposal, and image photo.

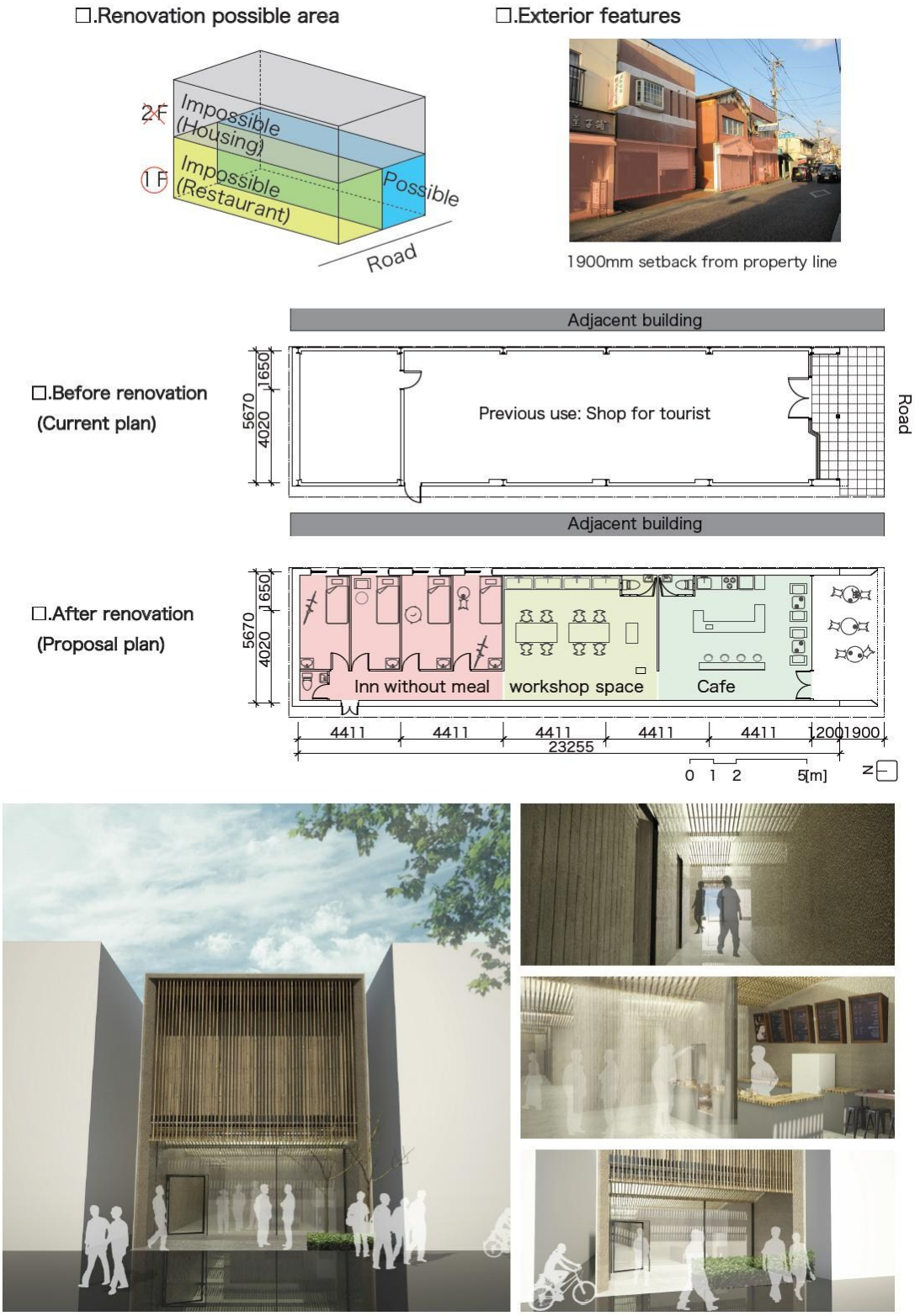


Figure 6: outline of case 2; picture of current situation, plan of present and proposal, and image photo.

4. Inspection of Feasibility of DTE program

In this section, we interview to 3 residents who have relationship with hot springs tourism in Ureshino; namely the owner of inn, the officer of tourism division of Ureshino city office, and the staff of souvenir shop for tourists to take their opinion about DTE program. As a result of interview, we got some useful opinions and advices. The idea of accepting the tourists not only inn but whole of town have possibility to create new choices of tourism in Ureshino hot springs town. On the other hand, we should consider about differentiation of existing facilities and new facilities. Furthermore, we must continue to consider about management operator of new facilities that we propose. Especially, in the interest of law, there are some issues when we manage the facilities that have lodging.

5. Discussion

As a result of this research, we are better able to understand usefulness of basic policy of DTE program. On the other hand, there are some issues to realize. But we believe that there are worth to know the possibility of DTE program by series of flow namely investigation, proposal, and inspection.

There are many vacant buildings in the center of Ureshino hot springs town. And most of them are not only less effectively utilized but also adversely affects scenery of Ureshino hot springs town. We recommend that effective utilization is promoted by considering not only the vacant building itself but also the concept of all of town.

6. Acknowledgment

We would like to express our appreciation of Mr. Nakashima, officer of the Tourism Affairs Division of Ureshino City Authority, for his useful advices. And we are grateful to Mr. Kitagawa, the manager of inn; Ryokan-Oomuraya and the participant of Nigiwai Lab. who cooperated with us by taking part in our interview survey.

7. References

Kota Sugizaki, Haruhiko Goto, and Taro Taguchi (2007). INVESTIGATION OF EFFECTIVE MANAGEMENT TECHNIQUE OF COMMUNITY SPOT IN A RESORT TOWN –A case study of the management community spot in Yubara hot-spring street, Minakami town, Gunma–. *Journal of Architectural Planning of Architectural Institute of Japan, No. 622, 97-104.*

Mahito, Nakazono, Yuko Ohuchi, and Sachiko Yamamoto (2005). THE PROPOSAL OF LONG-TERM RENTAL HOUSING CONTRACT AND THE PLANNING PROCESS BASED ON THE IMPROVEMENT. *Journal of Architectural Planning of Architectural Institute of Japan, No. 594, 147-154.*

Mahito Nakazono, and Sachiko Yamamoto (2006). GRANT FOR VACANT HOUSE IMPROVEMENT BY "FURUSATO SHIMANE TEIJU FOUNDATION" AND THE ENTERPRISE SYSTEM OF LOCAL GOVERNMENT –Study on the renovation system of vacant house in rural areas–. *Journal of Architectural Planning of Architectural Institute of Japan, No. 603, 65-72.*

Shoichiro Anai, Nobuo Mishima, and Yoko Taguchi (2013). LAND MANAGEMENT PRACTICES OF THE ONSEN (HOT SPRINGS) INN ASSOCIATION OF URESHINO, JAPAN. *Proceedings of 4th International Conference on Engineering, Project, and Production Management*, 482-491.

Soichiro Nakagawa, Kosuke Yamaguchi, Takeru Sakai, and Naoki Tsurusaki (2012). Renovation of a Vacant House according to Cooperation with Local People and Students Part2 – Case study on Itoshima Akiya Project–. *Summaries of Technical Papers from the Annual Meeting of the Architectural Institute of Japan, 1171-1172.*

Toshihiko Yusa, Yasutomi Sakuma, and Haruhiko Goto (2008). Relation Among Vacant House Owners, Residents, and the Neighborhood: Vacant Houses and their Management in Rural Areas. *Summaries of Technical Papers from the Annual Meeting of the Architectural Institute of Japan, 579-580.*

12. Tourism Development Utilizing the Local Resources - The Case Study of the Michinoeki Station and Renewal of Closed Schools in Southern Boso Peninsular, Chiba

地域資源を生かした観光の取り組みについて －千葉県南房総地方における道の駅、廃校を事例に　－

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Abstract : This area is located about 100 km South-East of Tokyo with the mild climate, mountains and ocean, 11 Michinoeki Stations (localized highway service area) , renewable closed schools and so on. Michinoeki Stations were constructed along the local highways for the purpose of drivers rest in the beginning but, in nowadays, the over 1000 Michinoeki Stations all over the country are working as regional centers to serve local products to the drivers. Closed schools because of the population decrease , especially in young generations, can be renewable for the other purposes such as lodges, restaurants or schooling centers.
It is necessary to brush up the tourism itself based on not the traditional group tours but the family and omotenashi tours utilizing the local resources.
Keywords: Michinoeki station, closed elementary school, experience program

１．はじめに

近年、多様化する観光産業において、人口減少、少子高齢化、環境問題など日本における社会状況を踏まえた取り組みが求められているといえよう。その一方で、経済政策の効果による長期景気低迷からの脱却の兆しを受け、国内外の観光客増加の傾向が生じている。このような視点より、千葉県南房総地域のエコツーリズムを事例とし、観光産業における地域の取り組みについての現状を把握・分析し、今後の観光客増加と定着に必要とされる課題を考察する。

２．南房総地域の特色と観光客の現状

2-1 南房総地域の概要

首都東京からは 100 ㎞圏に位置しており、時間距離２時間程度。房総半島の南端に位置し、西側には東京湾、東側及び南側には太平洋と三方を海に囲まれ、冬暖かく夏涼しい海洋性の温暖な気候のエリアで、特に南房総沿岸地域は、沖合を流れる暖流（黒潮）の影響を受け、年間平均気温は約 16 度。南部には一年を通して霧の降りない無霜地帯がある。

2-2 観光客数の推移

この地域の年間入込観光客数は、東京アクアラインなど高速道路の開通により、首都圏からの交通の利便性が著しく向上したことなどから増加している。しかし、交通が良くなった分、日帰り客が大多数

で、宿泊に繋がらないのが問題である。修学旅行は年々増加傾向である。2002 年度の 660 万人以降は減少傾向で、2006 年度には 450 万人まで落ち込む。東関東自動車道館山線が全面開通した 2007 年度から 2010 年度にかけては回復傾向に
転じ、500~580 万人程度で推移。2011 年度は、東日本大震災の影響で約 460 万人に減少した。2010 年度の宿泊施設における年間利用の修学旅行客数は 1.8 万人（全体の 3%）。
外国人宿泊数は 2 千人弱となっている。（韓国人が最も多く、台湾人、中国人と続いている）

３． 南房総地域の「道の駅」

3-1 「道の駅」とは

現在は国土交通省の背策として運営されているが、20 年前に民間の実証実験から誕生する。1990 年に山口県と広島県で道路の余裕スペースに 24 時間利用できる簡易トイレを設置。農協・漁協による地元の産品を並べて売る試みが始まる。1993 年に、道路利用者と地域の人々がふれ合うというコンセプトで、道路局による要綱が策定され、全国 103 箇所の施設が「第一号」として登録された。広い駐車場に清潔なトイレ、地域ならではの情報や、安価で新鮮な特産物に出会える。東日本大震災時には被災地周辺の道の駅で、避難所や物資の集積所としての役割を担った。2014 年 10 月現在、全国に 1,040 箇所定着し、ドライバーだけではなく地域住人にとっても必要な存在となっている。道の駅システムは海外でも注目されており、東南アジアの発展のための展開も期待されている。「休憩」「情報発信」「地域の連携」という 3 つの機能だけを統一し、施設の整備や運営は地域の創意工夫に任されていることが、バラエティーに富んだ、地域密着型の施設として成功した要因となっている。近年は、道の駅自体がブランド化し観光目的として注目を得ている。地産地消や 6 次産業、高齢者が集う福祉拠点など「地域の核」としての重要性が増している。また、「全国道の駅連絡協議会」を活用した全国での成功例や失敗例の共有化や、近隣の道の駅の紹介、医療機関の情報などを充実させることが求められている。

3-2 南房総地域の「道の駅」の特性

南房総には全国に先駆けて設置された「道の駅」が 11 箇所もあり、それぞれが個性豊かで地域の情報発信基地の役割もしている。

⑴［きょなん・見返りの里］：富士山や夕日が美しい場所、「菱川師宣記念館」
⑵［富楽里・とみやま］：ハイウェイオアシス併設、海・山の幸、地元産の直売所　＊1
⑶［とみうら・枇杷倶楽部］：2000 年「全国道の駅グランプリ」最優秀賞を受賞、房州びわ狩り　＊2
⑷［おおつの里・花倶楽部］：4000 坪の敷地・四季を通じて花摘み
⑸［三芳村・鄙の里］：農産物直売所「土のめぐみ館」オリジナル乳製品、足湯
⑹ ［ちくら・潮風王国］：海産物、季節ごとのイベント、漁船のオブジェ
⑺［ローズマリー公園］：中世ヨーロッパの建物、ノット式公園、紅茶
⑻［和田浦 WA・O！］：2012 年オープン、鯨料理、シロナガスクジラの標本　＊3
⑼［鴨川・オーシャンパーク］：扇形ピラミッドの物産館・レストラン、パノラマ展望台
⑽［南房パラダイス］：動植物園が併設、全長 300m の温室「房総フラワーライン」
⑾［白浜野島崎］：南房総南端の道の駅、野島崎灯台、花の情報館

＊1「関東道の駅アワード2014」・「プレミアム30」にて3箇所の「道の駅」が受賞＊印

＊2家族で一日楽しめる道の駅ランキング・東日本3位　「南房パラダイス」2011.8

＊3南房総市には国内最多の8つの「道の駅」（岐阜県高山市と並ぶ）

3-3　南房総地域における「道の駅」の問題点

道の駅が誕生して10年以上が経過し、多様化するニーズ、変化する社会状況を踏まえ施設の改修、既存商品の見直し、体験プログラムの整備・充実を検討すべきであろう。

道の駅「とみうら・枇杷倶楽部」はリニューアルを行う。

４．自然の宿　「くすの木」　南房総市和田町（文部科学省　廃校リニューアル50選）

名前の由来は、隣の山神社の境内にある安房地方最大の巨木、樹齢約750年のクスノキ

4-1　概要

町営の体験型宿泊施設。過疎化に伴う児童数の減少により1995年に廃校になった、南房総市の北側山間部にある上三原小学校をリニューアルし、1997年にオープン。千葉県の補助金を財源に整備。町からの補助金と施設利用料金で運営維持管理を行っている。

豊かな自然に恵まれた環境の中で、自然体験・調理加工体験・竹細工づくりなど、体験型交流施設として多くの利用者がある。利用者数：年間12,800人

4-2　施設概要

木造平屋建て（一部鉄筋）、建築面積：859.01㎡、延床面積：835.3㎡。宿泊室：6部屋

宿泊人数：48名。談話室（1部屋）。食堂兼会議室。多目的ホール（板の間３９畳）。

加工自習室。管理人室。事務室。

4-3　特色

廃校となった小学校の講堂の一部を残して改築し、「くすの木王国」（上区自治体）が運営管理していて、地元のおかあさん達がスタッフ（構成人数　36人）。体験学習として竹細工やわら細工といった手づくり物から、田植え・稲刈り・野菜収穫・乳搾りといった農業体験、さらに納豆や味噌づくり・餅つきなどのコースを体験してふるさとの香りを味わってもらう。このほかに近くの花嫁街道のハイキングもあり、1年12ケ月季節に応じた様々な体験メニューが用意されている。房州の祝いの席を飾った絵巻寿司を作り、食文化と風習をおいしく学べる「太巻き寿司づくり」も人気がある。すべて地元の人たちで運営し、料理は地元で採れた野菜や山菜を利用し、地元の「かあちゃん」による手料理の素人のもてなしが好評でリーピーターが多い。

都市の子ども達には第二のふるさととして、グループや家族連れには田舎でのリフレシュの場として、「気軽に田舎くらし」をコンセプトに取り組んでいる。

4-4　課題

体験運営スタッフの高齢化に伴う後継者不足が、懸念される。

4-5　今後の計画

周辺の恵まれた自然を守りながら地域の交流を増やしていくために、体験メニューのより一層の充実を図るとともに、2004 年開設した市民農園を活用し、都市と農村とのコミュニケーションづくりに努める。

５、地域行政の取り組みにおけるエコツーリズム政策の課題（南房総市）

5-1　エコツーリズムとは

エコツーリズムとは、旅行者が自然環境や歴史文化を体験し学ぶとともに、対象となる地域の自然環境や歴史文化の保全に責任を持つ観光産業のあり方と捉える。

5-2　人材の不足

地域全体で優れたエコツアーガイドを育成・研修するシステムが欠落している。さらに、各団体指導者の高齢化やエコーツアーが生業として成立が困難なことなどから、各団体が自力で後継者を育成することは不可能に近い状況である。また、養成したガイドも集客不足から、活躍できる機会が少なく、維持・確保が難しい。

5-3　集客の重要性

体験プログラムを採算ベースに乗せるためには、さらなる集客が必要である。南房総市の現状は、自然環境の保全やローインパクトの心配をする以前に、プログラムの整備と情報発信を充実することにより、一人でも多くの人が訪れてもらえることが優先といえる.

