

Developing Community Safety Maps for Urban Diagnosis

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Synopsis

This paper presents the concept and importance of the “community safety map” for “urban diagnosis.” As compared with similar kinds of maps commonly developed for community safety, basic properties of community safety map are listed, and the processes of developing them are also described. In the end, we discuss some examples of community safety maps which have been developed for Nagata Ward, Kobe City with the help of DiMSIS.

Keywords: urban diagnosis, community safety map, DiMSIS

1. Introduction

Sustainable urban disaster management that requires for a long-term perspective should appropriately link up post-disaster, retroactive recovery and restoration processes to succeeding pre-disaster, pro-active planning processes (Okada et al., 2001). Furthermore given current societal changes, disaster management needs to be fulfilled not only by the government sector but needs to be participated by local people, NGOs and private companies. Community participation promotes increased familiarity with the necessary information, for the public and helps to introduce strategic management of volunteer resources and adoption of appropriate tools is very important and effective in disaster risk reduction, especially linked to in advance, while are considered emergency case. The Hanshin-Awaji Earthquake disaster in Japan in 1995 and the Indian Ocean Tsunami disaster in 2004 indicated the importance of pre-disaster management and community participation for disaster management. The community safety map provides us with a necessary and useful platform for effective community activity and pre-disaster management.

2. What is community safety map?

Community safety, in its broad meaning, includes crime (burglary, stealing, robbery, and hijack) prevention, road safety (pedestrian, drunken driving, safety belt), alcohol abuse control, domestic violence prevention, natural and social disaster prevention, and other disorder reduction in a community. “Community safety means preventing, reducing or containing the social, environmental and intermediate factors which affect people’s right to live without fear of crime and which impact upon their quality of life. It includes preventative measures that contribute to crime reduction and tackle anti-social behaviour.” (Community Safety Unite, 2003) At the local level, the three groups, crime and disorder reduction partnerships, community safety officers, and neighborhood wardens are most involved in ensuring community safety (Home Office of UK, 2003).

In this paper the meaning of community safety is somewhat narrower, to focus on the multiple natural disasters, and the corresponding maps to be developed and used by community people are called

community safety maps.

When a disaster strikes, specific information processing requirements change as time elapses, the transition can be broken down into the following 5 stages (Kakumoto, et al., 1997). They are: Chaos Phase (the first few days after a disaster), Relief and Rescue Phase (a few weeks after the chaos phase), Early Recovery Phase (several months after the relief and rescue phase), Late Recovery Phase (beginning after early recovery phase and continuing for several years), and Normal Stage (after recovery is complete). In the normal stage, the data and information system are used for urban planning and revising the disaster prevention plan, and community safety maps should be developed, primarily in this normal stage, out of safety concerns related to disaster management.

More specifically we define that the community safety map is a kind of digital map which needs to be collaborately developed in the normal stage (disaster preparedness stage) by both the government and community people with the help of experts, private companies or others; it is to serve for community pre-disaster management, to be installed with basic

information and disaster preparedness information, and to be operated, updated and maintained by both the government and community people.

3. Why we need community safety maps?

Community safety map is an effective medium of communication to help local government and local people to manage the community for a safer living environment. Refuges, evacuation routes, the shortest way and shortest time to the refuge, and other disaster preparedness status of the community can be displayed clearly, visually and actively in maps. By organizing these kinds of information properly, people can use them conveniently and manage the community effectively.

Community safety maps enable us to map out the community damages and losses which could be caused during a short period in both the chaos phase and relief and rescue phase. In order to identify the social resources and expertise that would remain in aftermath, especially in a rapid assessment, it is important to keep track of the conditions of the social

Table 1 Some maps about community safety published on the website

ID	Name of Map	Content of Map	Remarks
1	Disaster Prevention Map of Tajimi City (Gifu Prefecture)	Inundation stage; dangerous areas; municipal office; medical facilities; refuge; and warehouse	Web GIS
2	Disaster Prevention and Disaster Information Map of Okayama City (Okayama Prefecture)	Dangerous point; and refuge	Web GIS
3	Disaster Prevention Map of Toyonaka City (Osaka Prefecture)	Dangerous points; municipal office, firehouse, police station; refuge; emergency materials arrangement; and emergency medical institution	Web GIS
4	Nagakute Town Map Information service (Aichi Prefecture)	Public facilities; school; tourist facilities; and life facilities and news	Web GIS
5	Mie Click Map (Mie Prefecture)	Municipal office, firehouse, police station; school; refuge; medical facilities; and heliport	Web GIS
6	Disaster Prevention Map of Shibuya City (Tokyo)	Refuge; emergency administrative wireless tower; disaster preparedness warehouse; and emergency water facilities	HTML Tools
7	Disaster Prevention Map of Hikone City (Shiga Prefecture)	Police station; fire department; emergency hospital; refuge; emergency heliport; and warehouse	HTML Tools
8	Civic Center Viewer (Civic Center Emergency Support) (Okotoks town of Canada)	Hazardous materials; response agent; fire response zone; police response zone; hospital; ambulance response zone; and emergency refuge	GIS

