

A Study on an Efficiency of Map Making Method for Encouraging Residents' Recognition and Coping Behavior with Local Risks

地域住民の理解と地域防災力向上を目指したマップ作成アプローチの効果に関する研究

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1. Background & Objectives

1-1 Background

Safety promotion movement is one of the main issues of Community based planning (Machi-zukuri) in Japan. This movement has been spreading not only Japan but also many countries in the world. For example World Health Organization (WHO) established Collaborating Centre on Community Safety Promotion (CCCS) to certificate communities which succeed safety promotion activities and 101 communities were already certificated until 2006. It can be guessed that main reason of safety promotion movements spreading is recognize change both of community members and governments, as only governmental measures are not enough to keep community safety, especially for precaution.

“Map Making Method (MMM) is one of popular way for recognizing community risks by residents themselves as basic step of safety promotion activities.

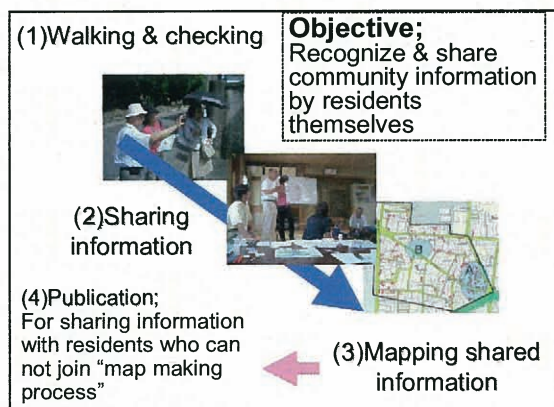


Figure1: Outline of Map Making Method

MMM is a combination method with walking community areas to find local information, sharing gathered information through group discussion, mapping shared information onto local areas map with residents themselves (Figure1).

As a viewpoints of cognitive psychology, Risk recognize process can be explained following four steps; 1) Risk identification:

Finding existing of risk points because of input information related risk, 2) Risk image formulation: Putting emotional images with identified risk points, 3) Risk estimation; Subjective estimating of expectation impacts in each risk points, 4) Risk evaluation; Judging each risk can be machi-zukuri or not.

And if this process was completed, Human beings can start coping behaviors by themselves (Kusuda, 2000).

MMM is useful for not only gathering risk information but promote participant's risk recognize process for getting willingness for risk mitigation, through participation of Map making process, and it is available point as community based safety promotion method.

But it is impossible that all of community residents join MMM as participants, because of restrictions of schedule, facilitation and so on, in other hand it is uncertainly that MMM can promote risk recognize to even them. Therefore, it is needed to confirm MMM effects to residents who didn't join Map making process, just show publication map, and if effects will less, it should be improved MMM to increase effects to them, as safety promotion methods.

1-2 Objectives

This study aimed to confirm effects of MMM to promote coping behaviors and identify points to be improved through following two sub-objectives;

- 1) To confirm MMM effects to promote coping behaviors of participants,
- 2) To confirm MMM effects to promote coping behaviors of residents who did not participate map making process (only watching the publication map).

2. Methodology

2-1 Case study field and methods

Regarding selection of study field, this study set up following two conditions; 1) Targeting community had been expected various safety risks, 2) Authors have confidential relationship with community residents, especially community leader to join MMM process.

From those conditions this study selected Kitano-kamishichiken district, in Kyoto city, Japan. This district was typical historical districts include oldest MAIKO-KAGAI, many traditional Japanese houses called "Kyo-machiya", two national registered historical heritages, and so on. In other hand, this district was basically residence district and the some of community organization members have been getting recognition of necessary for safety promotion activities. Authors had kept participate meetings and activities of community organization as observers and confidential relationship was constructed between authors and community organization members.

In this study Authors participated MMM process as observers/ advocators, and selected following four research methods in field community.

2-2 MMM Experimentation

The Experimentation of MMM was took place on 23rd August 2006. Below table shows outline of the experimentation.

This experimentation was implemented by 2 Authors; Taeko SAKAI, Takashi YOSHIMOTO and supported by community organization "Kitano Kamisichiken machi-zukuri committee", and

community center for landscape, Kyoto city. Total 21 participants joined it; include two authors, two university students, two staffs community center.