5-4　連携の不足

それぞれの地域で個別に事業を展開している。各地域の特性や観光資源、人、情報、技術を活用したエコツアーによる地域活性を展開していくためには、地域連携が不可欠であり、広域的なコーディネーター機能が求められている。

5-5　課題解決の方策

南房総エコツーリズム推進の核となる恒常的な中間支援組織の構築が、課題の解決として求められている。中間支援組織は、各地域にある各団体の調整、ネットワーク化、新プログラムの開発、人材育成、情報発信、営業活動など総合的にマネジメントし、受け皿と集客の強化を図り、利便性の向上につなげる。

5-6　新しい取り組み

南房総市では、21 年度から 3 年間で体験指導者として育成した 3 名が活動を始め、中間支援組織が具体化している。また、2014 年 3 月に千葉県初の森林セラピー基地『すぐそこ!あったか南房総「海・里・

人が織りなす癒しの森」』の認定を受けた。地域ごとの特色を生かした7箇所のセラピーロードがあり、現在、里山を案内するガイドを養成している。

６．観光客の動向

近年の旅行者のニーズは、これまでの見物型観光から体験型観光へシフトし、さらに家族は滞在型保養志向、若者はスポーツや人々とのふれあいへの参加など活動体験志向、高齢者では健康保養志向、また東日本大震災後ではボランティア参加旅行など細分化が進み、多様化している。観光産業へのニーズの多様化、細分化がさらに加速化する中で、他地域との差別化、狙うべきターゲット層の明確化を図り、既存の観光のあり方からの脱却を求められている。

最近の観光形態は、従来の有名観光地を巡る「発地型」観光に対して、地域の食や文化を訪ね、地域との交流や体験を楽しむ「着地型」観光が注目されている。自然の中での体験は、大人ばかりでなく子どもたちにも大きな感動と影響を与える。

南房総のあるところでは、田植え農業体験の参加者の家族との間に、コメの直販ルートが生まれたとのことである。また、修学旅行で宿泊した子どもが、家族ぐるみで宿に訪れ親類のような付き合いが始まったという例もあるという。

今すぐに南房総を活性化する効果とともに。10年後20年後の観光客や、移住者を育てるという意味もあると考えられる。

このことは、今後の観光政策においてのひとつの方向性を示すといえる。

７．おわりに

急速に加速化する人口減少・高齢社会を迎える我が国において、地方創生へ向けての対策が課題となっている。地域のさまざまな課題を解消しながらより進化している「道の駅」は、立ち寄る場所から目的地へと、地域の賑わいの拠点となり始めている。国土交通省は「道の駅」の機能強化をサポートし、政府の掲げる「小さな拠点」としての役割を担うことを促進することにしている。【全国モデル「道の駅」6か所】に、「道の駅　とみうら」も選定。

2014年に訪日の外国人旅行者は、前年より29.4%多い1341万3600人となり過去最高となった。政府は東京五輪開催の20年までに年間2000万人の目標を掲げている。外国人旅行者の消費は活発で、昨年は2兆305億円となり、企業も外国人の消費に期待している。地方も地域の経済力を高め、新たな雇用を生み出す可能性として、訪日客の誘致に懸命である。

観光は交通、宿泊、外食、流通など幅広い分野にまたがり、経済効果が期待される。おもてなしの文化や四季折々の自然など、豊富な「地域の宝」を生かし切れているとは言い難い。外国からの来訪者との国を超えた出会いを生む観光は、日本の国家ブランドを高め、日本社会のグローバル化を示す重要な指標である。官民一体の取り組みで「観光立国」が実現することを期待する。

参考資料　国土交通省HP　文部科学省HP　千葉県庁HP　南房総市観光プロモーション課　読売新聞

13. Hillside Development for Ampang Jaya Municipal Council, Malaysia

マレーシア・アンパンジャヤにおける丘陵斜面の開発

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Abstract: Some of the basic advantages of living on hillside homes include good scenery, tranquil environment and the common perception that "the higher the property is above the ground, the higher your status is". However there are also disadvantages of hillsides living such as higher risks and susceptibility to landslides and other geo-hazards. Landslides have occurred throughout the country of Malaysia over the years. Ampang Jaya Municipal Council has come a long way since its last major landslide in 2008 which involved 4 fatalities. Shortly after the incident Ampang Jaya Municipal Council forming a Slope Division that the main objective is to focus on slope management includes monitoring before, during and after the construction of any hillside development. The main imperative is to prevent largely scale landslides and further loss of lives.

This paper discussed the current implementation of the slope management at Ampang Jaya Municipal Council in Malaysia.

Keywords Hillsides, Hillsides Development, Landslides, Local Authorities, Slope Management

1. Introduction

The property developments on hillsides are difficult to stop mainly due to population increase and the continuing high demand for such homes with views" (Tajul Anuar, 2013).

The occurrences of landslide disaster one after another, show that there is something wrong somewhere with hillside developments and gives indicators of non-sustainable development. More property developers are offering hillside residential homes integrated with their natural surroundings and packaging them as being eco-friendly. Developers who offer hillside development with minimal environmental impact, preserve the natural landscapes and forest, minimize cutting of hill slopes and implement the "Low Impact Development" concept in their project are most welcomed.

2. Focus Area

There are three main areas which MPAJ focused on. Firstly in the early stages of any property developments on hillsides the initial plans submitted by the respective developers will be checked. Structural stability of the proposals to be evaluated and to look at the overall perspective such as buffer zone, infrastructure guidelines and other technical matters pertaining to the hillside development. Secondly, during the construction period
whereby the progress of the construction will be consistently monitored especially in terms of the overall stability of the areas involved and whether the developers meeting with the required construction standards.

Finally, after the construction has completed, the slopes will be monitored periodically to see if there are any changes, damages or disturbances to existing infrastructure such as roads and drainage.

3. Challenges

Monitoring slopes requires a good and updated database of property owners. For governmental-owned land, it is slightly easier since the data can be obtained from the database in MPAJ. However for privately owned land it takes some time to get the basic details of the respective land or property owners from the land offices database. The information obtained need to be doubly sure by MPAJ before notices issue out to the property owners. This will cause delays in repairing or maintenance works by these individuals.

4. Success Factors

The implementation of Jawatankuasa Teknikal Pembangunan Kawasan Sensitif Alam Sekitar (JTPKSAS) at the state level in vetting through new proposed development project; the introduction of various guidelines on hillside developments especially Selangor Town and

Country Planning department (JPBD) 2010 which is more stringent than those before aimed at developers looking to develop on slopes, as well as increased public awareness through the setting up of NGOs (Non Governmental Organizations) amongst residents in hilly areas.

5. References

Tajul Anuar (2013) New Straits Times

Selangor Town and Country Planning Department (JPBD) Guidelines 2010

14.Health Care and Tourism

ヘルス・ケアとツーリズム

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Abstract: Population in rural areas were rapidly decreased cause of the development of huge size urban areas. In 1950, 30% of world population lives in urban areas, according to UN report, in 2050, the ratio will reach to 66%. In other hand, the age-sex pyramids were drastically changed, so called the aged society with low birth rate are spreading and areas of a rural community at the limit viability due to aging and depopulation also increased in Japan.
In the future, the activities of exchange between urban and rural areas will essential issues. This expect of the ripe for cultural climate of individual areas. The recent years, style of tourism diversify such as eco, spa, medical, food, gourmet so on. Especially, focusing spa-tourism, there are many Kurhaus in Europe countries and a hot spring cure facilities were very familiar in Japan for a long time. The medicinal benefits were found now
The regional and facility planning focusing the health care, the hypothetical planning procedures will most essential based on the transition of social, economic and intelligence.

1．Location of Towns & Cities

The nodal of places where exchanging peoples, commodities, money and information became towns and cities in whole world. It easy to learn these nodes from along the roads, rivers, canals. Then, according to the expansion of routes of large ships, there are many port cities. Recent year, a means of transportation has been developed such as railways, aircrafts, and motorcars [1), 2), 3), 4)].

1-1 Land transportation

Primarily, people's coming and going were by walking entirely, then we used livestock such as horses, caws donkey, camels for to transport to another places with cart if necessary. Then we expanded the sphere of business activities. The longest road east to west will so call the Silk Road which connects Asia and Europe; they exchange the many goods between Greece/Rome and China/Korea. In Italy, there are Via Appia that start of operation is BC 1, total length is 560

km north to south.

Ancient cities along these streets were prospered during active trade activities but some of the cities were already become as ruins.

1-2 Marine transportation

The routes of ships among port cities were developed from the ancient period, then, port cities become prospered for a long time. Indonesia is biggest archipelago country, bugis peoples in Makasar knew excellent navigation skills and shipbuilding, so they move to not only neighbors' countries but also Madagascar and Cape of Good Hope. Biggest fleet of vessels is the Snhotakann and captain is Zheng He. In1405, first voyage with 62 vessels, 28,000 crews, and longest vessel is over 137 m, they conduct these voyage totally 7 times. They reached to Africa too. Next stage is the age of great navigations starting from mid. of 15c until mid of 17c. Now several hub functioned harbors were constructed.

1-3 Railway transportation

In end of 18c, the steam engine was developed during the industrial revolution, then, in 1825, first commercial based railway was operated in England. And after, in 1827: America, in1832: France in 1835: German was operated. Thus, the development of towns was constructed centering the new railway stations. In 1863, subway was operated at London, and first electric railway was operated at Berlin.

End of last year, 2014 Nov. 18, the freight train was started from the city of Yiwu, China and on Dec.9, the train arrived at Madrid. it Only 21 days, the train running 9,977 km, carrying 40 containers.

1-4 Age of the motorization

In 1796, pioneer steam engine car developed in France, about 1900, new steam engine car was

developed using petroleum instead of coal. Then, in1870, gasoline engine car was debuted. In 1908, T-type Ford as a popular car which was successes mass production. This is the start of a new motorization era. The ratio of car fleet in 1945 is one car for 47 peoples and in 2030 is one car for 4.2 peoples.

1-5 Arrival of aircraft age

In 1903, a manned aircraft was success in America. Then the aircraft can take off not only on the ground but also from the water surface and deck of ship. The first periodical passenger's flight was operated in 1913 in America by biplane. During the period of first and second world war (1914-1919/1939-1945), the technical progress so tremendously. Korean War and Vietnam War (1945-1970), jet air plane was developed.

Now there are many hub functioned air ports were constructed so it become more convenient age for us.

2. Transition on number of population in urban and rural (including mountain and fishing village) . [5),6)].

2-1 Transiton on the Ratio of Urban Population

Table 1 Ratio of Urban Population (Unit: 1,000)

Region	1970	1990	2010	2040
World	**36.08**	**42.62**	**50.46**	**63.85**
North-east Asia	**22.88**	**32.21**	**50.17**	**69.28**
South Asia	20.51	27.22	32.08	48.92
South-east Asia	**21.50**	**31.62**	**41.84**	**59.28**
North America	73.80	75.43	82.13	88.52
Europe	62.84	69.81	72.78	81.52
Sub-Saharan Africa	19.51	28.31	37.23	53.99
Japan	**53.20**	**63.09**	**66.83**	**76.72**

Source : UN, The World Population Prospects 2010

Urban ratio of South-east Asia (Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam : 9 countries) is lower compare with World level. Urban ratio of Japan is extremely high level compare with world and North-east Asia (China, Hong Kong, Korea and Japan: 4 countries).

2-2 Situation and Projection of Aged Society in Japan

Table 2 Projection of Aged Society in Japan (Unit: 1,000)

	2010	2020	2030	2040	2050	2060
Total population	128,057	124,100	116,618	107,276	97,076	86,737
15～64 years	63.3%	59.2%	58.1%	53.9%	51.5%	50.9%
Over 65 years	**22.8%**	**29.1%**	**31.6%**	**36.1%**	**38.8%**	**39.9%**

Source : Census (2010)、Institute of Population Problems (2020-2060)

Table 3 Ratio of working age (15-64 years) in Asia [7]. (Unit: %)

name	Japan	Malaysia	Thailand	Indonesia
2010	**64.2**	66.1	70.8	67.2
2050	**50.9**	65.4	62.5	64.0

Source : UN, The World Population Prospects 2010

Table 4 Ratio of Aged (over 65 years) in Asia (Unit: %)

name	2010	2020	2030	2040
Japan	**22.7**	**28.4**	**30.3**	**33.8**
Malaysia	4.8	7.1	10.3	12.7
Thailand	8.9	12.3	17.6	**22.2**
Indonesia	5.6	7.0	10.5	14.9

Source : UN, The World Population Prospects 2010

2-3 Aged Ratio by Area in Japan

Table 5 Aged Ratio in Japan (Unit: %)

area	2010	2020	2030
Quasi urban area	21.8%	28.0%	31.1%
Flat agricultural area	25.4%	32.4%	35.4%
Middle agricultural area	29.0%	35.4%	37.7%
Mountain agricultural area	34.0%	39.9%	41.5%

Source : Census、Institute of Population Problems

Classification by aged ratio

・Aging Society 7-14%

・Aged Society 14-21%

・Supper Aging Society over 21%

2-4 Limit Community

Caused by depopulation, over the 65 years people are over 50% of total population in the area. For this reason, they could not maintain of social activities such as community life and the ceremonies of coming of age, marriage, buridal, and ancestral worship.