and cultural environment that existed prior to a disaster. Thus community safety maps are considered to serve as a useful basic information dashboard (packet), which makes rapid assessment possible.

Information included in the community safety maps and that is obtained from continuous monitoring (before disaster) enables comparison to be made between preparedness status and recovery process. Community safety maps serve as a history recorder, information in community safety map, community emergency map, and community recovery map obtained from continuous monitoring enables comparison between preparedness status and emergency, recovery processes.

4. Some properties of community safety maps

4.1 The content

Some maps about the community safety, either paper maps or digital maps, have been developed, and many are already used for community disaster prevention management, especially in Japan. Table 1 lists up eight examples of this kind of maps published on the website, one from Canada, and others from different prefectures in Japan. From Table 1, we can see that the jurisdictional levels of the “communities” range from a town to a whole prefecture. More

detailed analysis shows, we can also find that the element cell of all these maps is Cho-Cho-Moku of the Japanese administrative district. The contents of the maps mainly include hazard information (dangerous points, inundation stage), municipal office (ward office and city hall), police station and police box, firehouse and fire brigade, refuge place, hospital and other medical institutions, and other emergency facilities or institutions.

Based on the maps already developed, we suggest that the community safety map should include the following information. They are disasters prevention organization information, medical institution information, lifeline management organization information, school information, refuge information, family information, disaster emergency information and others. Details are shown in Table 2.

4.2 Basic functions

Table 3 listed basic functions of the already publicized maps and their accompanying general GIS softwares. It can be seen from Table 3 that not all of the maps have the basic map display functions, such as pan and layer display / undisplay, especially two maps developed with the help of HTML tools. Only a few of them have the functions of element edit, query, calculation, and data exchange. And none of them has

Table 2 Contents of community safety map

Content	Detailed	Remarks
Disasters prevention organization information	Municipal office (ward office); police station and police box; firehouse and fire brigade; station; and post office	Basic information
Medical institution information	Hospital, clinic, drugstore, and consultant	Basic information
Lifeline management organization information	Water works office and drain office; and telephone and electricity company	Basic information
School information	Kindergarten, nursery school, element school, middle school and high school	Basic information
Family information	Numbers of family member and their activities	Basic information
Refuge information	Refuge place (emergent, the first and the second) and refuge direction (route)	Disaster preparedness information
Disaster emergency information	Fire hydrant; emergency wireless tower, radio, and amplifier; Temporal heliport; emergency water facilities; Electricity generation and substation; and disaster preparedness materials warehouse	Disaster preparedness information
Others	Pool, water tank, well, and emergency bulletin board	Mixed

Table 3 Some basic functions of the maps listed in Table 1

	Function	1	2	3	4	5	6	7	8
Map display	Display	Y	Y	Y	Y	Y	Y	Y	Y
	Zoom in/out	Y	Y	Y	Y	Y	--	--	Y
	Pan	Y	--	Y	Y	--	--	--	Y
	Bird's-eyes view	Y	--	Y	Y	--	--	Y	--
	Layer display / undisplay	Y	Y	--	Y	Y	--	--	Y
	Rotation	--	--	--	--	--	--	--	--
Element edit	Add /delete	Y	--	--	--	--	--	--	Y
	Modify (color, data)	--	--	--	--	--	--	--	Y
Search/Query	Search/Query	Y	Y	--	Y	Y	--	--	Y
Calculation	Distance	Y	--	--	--	--	--	--	Y
	Area	Y	--	--	--	--	--	--	Y
Data exchange	Data Import / export	--	--	--	--	--	--	--	Y
Others	Data display	--	--	--	--	--	--	--	--
	Supporting text display	--	--	--	--	Y	--	--	--
	Photo display	--	--	--	--	--	--	--	--
	Video display	--	--	--	--	--	--	--	--
	3D display	--	--	--	--	--	--	--	--
	Time change	--	--	--	--	--	--	--	--

(*1, 2 ...8 are corresponding map IDs in Table 1)

the functions of map rotation, photo, video or 3D display, and time change. Map display, element edit, query, calculation and data exchange are the basic function of the GIS software, and its corresponding digital maps should also have these functions.