They implemented following three MMM steps; 1) Walking districts to find below four type safety risks: Crimes, Fires, Disaster, car accidents, 2) Group discussion and making Map in that day. And finally, 3) they made publication map for all of community members include residents who did not participate MMM through three times meeting.

Table1: Outline of Experimentation

Conditions	Outlines
Day	23, August, 2006 9:00-14:00AM
Place	KITANO-KAMISHICHIKEN DISTRICT
Participants	21 persons (12 residents, 5 university students, 4 machi-dukuri support staffs related with Kyoto city)
Steps	(1) Walking districts <ul style="list-style-type: none"> Participants worked around KAMISHICHIKEN DISTRICT, divided into 4 groups and checked vulnerabilities points as much as possible, and attached corresponding color stickers into MAP (Fire/earthquake/traffic accident/crime etc). they filled in comments to paper pieces & took photos to each points.
	(2) Making Map Participants shared vulnerabilities each other through making map
	(3) Publication for residents who didn't join map making process.

3. Confirmed effects of MMM to participant.

3-1 Effects of MMM to promote participants recognition

Table2 shows risk points that participants recognized in each risk types through MMM experimentation;

(1) Car accidents: traffic and illegal parking as risk factors.

This experimentation made participants recognize to car

accidents risks dominantly. Total 47 risk points were recognized and those could be classified following two groups.

a) Car traffic in Kamisichiken Street; drivers who live districts around kitano-kamisichiken districts use to Kamisichiken Street as a bypass road and it makes much traffic there.

b) Illegal Car parking in Kamisichiken Street;

There are many illegal cars parking in Kamisichiken Street. On daytime most of those are delivery cars to “Ochaya”, Maiko entertainment places, and on nighttime most of those are taxis for transportation service to guests of “Ochaya”.

Table2: Risks/ Vulnerabilities points that participants

Risk types	The number	detail
Car Accidents	47	Places accidents occurred, blind corners
Crimes	22	Places suspicious individuals come
Disaster	7	Obstruction points (narrow streets, difficulty for evacuations etc)
Others	21	Some positive opinions to historical areas etc

Above two types risks points makes serious car accidents risk against children and aged people in there.

(2) Crime; Blind alleys as vulnerabilities of crimes

Participants were recognized existing of suspicious individuals. And they gathered 22 vulnerability points through MMM. Most of those are Blind alleys, which have characteristics both of easy entering, difficulty to see from outside, and locate near primary school.

(3) Disaster; Less recognize of disaster vulnerabilities through MMM

There are many vulnerabilities of disaster there; difficulty of evacuation cause by narrow streets, weakness of fire belongs to “Kyo-machiya”. But participants could recognize only 7 vulnerability points there. It can be considered that participants could not recognize invisible risk/vulnerabilities through MMM without suggestions of experts. It can be guessed that is one problem to adapt MMM to safety promotion.



Figure2: Publication Map

Safety promotion map were made from above risk/vulnerabilities information through tree times workshop by participants and it was published to all of households in Kitano Kamisichiken district. Publication map explain about eleven big risk/vulnerability points, which were selected by participants, because it was impossible to describe all risk/vulnerability points there. Publication map also include following two artifices to promote easy understanding; 1) Using icons to make recognize type of risk/vulnerability points viscerally, 2) Describing additional information in each risk/vulnerability points through comments and photos to make understand detail of them.

3-2 Effects of MMM to promote participants coping behaviors

As a result of observation survey, it was confirmed that MMM has effect to promote participants coping behaviors. Followings were described about process to participants get coping behaviors through observation survey.

Through the MMM process and follow-up meeting, participants shared risk/vulnerabilities information and it made participants share willingness for mitigation against car accidents risk. Therefore, participants implemented counting survey both of traffic and illegal parking. They also shared difference of stances to traffic control in each participant as a representative of each type residents.



Figure3: Transportation survey by participants



Figure4: A meeting for consensus building

From those process participants have been started to build consensus to community based traffic control plan by themselves as a first step coping behaviors in community level.

However they could not consider about disaster risks/vulnerabilities on above process.

4. Less effects of MMM to residents who only show publication

4-1. Outline of contribution survey

In order to confirm MMM effects to promote willingness of residents, who only show publication, willingness, for risk mitigation, contribution survey

Table3: Outline of contribution survey

	Outline
Days	15-29.november,2007
targets	Residents of KITANO-KAMISHICHIKEN DISTRICT who were received publication
Method	Questionnaire research by posting (102/700,colect rate:14.5%)

was implemented on November 2006 supported by community center for landscape of Kyoto city, and "Kitano Kamisichiken machi-zukuri committee".