This phenomenon occurred not only rural area but also happened in specified districts in urban area which were not non depopulation areas.

2-5 Number of Birth Population and Birth Rate in Japan

Table 6 Birth and Birth Rate in Japan (Unit: 1000)

	2010	2020	2030	2040	2050	2060
Birth pop.	1,071	836	749	667	557	482
rate	8.5	6.7	6.4	6.2	5.7	5.6

Source ：Census、Institute of Population Problems

Thus, tendency of aged society with low birth rate is serious problems in Japan.

3 Consideration on Tourism

Our all movement is the tourism except military purpose. Especially, after the industrial revolution that starting from the end of 18 century at England, migrants from rural area into urban areas. Because of this, there are many problems were happened such as long-distance commuting, costly rental of houses, jobless, deterioration of the environment so forth. Under these situations [4], Howard, Sir Ebenezer advocated the Garden City which has affluent natural environment in England [8]. In German, Dr. Schreiber advocated the Community Garden so called the Kleingarten in the urban area in order to recovery of health for citizens, and in 1814, the association of community garden was established.

3-1 Rural Tourism

The origin of this concept was starting from the activities of hunting and horseback riding in the rural areas done by the upper class and noblesse peoples. And opened to general citizens was after the industrial revolution in order to enjoying the refreshment in rural areas. They chose the rural are for a long stay and low expenses under the regal vacances. Most of employers are migrating from rural areas, rural areas are their hometowns or native places [9), 10)].

3-2 Agri Tourism

Main point of this tourism is based on the agricultural activities including accommodated in farmer's houses, jointly planting and harvesting, participating the events together with rural peoples.

3-3 Green Tourism

This is not same as above mentioned two kind of tourism. The concept of this tourism was established considering the situation of country and leisure and including the sense and life style of Japanese. In 1992, the Ministry of and Agriculture, Forestry and Fisheries advocated the Green Tourism. And in 2006, Agriculture, Mountain and Fishing – Women's day was established as a date of 10, March.

3-4 Other Type of Tourism

Based on the diversification of needs and seeds, there are several tourism are implemented such as Eco, Spa, Medical. Food, Gourmet, Este and so on.

3-5 Situation of Spa Tourism in Japan

- 「Famous Hot Spring 」: 78 facilities
- 「100 Hot Spring」: only use the original hot spring
- 「Hospital connection with Hot Spring」: 13 facilities

Related Licenses

・Onsen Hoyo shi

・Onsen Ryoyou shi

・Instructor of Bath and Use

Institution of Promotion of Health

・Exercise purpose： 348 facilities

・Utilizing hot spring：20 facilities

・Programmed utilize of hot spring： 37 facilities

Public Facilities

・Kyuka (holiday) Village： 37 facilities

・People's Accommodation： 113 facilities

※above two types located in National Park

・Heights and rest village： 32 facilities

※source is unemployment insurance, Location are oriented resort and surrounding to urban area

4 District Planning Method

4-1 Development of the District planning Method

The planning method are mainly divided mainly two. One is the problems solution type, and other one is achievement type of the target and goal. Furthermore, there are several constraints such as social, economic, cultural, technical etc. and given conditions physically in a course of planning.

In the course of above two methods, it will be required several imaginary planning components. Therefore, the essential attitude for planner is these uncertain planning factors should be solved as a certain factors.

I would like to ask to challenge on the hypothetical planning approach [11].

4-2 Same principles underlie a normal diet and medical treatment & Relations of body and land is non-duality

Health care in the presentation theme, it includes two concepts. One is medical health care and other one is attention for health. The second of the two means the Preventive Medicine. Thus

far, our life is depends on Curative Medicine.

This is important challenge of our life to the Preventive Medicine. Finally, we must all continue to be mindful of importance of our health life as means captioned two sentence.

References

1) Takayanagi Shunichi：「都市の思想史」. Sangyo Noritsu Tanki Daigaku Shuppanbu. 1975

2) Takayanagi Shunichi：「都市の思想史」. Sangyo Noritsu Tanki Daigaku Shuppanbu. 1975

3) Lewis Mumford：「都市の文化」. Kajima Shuppan Kai, 1974, "*The Culture of Cities*". 1970

4) Lewis Mumford：「歴史の都市　明日の都市」. Shincho-Sha, 1972, "*The City in History*". 1961

5) Donella H. Meadows, Dennis L. Meadows, Jorgen Randers：「成長の限界」. Diamond, 2005. "*Limits to Growth*". 2004

6) Kevin Lynch：「時間の中の都市」. Todai Ohtani Kenkyu-shitsu, 1974、"*What Time is This Place*". 1972

7) M. Honjo："*Urbanization, and Regional Development*". Maruzen Asia/UNCRD. 1980

8) Sugio Kunie：「景観都市の創出」. BIO City. 2007

9) Kikuchi Toshio ：「地理学におけるルーラルーツーリズム研究の展開と可能性」. Chiri Kukan. 2008. "*Potential Development of Geographical Studies on Rural Tourism with the Adoption of the Research Framework of Food Tourism*". Geographical Space

10) Titin Fatima, Kiyoko Kanki："*Evaluation of Rural Tourism initiatives in Borobudur Sub-District, Indonesia*". Architectural Institute of Japan. 2012「インドネシア・ボロブドウール区におけるルーラル・ツーリズム・イニシアティブの評価」

11) Reinhard J. Skinner, John L. Taylor, Emiel A. Wegelin："*Shelter Upgrading For the Urban Poor：Evaluation of Third World Experience*". Island Publishing House, Inc., 1987

15.“Dawn of Disaster - Resilient Structures for Human Settlement”
The use of innovative designs to meet the increasing risk of life caused by natural disasters

災害に強い居住地域の創造

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Abstract

I. The Disaster – After Typhoon Haiyan, one of the strongest typhoon ever to make landfall, barged through the Philippines, an estimated 1.1 million houses were destroyed which left families homeless.

II. Relief and Reconstruction Efforts – after assessments were made by national authorities, various agencies and groups looked to innovative design approaches in solving the now increased requirement that can face future natural catastrophes.

III. The Innovation - a long forgotten technology combined with three generations of research brought forth a solution on the call for “Disaster Resilient Structures”.

IV. Application – Funded by various groups, these “structures” were constructed to provide affected families a more secure and resilient homes, and future.

V. Other Application and Opportunities

VI. The Promise of Innovation.

Introduction

The Philippines sits along the destructive “Ring of Fire”, which is a string of volcanoes and sites of seismic activity, or earthquakes, around the edges of the Pacific Ocean, including deep ocean trenches and high mountain ranges. Similarly, the location of the Philippines being within the Western Pacific Ocean makes the archipelago vulnerable to up to 20 tropical storms and typhoons every year.

The built environment, with all technology available and progress in development are still vulnerable to the natural elements and movements, earthquakes, typhoons, floods, fires, ground settlement and even decay. While the Philippines is gifted with abundant natural

resources, it is prone to unpredictable earthquakes, the fiercest typhoons, and frequent floods and fires. With the fast growing population, which most belonging to the low-income families, disasters underscore the need for creative, perhaps "out of the box" and innovative design solutions for housing and structures that will stand up against these elements, a need on what is now known as "Design for Disaster Resilient Structures".

Recent Disasters

October 15, 2013, a magnitude 7.2 earthquake hits Bohol. Reported casualties; Death Toll - 222, Injured - 976, Missing - 8, with 671,103 total affected families. Total Cost of Damages- Php 2,257,37,182 worth of damaged roads, bridges, flood control facilities, school buildings, hospitals, and other public buildings. (1)

November 06, 2013, Typhoon Yolanda, with international name "Haiyan" entered the Philippine Area of Responsibility (PAR) and made landfall on six towns and cities in Southern Philippines. Reported casualties; Death Toll – 6,300, Injured – 28,689, Missing – 1,061, with 3,424,593 total affected families. Total Cost of Damages- Php 89,598,068,643.88 worth of damages to infrastructure, productive, social, and cross-sectoral facilities, with 1,140,332 houses were partially and totally damaged. (2).

After assessments were made by the National Disaster Risk Reduction and Management Council (NDRRMC), the National Housing Authority, and the Department of Social Welfare and Development (DSWD) to the extent of damage and needed action, all report led to the concern of immediately providing food and shelter to those affected. The NHA immediately called for a consultation meeting, inviting architects, engineers and industry experts with the aim of coming up of new and increased requirement for permanent housing design that would meet the increasing challenge of permanent homes that can withstand the increasing force of nature, especially typhoons and earthquakes.

There are many prevailing building system, technologies and innovative ideas for mass housing locally and internationally, either for temporary or permanent use, some are the nipa hut concept, houses built with paper, cardboard, fiber glass, metal containers, the conventional concrete hollow blocks (CHBs), pre-cast concrete panels as well as pre-cast shelter units and so on. Among them, the widely used reinforced concrete system, with its inherent qualities of relative permanence, durability and general availability, is still the ideal material for resilient housing. However, its general use of conventional post and lintel does not take full advantage of the capability of concrete to be molded to almost any form desired. Knowing these elements, the challenge now is to come up with a housing design that has; durable and environmentally friendly materials, efficient structural system, generally available materials and components, affordable and cost effective design, functional, aesthetically acceptable, and most of all, capable for mass production.

Meeting the Challenge

With the challenge of having a holistic house design that would face the fiercest weather conditions, E.Florentino^3 + Associates (EF^3+A), led by Ar. Edilberto F. Florentino, one of the prime leader and building system innovators proposed using "Ferrocement" technology, a long forgotten technology improved by three generations of research and development, which brought forth a practicable solution and application of Ferrocement to answer the call for "Disaster Resilient Structures".

Ferrocement is a highly versatile form of reinforced concrete made of wire mesh, sand, water, and cement, which possesses unique qualities of strength and serviceability. It can be constructed with a minimum of skilled labor and utilizes readily available materials. Proven suitable for boat-building, it has many other tested or potential applications in agriculture, industry, and housing.[(3)] The quality of Ferrocement makes it suitable for use in developing countries because its basic raw materials are available in most countries like The Philippines; it

can also be fabricated to almost any form or shape to meet the needs of the design; and the skills of Ferrocement construction can easily be acquired - which also do not require heavy plant or machinery.

In using this technology and in consideration of all requirements and concern of the the design challenge, EF[3]+A was able to complete a design solution, integrating the whole housing unit into a holistic structure, capable of withstanding winds up to 300kph, an increased wind capacity from the 250kph requirement of the country's National Building Code, considering that Typhoon Haiyan hit Philippines with a force of 270kph winds, strong earthquakes, fire and even decay.

Some design applications that made the solution possible was by veering away from too much dependence on post and lintel alone, instead, making the walls act as moment resisting frames[(4)] for support, changing the roofing material from conventional galvanized iron sheets to a Ferrocement roof, and by forming the roof shape from the traditional two and four sloped gabled roofing to a shape known as Hyperbolic Paraboloid, a type of shape or shell of double curvature. By designing the walls as moment resisting frames designed as a Ferrocement wall, the load solely expected to be carried by conventional post and lintel design was transferred to the whole wall system, much like a shoe box or a birdcage design. Also, with the help of the qualities of a hyperbolic paraboloid-ferrocement roof, the concern of durability and integration of the roof to the main structure was solved-in addition to increased advantages in wind resistance of said shape or form.

Application

Application of this system is not the first of its kind in the Philippines, for since the 1970s until present, this system has been applied by Ar. Florentino in all his projects, whether it be housing, hospitality, institutional, and commercial structures. But it will be the first of its kind specially designed as a resilient shelter for mass housing.

However, good designs can only be proven if it is applied. Funded by non-government organizations (NGOs) such as the French-Philippines United Action, a group formed from the French Chamber of Commerce in the Philippines, and spearheaded by Habitat for Humanity Philippines, with the support of LaFarge (Cement), these housing units were able to be constructed and completed, not long after the 1st year of Typhoon Haiyan. These cooperation led to the materialization of an objective to provide affected families a more secure, resilient, and worry-free homes. The first site in Daanbantayan, Cebu in southern Philippines became the pilot implementation site for what we call the "HFH-EF3 Hypar Duplex Housing". As of date, a total of 75 units have already been constructed and ready for turn-over. Another site, also in Daanbantayan, Cebu is being prepared as the second settlement site for the beneficiaries of these homes. The initial success of these "Hypar Houses" have taken the attention of several important foreign personalities and dignitaries to visit the what is also called the "French Village". Such personalities and dignitaries include; Nicolas Hulot, the founder and president of the Foundation Nicolas-Hulot, an environmental group first created in 1990, His Excellency Ambassador Gilles Garachon Ambassador of the Republic of France to the Philippines and Non-Resident Ambassador to Palau, the Federated States of Micronesia and the Marshall Islands, French movie celebrities Marion Cotillard, Mélanie Laurent and the French President himself, President François Hollande visiting the French Village last February 26, 2015. Also, several groups have already visited the site and lent their hands in constructing these houses, among which are from U.S.A, Australia, and Korea.

Due to the success of the first batch of Hypar structures, we, together with Habitat For Humanity Philippines, along with other partners and supporters, are now gearing up in implementing other applications of our designs such as; aside from residential duplexes, rowhouses, multi-storey residential and school buildings, as well as multi-purpose structures to be used as health centers, chapels, and other public uses.

The Promise of Innovation

This is by far not the only solution to the challenge of designing resilient structures. But this does open the eyes of our colleagues in the built environment, hopefully, to follow suit in these endeavors. Change is constant, innovations and creative thinking are the key to adapt to these changes. The promise of innovative thinking is endless, and boundless as is the human mind. With the right objective and partner, anything is possible.

References:

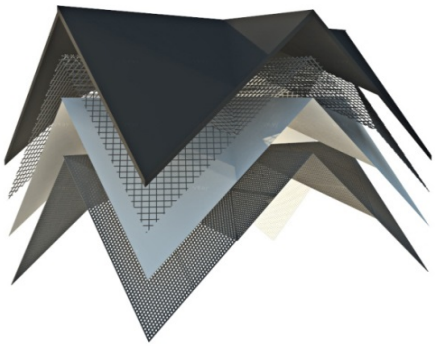
(1) SitRep No. 35 re Effects if Magnitude 7.2 Sagbayan, Bohol Earthquake. NDRRMC, Philippines.