4.3 Processes of developing community safety maps

The “Society of Creating Tomorrow’s Japan” (2002) pointed out that talking with local people, listening to their options, and checking the community by field investigation are necessary. To develop the community safety maps, Aomori Prefecture Police (2004) pointed out that deciding the information to publish in the map before field investigation is necessary. We suggest that two steps are necessary during developing the community safety map. The first step is collecting the basic information and making the basic maps, this step is mainly finished by the local government with the help of experts or others. And the second step is communicating with the community people and adding their ideas about disaster preparedness to the basic maps.

5. Some community safety maps in the Nagata Ward, Kobe City

Hatayama (2000) developed the community safety map for the Sinyo Element School of Nagata Ward,

Kobe City, with the help of HTML tools. Though this map is used for community disaster preparedness management, it does not have such functions as editing the data by users and displaying the video. For better use and management by the local people, and based on this foundation, we developed community safety maps in Nagata Ward of Kobe City with the help of spatial-temporal GIS software--DiMSIS. The new maps have the functions of zoom in/out, rotation, and we can also edit element information, import/export data, add video information, and change the point in time.

Fig 1 and Fig.2 are two interfaces of the community safety map. By displaying the photo information taken in different points in time and in a certain area or point in place, we can check the building character, land use or other information (Fig.1), which is very important for community diagnosis. We can also display the video information along a road, and check the road information (Fig.2), such as checking the road width for fire engine.

6. Conclusion

Community safety map is a kind of digital map to serve for community pre-disaster management, to be installed with basic information and disaster preparedness information, and to be operated, updated and maintained by both the government and

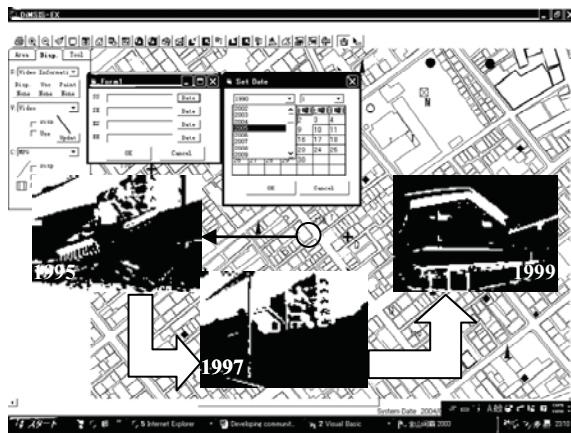


Fig.1 Photo display in different temporal phase for building check

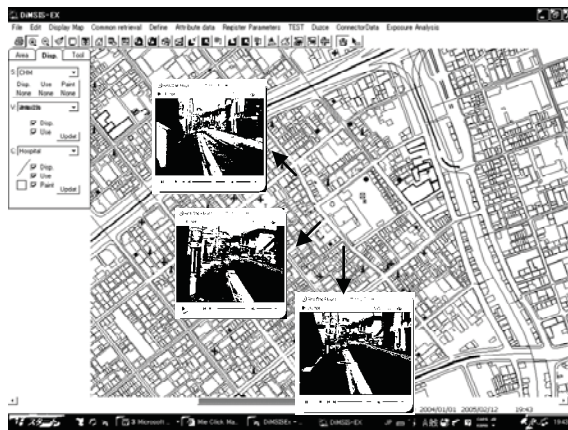


Fig.2 Video display in different location for road check

community people. It also provides us with a necessary and useful platform for effective community activity and pre-disaster management.

The contents of the community safety maps should mainly include hazard information, municipal office, police station and police box, firehouse and fire brigade, refuge place, hospital and other medical institutions, and other emergency facilities or institutions. Community safety maps should have the functions of map display, element edit, query, calculation and data exchange.

And to develop community safety maps, adding community people's ideas is necessary by communicating with them after the basic maps are made.

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都市診断のためのコミュニティ安全マップの開発

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要旨

本研究では都市診断のためのコミュニティ安全マップを取り上げるとともに、その重要性について触れる。安全なコミュニティ作りのために開発された類似のマップと比較することによって、コミュニティ安全マップの基本的な特性を列挙し、さらに、その開発プロセスについても述べる。最後に、DiMSIS を活用した神戸市長田区でのコミュニティ安全マップ作りの実例を示す。

キーワード：都市診断，コミュニティ安全マップ，DiMSIS