Survey targets were all of 700 households in Kitano-kamisichiken district. Questionnaire sheets were collected by posting. Collected rate were 14.5% (102/700). 80.4% of respondents (74 persons) recognized publication map and 70 respondents had never experienced MMM. This study was focused on above 70 respondents as analyzing targets.

4-2. Verify of Publication Map effects to promote risk/vulnerabilities recognition

(1) Limitation effects of Publication Map to identify risks / vulnerabilities

Figure 5 shows range about the numbers of new recognized risk/vulnerability points through watching of publication map.

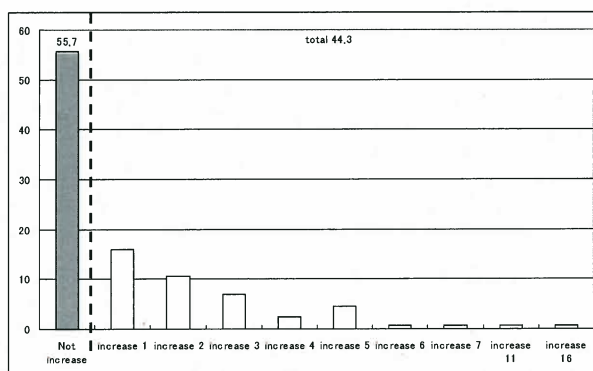


Figure5: Range of the numbers of new risks/vulnerabilities recognition (n=70)

A rate of Respondents who got any recognize through publication map were less than half (44.3%). It explained that posting of publication map had only limited effects to promote recognition of residents who did not participate map-making process.

Figure 6 showed that effects of publication map to risk/vulnerabilities estimation, which is psychological, process those individual estimate expected values of damage subjectively, for residents who did not participate MMM. This table explained that publication map promoted only from 34.4% to 50.8% of respondent's risk estimation in each risk and it can be guessed that Publication map has less effect to promote risk/vulnerability estimations. Table 4

shows compared with promoting effects of risk estimation by publication map, among respondents groups classified by number of new recognized risk/vulnerability points (high/middle/low group). It was verified that identification of risks/vulnerabilities and estimation of risks/vulnerabilities has significant relationship through chi-square test.

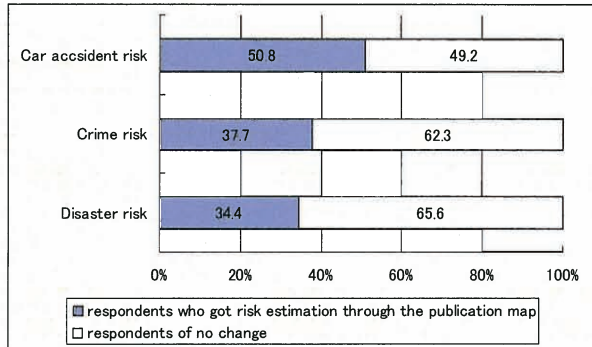


Figure6: Percentage respondents who got risk estimation through the publication map (n=65)

Above two analyses explained that publication map can promote risk/vulnerability estimation for respondents, who given risk/vulnerability recognize effects by publication map before risk/vulnerability estimation process. But generally, publication map has less effect of risk/vulnerability estimation to respondents because of lack of

effects to risks/vulnerabilities identification process.

(2) Less effects of Publication Map to promote coping behaviors

This sentence aimed to verify effects of publication map to promote residents behaviors to coping risks/vulnerabilities.