(2) SiteRep No. 108 Effect of Typhoon "Yolanda" (HAIYAN) 03 April 2014, Updates re the Effects of Effect of Typhoon "Yolanda" (HAIYAN) 17 April 2014. NDRRMC, Philippines.

(3) National Academy of Sciences, Ferrocement: Application in Developing Countries, Washinton DC, February 1973.

(4) National Structural Code of the Philippines (NSCP), Volume 1, 6th Edition, Moment Resisting Frame Systems. Table 208-11A. Quezon City, 2010,

Some of the images that will be shown

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2015.2.13


FRANÇOIS HOLLANDE
E CHANGE AND INCLUSIVE

16 .Creation of Broad Area Communication Hub through the Development of Shinkansen Station Surrounding Area

新幹線駅周辺開発による広域交流拠点の創造

Teppei MATSUO
Ureshino-city Municipal Office

Abstract: Ureshino-city has Kyushu's famous hot springs, and has been developed mainly as the town for tourists, driven by the tourism resources like "Ureshino-cha"(green tea) and the historical town area which preserves the appearance of the Edo Period.

These days, the social environmental situation of the urban area has drastically changed including the depopulation, declining birthrate and harder financial constraints.

Under such circumstances, the key points of the maintenance and development of the urban area has been shifting into the reconstruction and enrichment type, for instance improvement of living environment and commercial revitalization, from the conventional extension type development of new urban area.

The West-Kyushu Shinkansen scheduled to open in 2022 is expected to give rise to new demands in the tourism of Ureshino-city, which has rich tourism resources.

The open of the new route will improve the convenience of travelling from the broader area, and accordingly the urban structure and social environment of Ureshino-city, which have had no railway station, will also be dramatically changed.

Taking into account these situations, we intend to maximize the revitalization effect to be brought by the open of the new Shinkansen route, and we aim to realize "Ureshino-city, Full of Lively Cheers", with the slogan "Ureshino-city Invites, Attracts and Be Familiar to You" as the future perspective.

1. 美しい自然と歴史に彩られた街

嬉野市は、長崎県と接する佐賀県南西部に位置し、面積は約１２６平方ｋｍ、人口は約２万８千人である。「肥前小富士」の名を持つ唐泉山など緑豊かな山々に囲まれた嬉野市の中心部を塩田川が清らかに流れ、有明海に注いでいる。

本市は、日本三大美肌の湯と称される良質な温泉を擁し、「うれしの茶」や江戸期の面影を残す歴史的町並みなどの観光資源を活かして、主に観光地として発展してきた歴史がある。また、古くから（１９４２年から）土地区画整理事業を手法とする市街地開発事業を行い、住みよいまちづくりに取り組んでいる。

2. 観光のまち嬉野

嬉野市は、年間約１９０万人の観光客が訪れ、古い歴史と豊かな温泉を有する観光地であるが、観光客の推移は依然として横ばい状態である。このため、観光拠点施設の整備や市内観光のネットワーク構築などを進め観光・交流の活性化を図る必要がある。

近年の健康志向への関心が高まりつつある中、温泉や特産物である「うれしの茶」を活用した体験型観光の推進、新幹線嬉野温泉駅周辺地区への移転が決定している嬉野医療センターをはじめとした医療施設との連携による保養・滞在型観光の推進、ユニバーサルデザインに基づく「ひとにやさしいまちづくり」、歴史的町並みの保存・整備等により「誘うまちづくり」を行うことがテーマであり目標である。

3. まちづくりの基本理念

嬉野市では、多様なニーズに対応した都市機能や、就業・就学や消費などの都市活動機会が不足し、市民の生活行動も広域化（市外流出）していることから、市内に分散する既存の都市活動基盤・機能や、歴史・文化資源といったストックを有効活用するとともに、周辺都市との連携・相互補完により、活力あるまちづくりを進める必要がある。

また、嬉野市の都市活動主体（生活者、事業者、行政など）のニーズと、都市機能や都市の可能性をすり合わせ「集約と連携による新しい嬉野市の構築」を基本理念とし、行政と市民・事業者等の協働によるまちづくりを進めていく。

4. 社会情勢の変化を踏まえた市街地整備

人口減少や少子高齢社会の到来、厳しい財政的制約、地球環境問題の高まりなど都市を取り巻く社会情勢が変化し、市街地整備・開発の重点が、新市街地を開発する拡大型から、住環境改善や商業活性化といった再生・拡充型にシフトしてきている。

また一方で、経済が急成長しているアジア各国では、旺盛な消費拡大とともに海外旅行者も大幅に増加している。外国人観光客を取り込むことで、従来までの輸出産業に替わり、地域資源を活かした新たな分野での成長が期待されるが、今後ますます厳しい地域間競争に晒されることとなる。

嬉野市においても、こうした情勢を踏まえ、既存市街地を活かした拠点集約・機能連携型都市構造の構築を基本とし、特色を活かした魅力ある市街地整備に取り組む必要がある。

5. 嬉野温泉市街地の整備方針

嬉野温泉市街地地区では、多くの土地区画整理事業が進められてきた一方で、社会変化に伴う機能や定住者の流出によって、商店街の空き地・空き家等の大小さまざまな未利用地が発生している。

したがって、都市活力に大きな影響を有する大規模未利用地等については、宅地の所有権等の整序を促進し、利用価値を高めることで、新たな観光・交流機能の立地誘導を図る必要がある。

また、観光ニーズの変化に対応した温泉街の再生も急務となっており、回遊性のある市街地の形成を基本とし、空き家・空き店舗の改修・再開発、街なみ環境整備を進めていく方針である。

6. 新幹線開業効果の最大化について

九州新幹線西九州ルートの建設及び嬉野温泉駅の設置は、優れた観光資源を有する嬉野市において、新たな観光需要の掘り起こしが期待される。嬉野温泉駅には１時間に上下各１本程度の停車が予定されており、広域圏からの移動利便性が飛躍的に向上し、これまで鉄道駅が無かった嬉野市の

都市構造や社会環境を劇的に変化させることになる。

しかしながら、同じく新幹線駅を設置する近隣市が、在来線と接続し、利用環境の優位性を有しているため、嬉野温泉駅の拠点性は相対的に低くなるものと想定される。嬉野市内においても近隣市と近い地区においては乗降客が競合する可能性があり、新幹線ルートから外れた周辺市町についても、嬉野温泉駅の駅勢圏に取り込むには、道路などのアクセス機能が不足している状況にある。

さらに、新幹線は嬉野温泉への交通手段としての利用が期待される一方で、駅周辺の開発ポテンシャルが高まることにより、既存市街地からの都市機能や都市活動主体が流出し、市街地の空洞化が進む可能性もある。また、新幹線ネットワークで広域圏とつながることから、福岡市・長崎市へのストロー効果により消費や産業の市外流出も懸念される。

したがって、新幹線開業効果の最大化に向け、「コンパクトなまちづくり」、「大交流時代のまちづくり」、「特徴を活かしたまちづくり」、「安心安全のまちづくり」を視点とし、取組みを行う必要がある。

7. コンパクトなまちづくり

多様な都市サービスや都市活動機会確保のため、嬉野市の将来の都市規模や財政力、並びに既存の都市機能や都市集積を踏まえ、拠点地区の形成と各種都市機能の立地誘導によって、集約型都市構造への再編・再構築を図り、規模の小さい市場（ニーズ）を最大限に活用する必要がある。

8. 大交流時代のまちづくり

九州新幹線西九州ルートと嬉野温泉駅の開業をひかえ、都市間・地域間の交流と競争が拡大する時代において、市域を超えた広域的圏域からの人や財の流入を図り、活力ある嬉野市を創造するため、広域交流に対応した駅周辺のまちづくりをはじめ、温泉を核とした観光振興や、歴史・文化などの地域資源を活用した広域交流の促進など、活力と賑わいの創出に向けた地域の活性化が必要である。

9. 特徴を活かしたまちづくり

地方分権や地域の自主性が求められる時代において、嬉野市が市民の誇りと愛着の下で、自立した都市を確立するため、塩田津に代表される長崎街道（江戸時代）の名残の街並みや傾斜地につくられた棚田などの特徴ある風景、特産物であるお茶や歴史ある温泉など、嬉野市が有する地域資源を活用することで、都市魅力と生活文化の向上を図り、社会的・文化的価値を創造・発信することが必要である。

10. 安心安全のまちづくり

交流の促進が重要となる時代において、嬉野市は長崎街道の優れた歴史・文化的資産や嬉野温泉の集客機能に恵まれているが、同時に人口の高齢化や交流圏の拡大・国際化を踏まえると、これからの魅力ある観光地づくりは、多種多様な観光資源だけでなく、防災面においても、災害に強く、また、災害に遭遇した場合でも安全が確保された安心できる観光地づくりが必要である。

11. 嬉野温泉駅周辺整備について

嬉野温泉駅周辺地区では、交通結節点機能の整備と、駅周辺地区への移転が決定している嬉野医療センター等をまちづくりの核とし、隣接する嬉野温泉市街地との機能分担・連携を図りながら、広域生活圏機能の集積核の形成と、広域連携拠点に相応しい顔づくりを推進する。

駅周辺は、観光客が集うとともに、市街地や温泉街などの観光地に人の流れを誘導する広域的玄関口

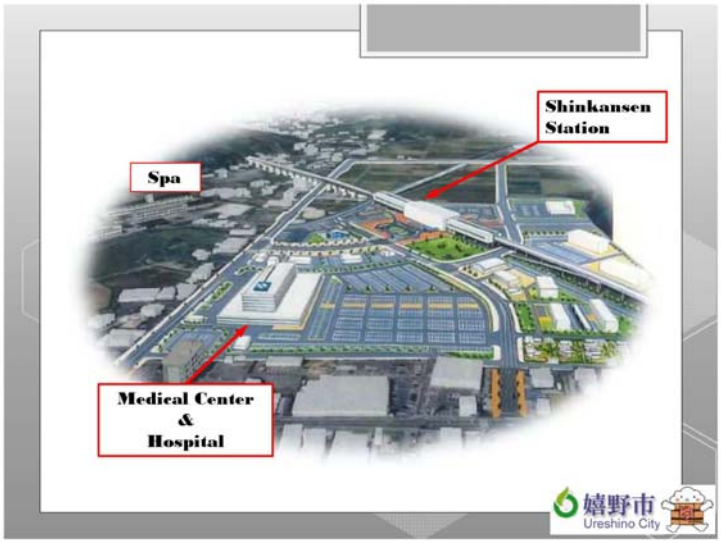
としての役割と西九州地域の観光・交通情報を発信するとともに観光客のニーズを把握する広域観光交流拠点としての役割もあるため、これらを発揮できるまちづくりを進めるとともに、さらに、みんなが、“また来たい”と思えるような「もてなし交流拠点」の創造を目指す。

12. 嬉野温泉駅周辺導入機能について

嬉野温泉駅周辺のまちづくりの基本方針は、“「もてなし交流拠点」の創造”であり、この方針を踏まえ、導入機能について検討する必要がある。

嬉野温泉駅は、西九州地域とのアクセス性を向上する「交通結節機能」について強化を図り、新幹線と二次交通手段の中継だけでなく、バスなどの地域交通機関の乗り継ぎ需要にも対応した交通ターミナルとしての機能を持たせることが重要である。また、駅周辺と市街地や温泉街との役割・機能分担の明確化を図るとともに、市街地・温泉街と駅をつなぐ道路・交通ネットワークなどの「連携機能」を導入する必要がある。

市外からの来訪者だけでなく、地域生活者も集いたくなる地域の観光・物産・文化・交通情報サービスを提供できる「情報機能」「地域振興機能」「交流機能」についても導入検討を行い、高齢者、障がい者、子育て世代、外国人、来訪者をはじめとしたすべての人にやさしいユニバーサルデザインの導入、また、駅周辺地区への移転が決定している嬉野医療センター等の医療機関と連携した「癒し・休憩機能」の導入も図る。



13. 嬉野市の将来像

嬉野市は、嬉野市内・地域内の視点から「住むひとを信頼で支える生活安心都市」、市域を越えた広域圏の視点から「訪れるひとを癒しで迎えるホスピタリティ都市」と掲げ、「誘う・魅せる・親しむまち　嬉野」を将来の全体像として設定し「歓声が聞こえる嬉野市」の実現を目指す。

嬉野市がこれまで育成、蓄積してきた地域資源・ブランドと、豊かな自然や農業、広域交通の要となる

新幹線を活用し、嬉野市の魅力の結集と広域連携によって、新たな誘客と多様な都市活動機会の創造を「誘うまち　嬉野」により目指す。
嬉野温泉や塩田川を活かした地域文化に対し、従来の利用にとどまらず、多面的かつ有機的な活用を図る多様な産業・文化活動の環境・基盤を整備することで、新たな交流機会と経済活動の需要開拓を「魅せるまち　嬉野」により目指す。
地域・人のつながりの構築と、市民が活躍する多様な機会の充実を図ることで、自己実現が可能な質の高い人生“クオリティオブライフ”が送れる社会環境を創出し、市民が主役となった嬉野市の新しい魅力の創造を「親しむまち　嬉野」により目指す。
これらの連携によって引き出される可能性や魅力を活用し、目標実現に向けたまちづくりの展開が重要であると考える。

17. Design of Kumamoto Station Area

熊本駅周辺地域都市空間デザイン

Tomoyuki TANAKA, Associate Professor, Kumamoto University,

Abstract: This is the urban design around Kumamoto Station area that reaches a form of the completion in 2018 after temporary construction in March 2011 continuously. In the long time for ten several years and very large areas for 63.2 hectares, we design and coordinate with the consistency and flexibility without being based on a master plan, by establishing the organization of the design coordination called a “Design meeting” and the “Working system” to realize the concept called "the Park Station". We design and coordinate constantly the townscape that has balance whole characteristics with the personality of each project by the new concept called "KEI" for the technique of the conventional urban design.

１．熊本駅周辺都市空間デザインのエリア

現在熊本駅および駅周辺都市空間の整備が行われている。2011 年 3 月には九州新幹線全線開業にあわせ、西口では新幹線駅舎や駅前広場が完成し、東口では駅広を中心とした暫定整備が完了した。さらに周辺の広場や街路、再開発施設等も大部分整備された。最終的には、2018 年完了を目指す在来線高架化に伴う在来線新駅舎整備や、東口駅広完成形整備をもってグランドオープンとなる。

熊本では百年に一度ともいわれているこのプロジェクトエリアは、既成中心市街地から南西方向に約３キロ離れた春日地区に位置しており、その範囲は 63.2 ヘクタールにも及ぶ。城郭周辺地区や市街地が汽車の煙を嫌った等諸説はあるが、駅の立地が市街地から離れていることは大きな特徴であり、利便性に関する課題を持ちつつも、恵まれた自然環境に近接しているという利点も併せ持っている。

西方には駅周辺を包み込むような広大な緑のパノラマを花岡山と万日山が形成し、東方には豊かな水辺空間を弓なりに迫る白川、坪井川の大小河川が提供している。また遙か東方には阿蘇の山並みを望むこともでき、まさにここは水と緑が豊富な県都熊本の玄関に相応しい環境であるといえる。

２．デザイン会議とワーキングシステム

広域交通結節性や生活利便性が高く、豊かな自然環境を活かした魅力的でにぎわいのある駅周辺地域を、ということで 2005 年に基本計画が策定され、まちづくりの骨格が公表された。しかし今後十数年にも及ぶ長い時間において大小幾多の事業が計画・実施されていくなかで、様々な変化に対応しつつも一貫性を保持し、質の高いまちづくりを展開していかなければならない。行政担当が数年おきに交替する流動的な人的環境のなかで、どのようにそれを担保・実現していくか―このような問題意識のなかで「熊本駅周辺地域デザイン会議」が同年設置された。これは建築、まちづくり、景観等に関する学識経験者や専門家等により構成され、民間や公共の各種事業との協議や調整、また各事業間の調整を行うことでデザインの統一性や長期にわたる一貫性を図りながら
まちづくりを進める仕組みである。

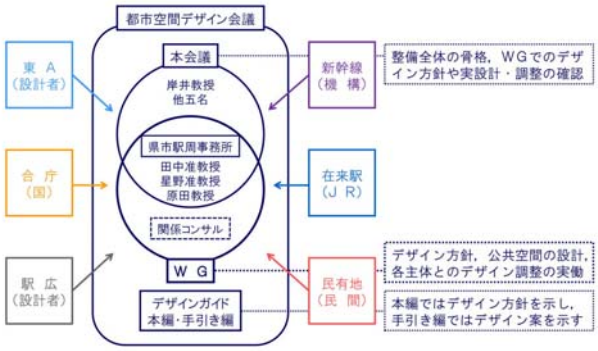


図１　デザイン会議とワーキング

といっても全国から専門家が集まるデザイン会議の開催頻度は約３ヶ月に１回が限度である。実際の協議調整には即応性等のスピードが要求されることもあり、会議メンバーにおける地元の若手学識経験者３名に行政担当者、コンサルタントを加えた「ワーキングシステム（WG)」が会議に内包されるかたちで設置された。デザイン会議では大きな方針の審議や決定等を行い、WG では実際の事業等に関する協議調整についてきめ細やかに対応する、といった役割分担である。そこで WG は、筆者らが担当することになった（図１)。

３．都市デザインの考え方

熊本駅周辺はその立地や地勢的特徴から商業を中心とする副都心開発ではなく、周囲の緑や水を活かした「パーク・ステーション」とする方針が 2005 年に県・市が策定した基本計画に示された。この計画には都市景観形成上での重要な空間の配置計画が盛り込まれており、それは駅の東西を結ぶためのコンコース幅員(25m)や、タクシープールのない駅前景観をということから設定された東口コンコース前の大きな溜まり空間などである。また駅前から坪井川水辺まで広場が連続するために、交差点隅切りを大きく確保することにより生まれた「交流広場」や、熊本を象徴する路面電車を歩道側に寄せることによる国内最長のサイドリザベーション化なども重要な配置計画である。

このような個性的な要素が盛り込まれた基本計画であるが、一方でまちづくりのテーマはゾーニングや軸そして結節点というように、既存の都市デザイン手法を踏襲したものであった。

そこで WG では基本計画の「パーク・ステーション」なるテーマおよび空間の配置計画を評価・尊重しつつも、“日本中どこにもあるような駅周辺空間”ではなく、固有の地域性を獲得するにはどのようにしたらよいか、といった問題意識を持ち、考えうる可能性や理想イメージを徹底模索し（学生と 44 案の全体イメージを作成)、それを基に行政・コンサルタント・学生も交えて今後の方向性に関する議論が行われた。

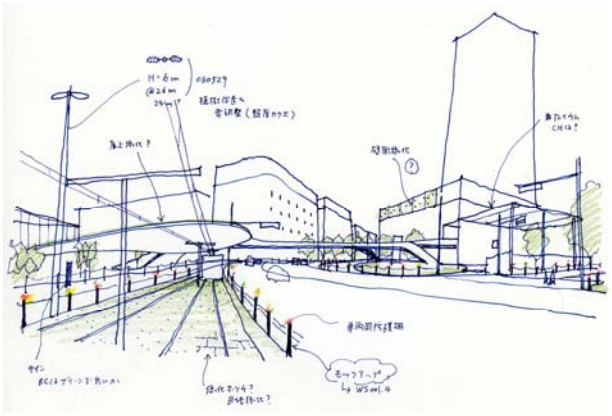


図2「景」を調整するスケッチの例

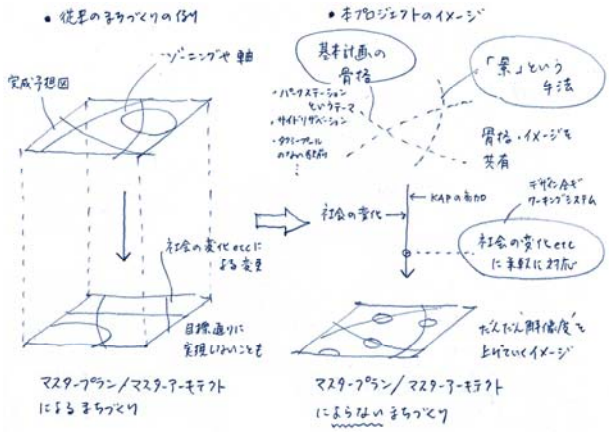


図3　従来のまちづくりとの違い

この都市デザインでは広場・道路・河川といった公共整備が先行し、民有地が追随する。このためマスターアーキテクトによる主導や、あらかじめ描かれたマスタープラン等の完成予想に則ったルールによって進めていくのではなく、官民で都市空間のイメージや骨格のトーンを共有し、さまざまな変化に柔軟に対応しながら徐々に全体を形成していく手法を採用。さらにそのイメージやトーンを共有するために、「ひとの目線から捉える空間のまとまり」とする「景」という考え方を示した。これはアイレベルで描かれた
スケッチのように都市空間を捉え、そこに表れるすべての要素をデザイン検討の対象として管理境界を越えた調整を行うものである（図2）。

つまり本都市空間デザインの考え方は、①前世紀型のゾーニングや軸といった手法に替わる新概念「景」により都市空間を構成し、②マスターアーキテクト制やマスタープラン等の完成予想図を描きそれに向かうスタイルではなく、イメージや骨格を共有し様々な変化に柔軟に対応する仕組みをもって最終的に完成図ができる、という方 針や進め方に整理された（図3）。

4．3つの「景」

63.2ha のなかで、駅を中心に東西駅前広場や再開発地区から白川・坪井川を抜け阿蘇を望む東西エリアを「出会の景」、駅前を南北に貫く路面電車通り沿いのエリアを「木立の景」、坪井川周辺に広がる親水エリアを「水辺の景」として設定した。また3景以外の空間は事業の進捗とともに展開する「生活空間」として位置付けた（図4）。

「出会の景」は駅前広場を含む中心的なエリアであり、わかりやすさを確保する「空間の連続性」、にぎわいと居住性を高める「タマリ空間」、誰にもやさしくわかりやすい移動経路確保する「熊本ホスピタリティ」の両立が求められた。イメージとしては豊かな緑や大らかな空を感じる自然景観のなかで、目通り付近では交通機能や賑わいに関する明視性が確保され、“公園のような居住性をもちつつも、何がどこにあるか分かりやすく使いやすい”駅周辺空間である。

それを実現するための主な調整対象は JR 駅舎、くまもとアートポリス（KAP）事業による東西駅前広場、立体横断施設と交流広場、市街地再開発、熊本駅帯山線の街路や春日橋、そして白川橋の景観再整

備と多岐にわたる。WG では一連の都市空間として配置や形状、色彩等に関して調整を行い、個性を活かしたまちなみの形成を目指した。例えば、東口では出会の景や木立の景へとつながる樹木の配置を駅前広場へと引き込むことで街路への広がりと連続性をつくることができ、西口では駅舎のピロティとシェルターを連携することで、駅と駅前広場との一体感を生み出すことができた。

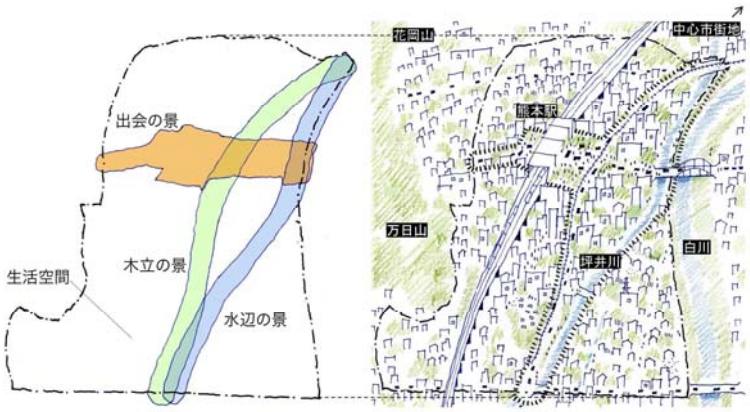


図4　3つの「景」と生活空間

「木立の景」では、出会の景とのつながりや景の一体感を演出する「木立の連続」、沿道民有空間との「協調・連携」を重視した。木立の景は路面電車が歩道沿いを走るサイドリザベーション化と軌道を覆う緑の帯によって国内でも有数の街路景観を形成している。街路樹については、庭園の考えにある三角形の樹木配置を引用したランダム植栽とした。クスノキ（県木）・ケヤキ・イチョウ（市木）の主景木を15m以上の間隔で配置し、ウスギモクセイ（熊本ゆかりの樹木）・シマトネリコなどを添景木として全体に彩りを持たせた。このような植栽計画を行った背景には、街路が直線ではなくゆるやかなカーブを描いていたことと、民有地の開発が街路整備後となる特徴を逆手に捉え、将来的に三角形の樹木配置が民有地へと展開していくような調整を行うことで、奥行きのある街路景観の形成を目標としたためである。また合同庁舎とは二本木口電停との連続性をつくるため、歩道面の高さを揃え、樹木配置の連携や舗装、誘導ブロックの配置の調整を行った。

「水辺の景」では、連続性のある空間を形成するため「見る・見られる」の関係を与え、回遊性を高めることをテーマとした。将来坪井川沿いの遊歩道整備へと展開していく規範となるように水辺広場を整備した。また土地の記憶を後世へ残すため、残存していた取水堰の遺構を一部補修して保存することとした。左岸に残る加藤清正築造の背割堤と共に、坪井川と地域との関係を後世に伝える役割を担うことが期待される。

またWGでは各事業間の協議・調整だけではなく、その下地や背景にもなる「地」のデザインとでもいうべき膨大なデザインも行っている。景のなかでは街路や広場の舗装、サイン、照明、各種柵、樹木、地被、街具、縁石等どれも大事なものになる。これまで行政やコンサルの担当ごとに決められてきたものたちについて、ひとつひとつ丁寧に時間と手間をかけて整理し、一貫性をもつデザインを積み重ねてきた。これも景を形成する上での重要な役割を担っている（図5）。

図５　新幹線開業時の暫定整備（2011 年 3 月）

５．市民参加の取り組み

都市空間の骨格はデザイン会議で決めるプロセスをとっているが、実際に利用者や市民が触れる身近なデザインに関しては、ワークショップ（WS）などの場を設けて意見交換を行ってきた。とくにUDについては、公共空間の動線、サイン計画、舗装や誘導ブロックの配置など設計の段階で４回のUDWSを開催し、広く意見を募ることで実際の設計へと反映させてきた（図６）。

UDWSで得られた意見の反映例としては水辺広場のスロープが挙げられる。具体的にはスロープをメイン動線と位置づけ、基準より十分な幅員をとり、川全体を眺めながら水辺まで降りていけるような設計とした。UDに関する取り組みは、外部空間だけでなく合同庁舎のUDWSにもWGメンバーが参加し、駅周辺における公共空間の一連のUDの実現を目指している。また、街路における柵や照明、ベンチといったストリートファニチャーについては、駅前に原寸のモックアップを制作し、地元のイベントなどと連携して意見交換を行ってきた。

サインの原寸模型による検討（上）とUDWS（下）

６．継続的な景観整備

2011年3月の新幹線開業とともに暫定整備で供用を開始したが、その後もデザイン会議やWGを継続的に開催し（大小合わせると200回を超えている）、利用者からの意見の反映や民間事業者との協議・調整を継続して行い、細やかな改善や対応を重ねることで、都市デザインが一貫性を持ちながら段階的に成長していっていることは、当会議が設置されたことの大きな成果である（図７）。

当地区の整備は、新幹線開業時と在来線高架化時の二段階整備で進めていることにより、市民や利用者の意見を踏まえた整備後の改善点への対応や、公共だけでなく民有地の開発も含めた景観形成を継続的に行うことができるメリットがある。そこでの一貫性は、デザイン会議、WG、そして維持管理まで含めた事業・調整の流れを示したデザインガイドによって多角的に担保され、都市空間の考え方を共有しながら広がりのあるまちづくりを継続的に行っている。

東口駅前広場周辺の整備前（上）
と暫定整備後の比較（下）

18.Application of Design Thinking to Generate First-Person Regional Development Initiatives in Arita: Focusing on the Secondary Effects of Co-Creation

共創プロセスの副次的効果に着目した有田における当事者主導型地域開発へのデザイン思考の適用

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Abstract: A regional development project requires a sustainable business model not only in an economic context, but also in other contexts, to keep various stakeholders motivated and involved in the project. In rural areas, it is comparatively important to design and organize ba which realizes co-creation among various organizations since each organization holds limited project infrastructure.

Authors have been accumulating case studies globally which apply design thinking methodology to co-create innovation or regional development among various profit/non-profit organizations, focusing on the remarkable secondary effect of design thinking methodology derived from its human-centered and highly collaborative process.

In this paper, the authors report on Arita Design Thinking Program as one of their case studies to generate first-person regional development initiatives from the perspective of secondary effects of design thinking methodology.