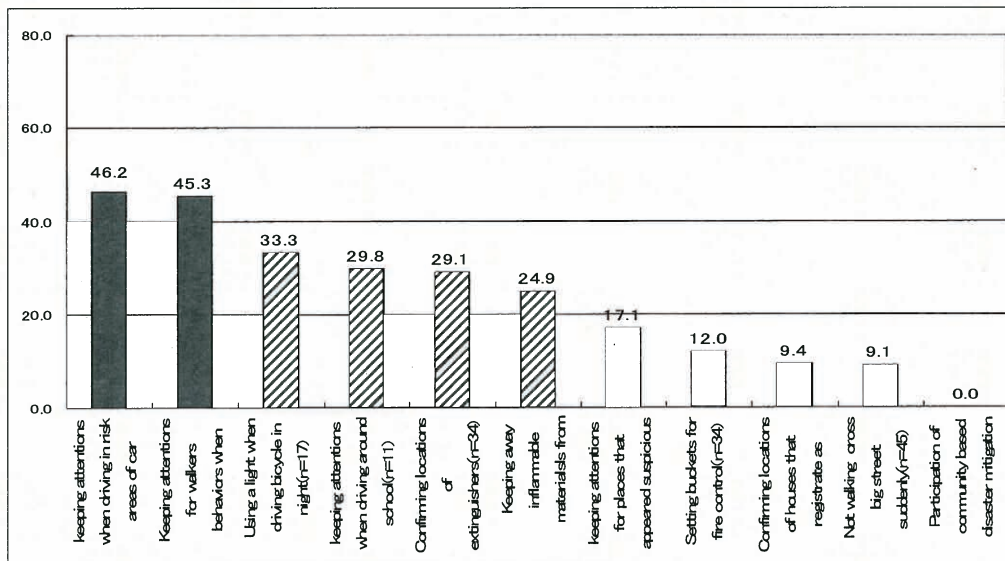


Figure7: Percentage of respondents who got new coping behaviors through watching of publication map

Above figure explained that percentage of new promoted coping behaviors through watching of publication map (denominators were the numbers of respondents who did not have coping behaviors before watching publication map).

Even most promoted behaviors, a percentage of new promoted coping behaviors was less than 50 % (46.2%) and 8 of total 11 behaviors were less than 30%. Especially “Confirming locations of houses that register as evacuation places of children”, “Not walking cross big street suddenly”, and “Participation of community based disaster mitigation activities” were less than 10%.

Additionally it could not be significant correlation between total amounts of identification of risks/vulnerabilities points and amount of promoted coping behaviors, estimations of risks/vulnerabilities and amount of promoted coping behaviors.

Those results expressed that watching publication map has less effects to promote coping behaviors for even residents who can get identifications/estimations of risks/vulnerabilities through it.

(3) Bottle-necks to promote risks/ vulnerabilities recognizing using by Publication Map

Above two sections explained that risks / vulnerabilities recognizing and coping process through publication map is obstructed in two sub-processes; 1) risks / vulnerabilities identification process, 2) coping behaviors of risks / vulnerabilities processes. Both two sub-processes are bottlenecks to promote recognizing and coping behaviors by MMM, for residents who did not participate map making process.

Following are shortages of publication map for each sub-processes that identified by a hearing survey to 8 residents of Kitano-Kamishichiken district. Data of hearing survey is 7th December 2007. All of they have already watched the publication map.

Regarding risks / vulnerabilities identification process following two points was found.

1) Lack of information about aims and outline of the publication map;

Most of residents did not know about implementation of MMM there. Additionally no handout to explain aims and outline is attached with publication map. Those situations obstructed understanding of publication map to residents who did not participate map-making process.

2) Limitation of capacity on paper media;

There were various information about risks / vulnerabilities and resources of safety promotion in small space of the publication map. It made residents be confused and it obstructed that residents keep interests of it. As results of those shortage, most of residents saw only once or two times and the publication map could not promote risks / vulnerabilities identifications of them.

Regarding coping behaviors of risks / vulnerabilities processes following two points were found.

1) Limitation of information transfer through paper media;

The publication map had ingenuities to transfer information viscerally such as icons that explain risks /vulnerabilities points, photos, comments in pop-ups. Those ingenuities were not enough to transfer information to residents. Additionally the map could not put detail information that needed to start coping behaviors such as “when”, “How”, “How” those risks / vulnerabilities points are danger, and how to deal them.

2) Mix and Confusing of various information

Related with above, the map put various information about various risk for various targets person there, and those information did not classify. It made residents be confused and it obstructed transfer of information to residents. As results of those shortage, most of residents could not be

promoted coping behaviors through the publication map.

5. Conclusions and recommendations

5-1 conclusions

The following were the main findings of this paper as conclusions

- (a) MMM have effects to promote risks/ vulnerabilities recognize and coping behaviors of participants,
- (b) MMM has a fear of overestimate or underestimate of risk/ vulnerabilities by participants and it is needed to supervise of experts such as planners, governments, and university.
- (c) MMM has limited effects to promote risks/ vulnerabilities recognize and coping behaviors of residents who did not participate map-making (watching the publication map only), because of existing of bottlenecks on psychological process.