１．序

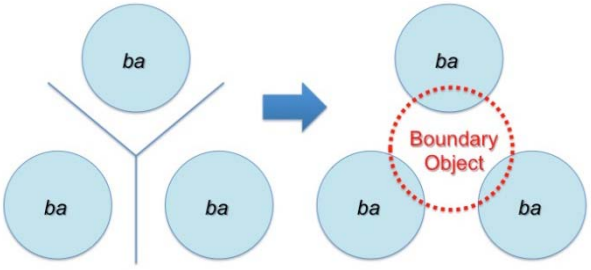
「地域づくり」においては，経済的に持続可能な事業モデルの構築では不十分であり，多様な関係者が事業関与への動機を維持しうるモデルの構築が求められる．特に，地方においては大企業が少なく単組織が保有するリソースが限定的であるため，水平型多組織間連携による持続可能な共創を可能とする「場」のデザインおよびマネジメントの必要性が一段と高い．しかし，異なる背景を持つ個人・組織による共創の実現は，従来行われてきたような単なる交流の場の設定やコーディネイトといった手法では困難であることが過去の実績から明らかになっており[i]，新たな方法論が求められている．すなわち，各個人・集団・組織の主体性を維持した共創には，各属性のインターフェースにおいて，創造ベクトルを伴って媒介するコミュニケーションが不可欠であり，そのための「共通言語」の共有および，多様性を包含する共創デザインプロセスの運用が鍵となる．

本稿では，2014 年に実施した有田の地域再生をテーマとしたデザイン思考プログラムにおける「場」のデザインおよびマネジメントについて論じる．

２．デザイン思考プロセスの副次的機能

著者らは，日本型イノベーションプロセスについて野中ら[ii]が理論化した知識創造論と*デザイン思考*の親和性に着目し，中小零細事業者間での産学・地域連携に適した地方型イノベーション創出メカニズムとして，デザイン思考を介した「場」の設計・マネジメント（facilitation）を重ねている．国内外の営利・非営利組織のイノベーション共創や地域開発へのデザイン思考の導入・適用を重ねる中で，デザイン思考の主たる機能「課題発見・課題定義・課題解決案のデザイン・試行検証」に加え，いわば副次的機能ともいえる「デザインされた解決案」の具現化を促すデザイン思考の*バウンダリーオブジェクト性*および間身体性に基づく*相互主観性*の形成を確認し[iii]，2011 年より，これらデザイン思考プロセスの副次的機能と「場」の設計・マネジメントとの関係に着目したプログラムを展開している．

地方型イノベーション創出エコシステム



バウンダリー・オブジェクト

３．有田での国際産学地域連携デザイン思考プログラムへの適用

多組織間連携による地域に根ざしたイノベーション共創の場としての機能を主眼とし，教育よりも実践に重心を置いた（図１）国際産学地域連携デザイン思考プログラムを設計した．「場」の設計・マネジメントいずれにおいても，各チームのメンバー間に相互主観性が形成され，内発的かつ持続的な自立展開が生まれることを最も重視すべき達成目標と位置付けたファシリテーションを行っている．

有田の事業者（異なる性質を有する窯元 3 事業者と非窯業の 2 事業者）および有田町議会議員を各々核に据えた６チームに，地域内外のクリエイター・研究者・様々な学生・潜在顧客層としての社会人を１−２名ずつ配し，チーム自らが当事者となり実践することを前提とした新たな事業モデルを共創した．各チームの展開に応じて新たな参加者・海外機関・投資家・自治体職員・様々な専門家や関係者を迎え，計５カ国 60 名前後が参画した．

有田の窯元での１泊２日のキックオフワークショップ（10 月），佐賀大学での中間ワークショップ（11 月），有田町商工会議所での検証ワークショップ（2 月）と，３度のワークショップを実施した．キックオフワークショップに１ヶ月先立ち SNS を活用した「場（全体）」を開設以降現在に至るまで，オンラインでの場のファシリテーション（全体およびチーム毎），デザイン思考という方法論についてのオンライン指導，チームごとに適宜対面でのミーティングを行っている．

４．結

各チームにおける事業モデルのデザイン・仮説検証・ピボッティングを経て，現時点において，本プログラムにより獲得した事業インフラから生まれた遠隔地大学技術シーズを活用した新たな製品・事業モデル（一部試作済み），参加事業者の技術シーズを活用した新たなコンセプトの製品開発（特許出願準備中），地域自治体・首都圏企業・地域事業者を巻き込んだ，地域資源のリ・デザインによる地域再生を目的する新サービスの試行（法人設立準備中）が展開されている．特筆すべきは，これらの成果はいずれも本プログラムにより初めて出会った異なる背景を持つチームメンバー間の新たな関係性の中から生まれている点である．

デザイン思考の採用，すなわち，観察・共感により暗黙知を読取り，言語化・視覚化された形式知を元に解決案を共にデザインし，そのプロトタイピング・検証を通じて更なる暗黙知を獲得・共有するという循環が繰返された結果，多様な背景をもつチームメンバー間において一体的かつ内発的な自立展開がなされ，適宜ステイクホルダーをも巻き込みつつ新たな社会システムの構築が展開された．地域再生を目的として有田で実施した本プログラムにおいても，持続的にイノベーションを自己創出する「場」の成立を確認した．

謝辞

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ⅰ 文部科学省：大学発イノベーションのための対話の促進について，
http://www.mext.go.jp/b_menu/shingi/gijyutu/gijyutu16/003/houkoku/1335413.htm，（参照 2015-01-10）
ⅱ 野中郁次郎，竹内弘高：知識創造企業，東洋経済新報社，1996.
ⅲ Akane Matsumae and Karl Burrow: “Business Model Canvas as a Method to Develop Customer-Oriented Service Innovation”, Serviceology Designing for the Future, Springer (LNCS), 2015

19.Re-Design of the City
—Focusing on a Renovation Case Study in Kumamoto City

都市の再デザインについての考察
—熊本のリノベーション事例から考える—

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Abstract: The term 'renovation' first became a major topic of debate in Japan's architectural world around 2000. However, there have been cases of renewing or restoring old buildings in Kumamoto City as far back as 1987—about 30 years now. A good example of this is the Kaminoura area which was built up around the neighboring central shopping arcade and old-fashioned samurai residential district in Joukamachi. In 1987, Kaminoura—then a warehouse—was renovated into a restaurant and is an area of considerable expanse today. Another example is that of Kawaramachi, a commercial zone formerly shaped by the wholesale textile shops in Joukamachi whose renovations began in 2003. As for the Kaminoura renovations, these made use of the warehouses and old private houses in the area as well as the buildings in Kawaramachi to create a standout district within Kumamoto City. By considering these two above instances, this paper will explore the possibility of developing urban renovation methods that can take account of and incorporate the natural, cultural and historical resources of preexisting structures in certain areas. This paper analyzes the renovations in the two case studies above by focusing on the changes in building and roadside land prices and fireproofing practice—the latter of which poses new constraints on urban development. The results of the analysis are illuminated by the two following points. First, in areas with a high density of shops, renovations entailed only a small drop in roadside land route prices. Second, fireproofing practices differed in the two case studies.

1 問題意識と研究の狙い

現在、長年未使用であった古い建物を活用する、リノベーションまちづくりが注目されている。最初に本報告のキーワードであるリノベーションについて、リフォーム、コンバージョンの定義との違いも示しながら明らかにする。寿崎（2005）によれば、リフォームとは「壁紙の張替え、キッチンなど水まわりを新しくするなどの表面的な仕上げを新しいモノにとりかえる」[1]ことを指し、リノベーションは「間取りなどの制約をとりはらい設備なども更新して価値を高めよう、という概念」[2]であるという。また、

[1] 寿崎かすみ（2005）182 頁。

[2] 同上。

コンバージョンは「建物の用途転用を伴う改修であり、古いオフィスビルや倉庫を住宅やSOHOなどに転用して改装する動き」[3]であるとしている。2000年頃から日本の建築界で活発に議論されるようになった「リノベーションまちづくり」とは、リノベーションとコンバージョンの両方を含んでいる[4]。したがって本稿でもコンバージョンを含めた意味としてリノベーションまちづくりを論じていきたい。

本稿では熊本市内のリノベーションまちづくりを、建築物とまちの活用、新しい都市計画制限（防火地域）への適合などにも着目して分析を行った。本考察の目的は、地域固有の自然、文化、歴史を活用する都市の再デザインを終局の狙いとするが、その一つとして既に動きつつある熊本市内のリノベーションまちづくりを考察するものである。これにより、地域ならではの特徴を明らかにし、経済的・文化的価値の向上が相互に係りあう次なる方向性を示すことである。

2 熊本市内に見られるリノベーション事例

熊本市内では、1987年から継続的に古い建物を改修し利活用する事例がみられる。熊本市中心部のリノベーションエリアは図1である。本稿で示す上乃裏地区、河原町はともに中心市街地の一画にあり、上乃裏地区は熊本城の東に位置し城下町の武家屋敷街区を基盤にもつ地域であり、現在は中心商店街と一帯をなす地域である。また2003年からリノベーションが起こっている河原町は熊本城の南に位置する旧町人地であり、戦後に繊維問屋街が形成された街区である。

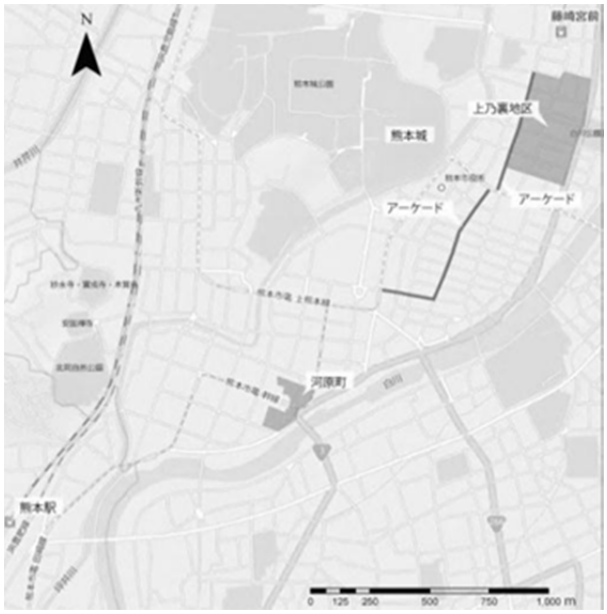

図1　熊本市中心部のリノベーションエリア

熊本市の都市形成過程を見ると、熊本城下の半径数百mの範囲は旧町人地、旧武家地、旧軍用地で占められ、それらの中に旧県庁や学校等の公共的施設が多く分布する地域であり、中心市街地という同じ

[3] 同上。

[4] またJacobs, Jane（1961、訳1977）によれば、古い建物は「活気にあふれた通りや地区が育つために必要なもの」（訳書212頁）であるとして、「劇場に姿をかえたガレージ」（訳書219頁）など、コンバージョン事例について今から50年以上前に指摘されていることも興味深い。

一帯でありながらも、異なる歴史的・文化的な背景の地区が織り成す地域であることがわかる[5]。上乃裏地区と河原町の両者を比較すると、上乃裏では蔵や古民家の活用、河原町では繊維問屋街の共同ビルを活用したリノベーションが見られ、近隣の地域でありながらタイプの異なるリノベーションまちづくりを確認することができる。

リノベーションまちづくりとまちの活力との関係を探るために上乃裏地区の建築物の変遷と路線価に注目してみた。昭和 39（1964）年発行の 1：3000、昭和 50 年（1975）年と平成 7（1995）年、平成 18（2006）年、平成 25（2013）年発行の 1 ：2500 地図を用いて、建築物の形状変化の有無を確認した[6]。築 40 年以上の建物、築 20 年以上、そして 1995 年以降の建築物、さらに駐車場の分布を表示し、2006 年から 2014 年の 8 年間[7]の路線価の変動を示した（図 2）。

2006-2014 年の熊本市内の最高路線価は、1 ㎡あたり 144 万円から 115 万円へと 79.9%[8]に下落する状況であった。上乃裏地区の路線価は駐車場の多い地図の北側で下落率が大きいことがわかる。しかし、上乃裏地区の中央を南北に通る上乃裏通りの路線価は、2006 年、2014 年ともに 10 万円台を示しているが、2006 年比 96.3%で推移しており、下落率が小さいことがわかる[9]。これにより、リノベーションの集積がある上乃裏通りの路線価は、ほとんど減少していないことを確認できた。

河原町は 2003 年から始まる河原町プロジェクトによって古い建物の活用を行っている。このプロジェクトは、「昭和 33 年のヤミ市大火災の跡に急ごしらえで建てられ、年月とともに大半が空き店舗状態になっていた繊維問屋街共同ビルに若きクリエイター達を誘致する」[10]ことを目的として始まったものである。

ここでもリノベーションまちづくりとまちの活力との関係を探るために、建築物の変遷と路線価の推移に注目してみた。河原町も上乃裏地区と同様に、昭和 39（1964）年発行の 1：3000、昭和 50（1975）年と平成 7（1995）年、平成 18（2006）年、平成 25（2013）年発行の 1 ：2500 地図を用いて、建築物の変遷と駐車場の分布を表示し、2006－2014 年の路線価の変動を見た（図 3）。地図の南側に 1975 年以前の建築物がみられるが、そこにリノベーションされた店舗が集積している。

2006-2014 年の路線価の比率をみてみよう。河原町の路線価は、2006 年、2014 年ともに 1 ㎡あたり 10 万円前後であるが、リノベーションの集積がある直近の路線では、2014 年の路線価は 2006 年比の 86.8%であった[11]。上乃裏地区でみられたと同様、熊本市の最高路線価の推移（79.9%）よりも小さいことを確認できた。

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5 熊本市都市政策研究所（2014）

6 増改築等によって建築物の形状変化があった場合、実際の築年数と異なる場合がある。

7 最新の路線価が明らかにされている 2014 年と、1：2500 地図が発行されている 2006 年とを調査の対象年とした。

8 国税庁「財産評価基準書」（2006、2014）より算出した。

9 同上。

10 冨士川一裕（2007）59 頁。

11 国税庁「財産評価基準書」（2006、2014）より算出。

図 2　上乃裏地区の建築物の変遷と路線価の推移
（出典）地図（1964、1975、1995、2006、2013）国税庁「財産評価基準書」（2006、2014）を加工して作成。

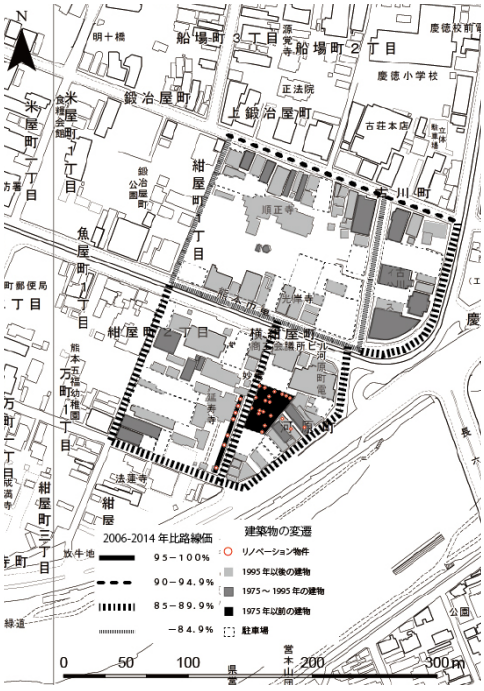

図 3　河原町の建築物の変遷と路線価の推移
（出典）地図（1964、1975、1995、2006、2013）、国税庁「財産評価基準書」（2006、2014）を加工して作成。

以上、二つの地区でみてきたように、古い建物を放置するのではなく、リノベーションによる利活用がなされた物件が集積している街並みにおいては、熊本市内の最高路線価の変動と比較して、下落率が小さいことが確認できた。上乃裏地区と河原町は先に述べたように、街区の形成過程やその後の用途が異なる地区であるが、古くなった街並みの利活用が建物レベルの改修等の積み上げで進むことで、従来のまちの脈絡・コンテクストを残しながら達成されることを一つの現象として捉えることができた。

3　新しい都市計画制限への適応

ところで、上乃裏地区や河原町は、現行の都市計画制限としては、防火地域や準防火地域に指定されており、防火対策として、都市計画制限に如何に適応するかが改修等を基本とするリノベーションでは課題である。

都市計画制限への適応については上乃裏で、旅館から複数の店舗が入居する建物へとリノベーションされた事例を取り上げたい。そこでは、「防火の対策については資金不足から最初に 1 店舗分の改装を行い、出店料で資金をため、それを次ぎのリノベーションに充当することを繰り返すことで、現在は 7 店舗が入居している。建物の内部に鉄板シートや防火雨戸などを設置して防火基準をクリアした。その後、資金に余裕ができてから更に排煙窓を設置した」[12]という。

また、河原町から約 300m 西に離れたところでは、先の河原町プロジェクトとは直接関係ないが、伝統的な街並みから学べる興味ある事例を報告することができる。石油・砂糖・小麦粉を扱っていた築 100 年ほどの旧商店の倉庫からカフェへとリノベーションした事例がある。ここでは「油を使っていた

12　平成 27 年 2 月 22 日、工務店代表者へのインタビューによる。

ので、他に火が移らないようにとお店の両側にレンガ造りの防火壁が作られた」[13]という。この事例については今後詳細な調査を行うこととしたいが、城下町熊本においては、都市計画制限への適応のみならず、火が移らないように近隣へ配慮するという特徴を持っていることも確認できる。

4 熊本市におけるリノベーションまちづくりと多様性

今回の分析では、リノベーションの集積があるところでは路線価が維持されているという共通点を抽出し、都市の成立の背景が異なることで、異なる趣を持っていることがわかった。そして防火についても、近隣への配慮を重視した住まいて自らの工夫があり、それが現在まで残っていることも確認できた。

さらに、熊本市の中心市街地では上乃裏地区や河原町の繊維問屋街の空きビルの活用の他にも古い建物という都市のストックを活かす、リノベーションまちづくりの動きが重層的にみられる。例えば、旧町人地であった新町古町地区の町屋の活用や、中心商店街の空きビルの活用である。

このようなリノベーション物件は、Throsby, David（2001、訳 2002）によれば、文化資本であるとされる。文化資本とは、経済的価値と文化的価値を「具現化し、蓄積し、供給する資産」[14]である。これは、地域で受継がれてきた理念や信念、伝統、価値が、建物や文学・音楽などの形態で現れる。多様な文化資本を活用することで、都市の経済的・文化的価値の向上に寄与するという。

様々な地域で動きつつある熊本市中心部のリノベーションまちづくりは地域固有の都市の再デザインという観点のみならず、経済的・文化的価値の向上に寄与するという視点からも重要な手法であろう。

参考文献

寿崎かすみ(2005)「空堀地区長屋再生プロジェクトをどう捉えるか」『国際社会文化研究所紀要』No.7、181-192 頁
清水義次（2014)『リノベーションまちづくり』学芸出版社
冨士川一裕（2007)「まちづくりと『記憶の継承』―熊本まちなみトラストの活動―」都市計画協会『新都市』vol.61、No.1、58―62 頁
Jacobs, Jane（1961、訳 1977）*The Death and Life of Great American Cities,* Random House Inc.（黒川紀章訳『アメリカ大都市の死と生』鹿島出版会）
Throsby, David（2001、訳 2002）*Economics and Cultures*（中谷武雄・後藤和子監訳『文化経済学入門』日本経済新聞社）
熊本市都市政策研究所（2014)「熊本都市形成史図集」
国税庁（2006、2014)「財産評価基準書」

[13] 平成 27 年 3 月 17 日、店舗スタッフへのインタビューによる。
[14] Throsby, David（2001、訳 2002）訳書 81 頁。

20.The Trace on the 10 Years of the Environmentally Symbiotic New Community Plan

環境共生型ニュータウンの 10 年の歩み

Yohei SADOHARA, Graduate Student, Kyushu University
Atsushi MAKI , Jun Architecture Regional-Planning Consultant

Abstract :This paper is a report on the track of past 10 years of the planning of environmentally symbiotic housing area in an artificial island (Island-city), which locates in eastern district of Fukuoka city. In this area, several enterprisers initiate to develop various facilities, such as housing, education, medical care, and promotion of business foundation. However, this report will focus on introducing Sekisui House Group, whom planned and developed the largest housing area in Island-city. The opening of the town was 10 years ago, and now about 2,000 households live there. The development concept is based on the theme "all of us is involved", and is head to make town with the residents participation, focusing on "people", "environment" and "children". Moreover, the approach to environmental problems is substantial. In this town, 30 percent of the whole housing area is greened, and is promoted to be the town of energy saving, energy creation and of zero emission of CO2. As praised in the Asia Habitat Award, outcome of this approach is highly rated and the area is the uptown, which represents Kyushu as well as Fukuoka city already. From the position that took part in plan decision, this paper will report on the concrete preparation method of the area and the community designing activities participated by the residents.

1. Introduction

The housing planning in the Teriha district, located in Island-city, started in 2004 by the condominium in "Onshima area" with 289 dwelling unit. Island-city is an artificial island in the western part of Fukuoka city, and the housing planning is advanced concurrently with reinforcement of the function of harbor facilities.

The main concept of the town is "the town that evokes the power to live", which reflects the social conditions of the collapse of Bubble economy. Keywords to realize this concept are "nature", "health", and "children". Each of these keywords sets concrete objectives of the plan, which are "the town in symbiosis with abundant nature", "the town of health where everyone lives vigorously and brightly", and "the

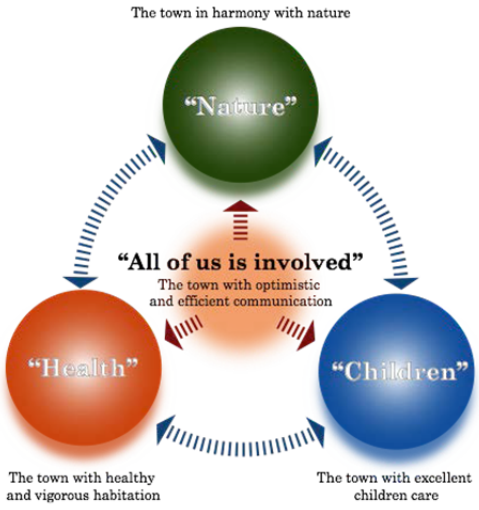

Figure 1. Three keywords of development concept

town where children live free from all cares and in good health". All together, the objective can be put as follow, "the town where everyone takes part in establishing community full of liveliness", and the keyword as "all of us is involved" (Figure 1). Under this concept, condominiums and detached housing area was planned integrally.

2. Development of condominium and harmonization of detached housing area

Policy of the condominium plan is "the condominium with abundant view of ocean and

Figure 2. The buildings with weight on the

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green", or to accomplish the following: ① establish environmentally symbiotic condominium with rich green and nature, ② arrange the buildings with weight on the view of ocean and central park ③ form of the buildings with consideration toward environment and universal design (Figure 2).

In the same way, policy of detached housing area plan is "the residence area of individuality and harmony, having respective theme by block", or to accomplish ① to make the best effort to establish the town full of green ② to represent fine touch and feel of nature by utilizing the real material ③ propose the life taking advantage of living close to sea, sky, and green.

One of the most distinctive parts of the housing plan of Island-city is the harmonic development of condominiums and detached housing area, which is enabled by connecting "green network" and "pedestrian network" that are stretched through out both areas (Figure 3). This characteristic is clear in the "Onshima-area", an area developed in the early stage. Here, condominiums and detached houses are arranged around the symbol of the area, "Satoyama". "Satoyama" is a small hill with a big camphor tree as symbol tree, and has conception from "village shrine" (Figure 4,5). The arrangement is planned over the city-axis of Kashii, which originate from the Kashii Shrine. By doing so, the town aims to take over the history of Kashii and the tree-culture of Teriha to modern times (Figure 6).

Figure 3. Planning of green network

Figure 4. City axis leading to "Kashii-gū"

Figure 5. Planning of Satoyama

3. Contents of the plan

3-1.Condominium area

The placement of the residential buildings of condominiums draws a gentle curve with Satoyama as th e center of the fan shape (Figure 7). A community park is placed in the center of the area, which creates seamless relation without obstacle between the park and the housing area.

As for the overall sectional planning, the height of the residential buildings are planned to be lower as the buildings come closer to the sea, so that many dwelling units can earn ocean view as much as possible. Also, in order to hide parking lot, " an embanked green belt" is built from the road in the area (Figure 8).

Façade of the residential buildings consists of gentle curve, which used "waves" as motif. Plan of the residential buildings make use of this curve as well; the curve gives depth and the feeling of resort to the rich balcony (Figure 9). For the plan of dwelling units, the idea of main theme "consideration for child care" and "family's communication" is intended.

Figure 6. Deployment plan of Satoyama

Figure 7. Deployment plan of residential buildings

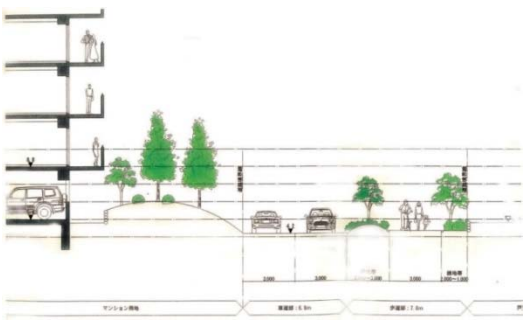

Figure 8. An embanked green belt

3-2. Detached housing area

The mai n characteristic of this area is the arrangement of detached houses with the theme “publibate” (which is a neology “public + private = publibate”) (Figure 10). Precisely, by arranging “open detached house” facing the center of the public square, interactions between the residents are encouraged while taking their privacy into consideration. This is enabled and will be maintained by utilizing methods such as “setback of wall”, “control height of the building”, and “installation of a low hedge” decided in the “building agreement”. Moreover, green-rich environment in the open space is secured with the “Green Space Agreement”, which is determined together with the condominium area.

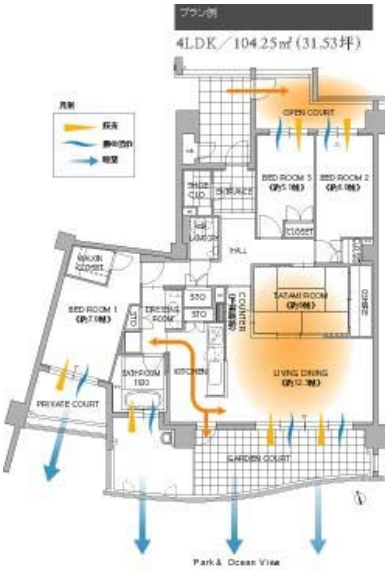

Figure 9. Plan of dwelling unit

Figure 10. The arrangement of detached houses

The overall plan of the housing area, which is intended to gain the sight toward the area, connects the exterior green part of the area openly and enhances the charm in the area increasingly (Figure 11).

Figure 11. Overall plan to ensure the visibility towards the residential area

4. Activities on environmental maintenance of the district

The distinctive feature of Teriha is the activities on environmental maintenance by the residents that are triggered by the keyword “all of us is involved”.

After the completion and occupancy of the residents “T.C.A.” (Teriha Community Association) was established, and community activities among the residents and environment beautification activities are advanced (Picture.1). Furthermore, patrol by security company is put forward for children’s safety on the way to school. Indeed, programs to become the advanced housing area in Fukuoka City are being proceeded in Teriha.

Various prizes such as Asia Habitat Uptown prize and a Japan Housing Association prize were given to such planning of housing area and resident's activity.

Picture 1. The community activities among the residents

5. Recent approaches

Even now, 10 years after the opening of the town, housing development in Teriha district is being set forward persistently.

For the condominium area, the first area that was authorized to be the “model of environmentally symbiotic housing area” was completed in Kyushu. Also, “Block of Zero-CO2 ” of the “CO2 lead model business” by the ministry of environment is being built in the detached housing area.

In the green housing area circled by the sea, many young households are occupying and the laughter of children fills the air. Surely, the realization of the concept made in the beginning is still being promoted.

21 .A Study on the industrial productivity and urban infrastructure maintenance of Gunkanjima

軍艦島の工業生産性と都市基盤整備に関する研究

Kyoichi NAKAMURA, architect, Japan

Abstract: This artificial island was created by the coal mining business. In the 1870s, local capital paid for seawall and mining machinery maintenance. However, due to harsh local environmental conditions, including typhoons, this maintenance was inadequate. In the 1890s, a large capital-based company, Mitsubishi, joined the business. The company began land reclamation and refurbished the mining machinery. However, the living environment consisted of temporary buildings only. As the coal mine extended deep under the seabed, the working environment became increasingly severe and the workers demanded improvements in their living and working environments. In 1897, the "Naya" system (an indirect employment system) was abolished and a direct employment system was established. Following this, Mitsubishi introduced new technologies to improve industrial productivity. In 1902 the company built a thermal power plant which produced electricity. In 1904, using exhaust heat from the plant, the company started a salt production business which supplied salt as well as drinking water. The island, originally a reef of 2ha, was expanded to 5ha. By the early 1900s, a small-scale mining town, which housed about 2000 people, had appeared on the previously uninhabited island. Although the ever-increasing depths of the mining tunnels put pressure on company management, the company continued to build an industrial city, introducing cutting-edge drilling techniques, civil engineering and construction methods. In this presentation, we focus on the early period of Gunkanjima's development into an efficient industrial city (1897-1912), and verify how improvements in industrial productivity led to better maintenance of the urban infrastructure.