Above conclusions shows us that MMM is one useful method but more improvements is needed to help community based safety promotion more efficiency, particularly keeping of effects to residents who did not participants map making process is precondition to adopt MMM. Because it is impossible that all residents in community participate MMM physically. Then if community based safety promotion activities will proceed without residents who cannot participate, these activities have a fear of making bias and most of residents cannot reduce risks/ vulnerabilities related with them in community level.

5-2 Recommendations –Trial drawing of” local information finding/stock and share system based on MMM”-

From above conclusions,” local information finding/stock and share system based on MMM” is draw as recommendations of this paper. Figure 8 shows structure of the system.

1) MAP MAKING PART

This part is adopted from MMM. Participants collect risks/ vulnerabilities information through walking and watching on their community. And participants can be

promoted risks/ vulnerabilities recognize and coping behaviors. Map making should implement continuously with changing target participants, period of time, focused risks/ vulnerabilities.

2) STOCK PART

Collected information through MAP MAKING PART will stock in PC. This part also has factors of presentation for residents who cannot participate map-making process.

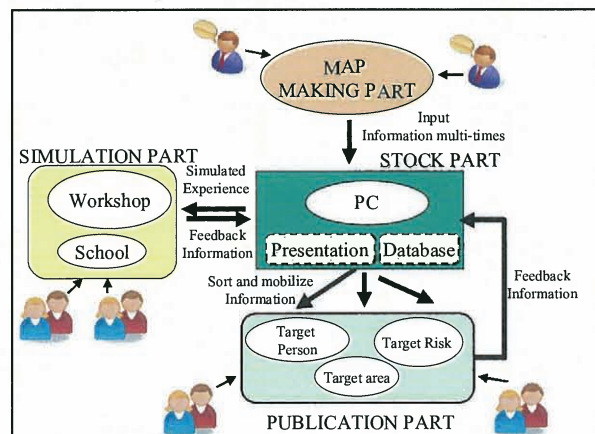


Figure8: Outline of local information finding/stock and share system

3) SIMULATION PART

This part is workshop like a Disaster Imagination Game (DIG), based on risks/ vulnerabilities information in STOCK PART. In this process, residents, who can not participate map making process, are be able to experience Map making process on simulation, and it promote risks/ vulnerabilities recognize and coping behaviors of them.

Additionally new information inspired by simulated experience will be mobilized to STOCK PART.

4) PUBLICATION PART

Information in STOCK PART can be export as publication map. Those maps can/should sort information focus on needs of residents, such as target person (ex: aged persons, children, challenged person, and so on), target risk/ vulnerability, target area and target hours. Additionally new information by each map user will be mobilized to STOCK PART.

Most critical problem of MMM is that despite it is impossible to participate all residents in community, MMM has no alternative way to promote recognition risks /vulnerabilities and coping behaviors to them.

Above system can solve it using by simulation experience through PC. Authors have already started to develop prototype system entitled “dynamic safety promotion map”. This system can simulate whole day risk of car accidents and suspicious individual in KITANO-KAMISHICHIKEN district.

Additionally this system divides three dimensions of information: collection, stock, and publication. Therefore it can be easily to update of information and publication for each target person and needs. In most of MMM introduction cases, update of information and optimum provision of information is remaining problems and above system can improve it.

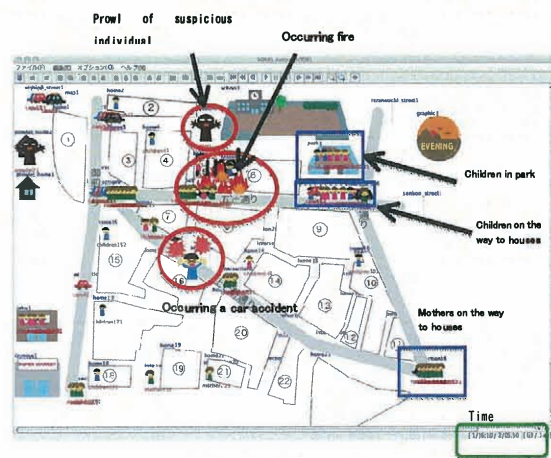


Figure9: Image of dynamic safety promotion map

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