Keywords: Gunkanjima, development, landfill, infrastructure, modern, Mitsubishi

1.Introduction

Land reclamation was repeated on a two-hectare reef island outside Nagasaki Port, where the foundation of an industrial city was established. Rokkai-sha, a company headed by Shojiro Goto, obtained a government permit in 1869 and started mining in Hashima (later renamed Gunkanjima). However, mining stopped within a year. In 1870 and 1804, former Fukahori-han executives twice attempted mining, but both times ended in failure. In 1875, Hidenoshin Koyama, who learned about modern mining technology and obtained Amakusa mason seawall technology, started coal mining. He invited a British engineer, built a dike, and equipped the mine with machinery. Unfortunately, due to a typhoon, he had to close the business after only one year. However, the coal mining business based on local capital established the modern industrial city. We divided the phases leading to the modern industrial city into four stages.

2. Stage one: birth of the coal mining town

In the late 1880s, the first stage of modern urbanization began when Mitsubishi (with ample capital) became involved. A mining application survey diagram drawn in the Meiji period, 1892, (Fig.1) still exists. It can be confirmed that parts of the northern mountain（A） were excavated for land reclamation. Mitsubishi began coal mining preparations from the landfill development in the northern area. On this survey map we can see the placement of mining-related buildings and residential facilities. The land was used in a similar way to the Nakanoshima coal mine (Fig.2) on the neighboring island. Coal mine-related facilities were located on the east and north sides of the island and residential facilities were located on the south and southwest sides (Fig.3).

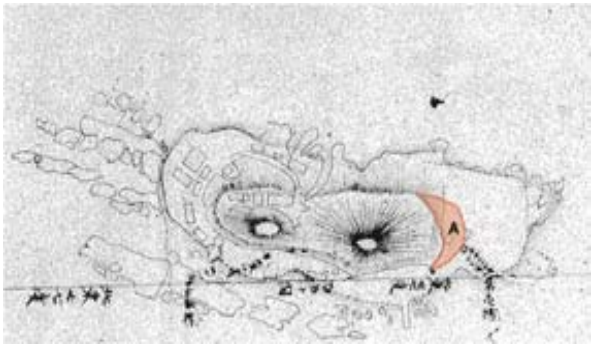

Fig.1 Mining application survey diagram , 1892.

Fig.2 An overlooking view of Nakanoshima from Hashima,circa the 1880s.

The majority of the residential facilities were wooden bungalows, where workers lived together temporarily. It was a large construction built for the Naya system and the style was often found in coal mines (Fig.4). In the Naya facility in the Takashima coal mine on the neighboring island, the operators collected a 6% commission, 4% for barn maintenance from the miners' salaries, along with catering board wages; thus, they gained large profits[1]. Due to a Fukuryo Shimpo article that reported the devastation in Takashima coal mine in 1887, the labor problem became a major social issue. Although the government enacted the "Mining Act" in 1890 to protect workers, the Naya system continued to prevail.

Fig.3 The landscape of Hashima circa 1890

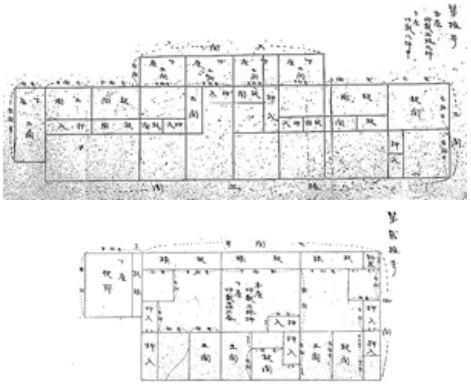

Fig.4 A registration document of real estate in the Hashima coal mine

The Hashima coal mine launched drilling preparations in the era of this working environment in the background. Excavation work was launched in 1891. A second intake shaft of 159 meters was completed, and by 1894 this had lengthened to as long as 480m. A beverage distilled water machine was installed in 1891 at the time of starting coal mining, and an elementary school was established in 1893.The angle of the coal seam bed in Hashima was steep, so their coal mining field soon went deeper under the seabed. Thus, in 1897, around 700 miners launched a strike and the labor side requested improvements in the working environment and mechanization of the mine.Due to these complaints, Mitsubishi abolished the Naya system, which was an indirect employment system, and made plans to change to a direct employment system. At the same time, the company promoted the marriage of miners and a separation of households as their policy. This reform was the modern industrialization that our study focused on.

3. Stage two: the coal mine district with makeshift buildings

As Mitsubishi industries wanted to improve stable production, they introduced new technology and tried to improve the working environment. Ahead of other coal mines, they developed a thermal power plant to start electrification in 1902. In the Takashima coal mine on the neighboring island, over 500 people died from cholera infection in 1895. Under the high density working environment of a coal mine, measures to deal with contagious diseases were also an important issue. In 1904, a salt production business using power exhaust heat was started (Fig.5) and distilled water for drinking was obtained (Fig.6). Based on the Mitsubishi financial ledger, we created a graph to find out mining productivity during the second stage (Fig.7). It was growing until 1904, owing to the reforms, but subsequently began to gradually deteriorate. In order to secure workers, entertainment facilities were built on the island. These facilities, independent of the mining business, included an entertainment hall and a red-light district.

Fig.5 The salt production plant in 1904

Fig.6 Distilled water distribution

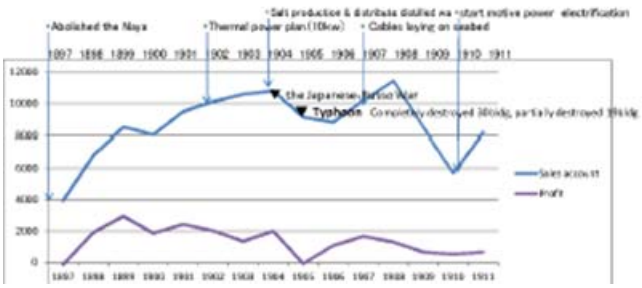

Fig.7 The correlation between sales and profit according to the financial ledger

Due to seawall maintenance and landfill activities in the early 1900s, the island expanded to about five hectares. There had been a small-scale coal mining district, with about 2000 islanders, on the original uninhabited island called Hashima in the early 1900s (Fig.8). However, the reef that had risen from the sea had almost disappeared. Landfill expansion had reached its limit (Fig.9).

Fig.8 Hashima in the early 1900s (a chimney from salt production plant can be seen in the upper right of the picture)

Fig.9 A transition landfill diagram (and map the underlying : prototype reef).

In 1901, Mitsubishi dispatched coal mine engineers to western countries for a long-term survey on cases in advanced areas[2]. For the mining engineers, not only mining technology and improvement of the working environment, but environmental improvement of the entire industrial city was also an important issue. After they conducted inspections of coal mines, mine facilities and industrial cities, they returned home in September, 1902. The changes in social situations, including the wars which broke out across the world, spurred the promotion of the energy industry. Management was under increasing pressure; thus, fundamental reform was also required in the Hashima coal mine (Fig.10). Under such unstable global circumstances, the Japanese-Russian War broke out in 1904. In the pit, dug even deeper under the seabed, the working environment became increasingly severe. An increased cost of carrying coals also began to put pressure on the management. In addition, in Hashima, the forces of nature were harsh. When the island was struck by a typhoon in 1905, damage to the facilities and residences was unprecedentedly extensive. Around 1905, problems relating to the social environment, labor environment, and the disaster environment, occurred simultaneously, which also challenged the management. However, since the coal reserves on the seabed near Takashima and Hashima were enormous, the island prepared to enter the third stage (Fig.11).

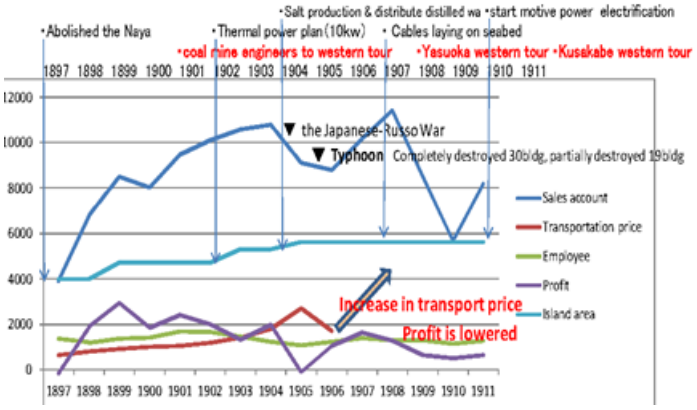

Fig.10 Social changes, incidents and Mitsubishi's employees fluctuations in the era in the second stage. Increase in transport costs lowered profits

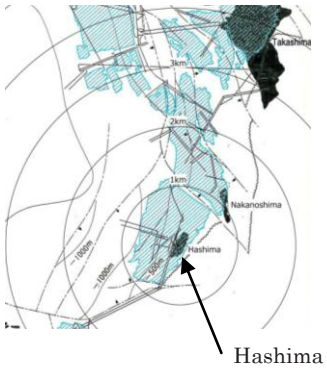

Fig.11 Coal resources on the seabed near Takashima and Hashima

4. Stage three: preparing for, and the early stages of, the modern industrial urbanization

In 1908, Katsuya Yasuoka, a chief architect from Mitsubishi, started an inspection tour to vist western cities and architecture (Fig.12).One of the purposes of his visit to western countries was to do research for the construction of the Marunouchi building. He also planned to see UK coal mining cities where the development of workers' housing construction was stipulated by law. He returned home in 1909 with advanced technological information.

Although it was unknown whether or not Yasuoka was involved in the design, the old #14 Building (a wooden five-story building with a garden on the roof) was built in Hashima in 1913, where concrete was used for the floor and roof (Fig.13). In the Nagasaki Yotetsusho (later called the Mitsubishi Shipyard of Mitsubishi Goshi Kaisha), factory building techniques, which started from end of the Edo period, and Western-style technologies, including brick manufacturing and cement[3], were implemented. Building technology from the Marunouchi urban development, which started in 1894, was also adopted. Concrete was used in the third dock, completed in 1905[4].Reinforced concrete buildings were constructed for an oil storage warehouse and warehouse (Tokyosouko) in Kobe (Fig.14). It seems that concrete building, in combination with accumulated technology from Mitsubishi, was put to practical use in Hashima.

In the final stage of preparations for the creation of the modern industrial city, Yoshitaro Kusakabe[5], who finished an inspection tour of Western countries in 1913, was appointed as a director of the mine. He witnessed several successful cases of advanced coal mining technology, and completed high-rise and high density residential buildings in the areas of New York and Chicago, and returned home.

Fig.12 Inspection tour route in the UK , 1908

Fig.13 A five-story wooden building (Reinforced Concrete was used for the floors and roof), 1913

Fig.14 Warehouse (Tokyosouko) in Kobe, 1906

5. Conclusion of the industrial urbanization in the early period

Due to the necessity of working environment improvements to increase productivity in Hashima, Mitsubishi prepared the urban development while its engineers were obtaining information from Western countries.They were also taking unstable elements into consideration in the mining business in Hashima, including measures for typhoon disasters. Fortunately, Director Kusakabe found a new high-quality coal seam and launched the construction of the modern industrial city, which was capable of both stable operations and supporting a high density residential environment. Seawalls were shored up with reinforced concrete. High-rise apartment buildings were constructed using reinforced concrete as it was necessary to accommodate laborers and their families to ensure a stable environment for coal mining.At the same time, some religious activities were started to further stabilize the lives of the residents. The Mitsubishi Mining Company History stated that the "dismantling of the Naya system" indirectly caused the island's industrial urbanization with modern architecture[6].To cope with worker requests to improve working conditions, the company's mining engineers, architects and technical personnel imported advanced technology from foreign countries for the development of the city, to ensure a stable coal mining operation which contributed to the infrastructure of the industrial city.

In addition, a high-rise reinforced concrete apartment was built in 1916, in the early period of the modern industrial urbanization of the island. As the style of the building was designed to suit the lifestyle of Japanese workers, it can be said that it demonstrated modern, Japanese-style architecture (Fig.15)

Fig.15 Seven-story reinforced concrete building (No.30 Building)

References

1)Maekawa,Masao. Tankoshi: Nagasakiken Sekitanshi Nenpyo.Ashishobo.1990, p.119.
2)Matsuda, Junkichi.Matsuda Buichiro Shoden.1996, p.12. There are records of the investigation visit city.
3)Nakanishi,Yo.Nihon Kindaika no Kisokatei:Jo.Tokyodaigaku Shuppankai.1982, p.78.
4)Nankai,Yohachiro. Kogaku Hakase Shiraishi Naoji Den. Kogaku Hakase Shiraishi Naoji Den hensankai.1943, p.152,183.
5)Sekitankogyo Rengokai,Sekitan Jiho volume3 no.11.1928,p.1028.
6)Mitsubishi Kogyo Cement Kabushikigaisha.Mitsubishi Kogyo Shashi. Mitsubishi Kogyo Cement Kabushikigaisha.1976,p.175.

Figure legends

1) Mining application survey diagram , 1892. The Mitsubishi Archives.
2) An overlooking view of Nakanoshima from Hashima, circa 1880s. Nagasaki Museum of History and Culture Collection.
3) The landscape of Hashima ,circa 1890, created by the author.
4) A registration document of real estate in the Hashima coal mine. The attached document,1890. The Mitsubishi Archives.
5) The salt production plant in 1904:Project Committee of Hashima Mine Closure`s 40th Anniversary,Great Hashima.2014, no.016.
6) Distilled water distribution :Project Committee of Hashima Mine Closure`s 40th Anniversary,Great Hashima.2014, no.015.
7,10) Analyze the the financial ledger. The Mitsubishi Archives.
8) Hashima in the early 1900s :Project Committee of Hashima Mine Closure`s 40th Anniversary,Great Hashima.2014,no. 001.
9) Nakamura, Kyoichi. "Research on the formation and development of the Hashima (common name Gunkanjima) of the Meiji era",Sangyokokogaku (industrial Archaeology) no.150.Nihon Sangyo Koko Gakkai (Japan industrial Archaeology Society), 2013, p.10-20.
11) Mitsubishi Kogyo Cement Kabushikigaisha. Takashima Tankoshi. Mitsubishi Kogyo Cement Kabushikigaisha,1989,p.500.
12) Inspection tour route in UK. Yasuoka Katsuya Mailed to Souda, June 1908. The Mitsubishi Archives.
13) Akui,Yoshitaka. Shiga,Hidemi. "Studies on the modern buildings on Gunkanjima island, 1916-1974",Tokyo Denki University,1986,p.13.
14) Toyoshima,Mitsuo.Tekkin Saizensen:Tekkin koji no naze wo tokihogusu, Kenchikugijutsu,1999,p.6.
15) Seven-story reinforced concrete building (No.30 Building)