3. Accumulation and Provision of Information on Natural Disasters and Disaster Reduction

3-1. Policy and Methods

3-1-1. Policies on Accumulation

Based on the resolutions of 23 countries in the Asian region, ADRC has been collecting and organizing information on the situation of natural disasters in each country, as well as information, knowledge of and experiences with the systems, plans, and specific measures of each country for disaster reduction. This is to facilitate the sharing of information between countries. The development of such fundamental information infrastructures has been carried out with the aim of promoting the establishment of national disaster reduction systems in each country, and multinational cooperation for disaster reduction in Asia.

In addition, we collected information from the disaster reduction officers of various countries and other related organizations, and constructed a database of the latest information on recent natural disasters and human resource information on specialists of disaster reduction, with the intention of disseminating the information. It has also become possible to acquire more detailed and definite information through collaboration with foreign visiting researchers and the Asian Unit of the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), which is reflected in disseminated information. Furthermore, the OCHA ReliefWeb Office in Kobe has opened in ADRC this fiscal year and has facilitated sharing information more quickly and clearly.

We plan to continue collecting detailed information on the following, and release the information through the Internet and other media:

①Disaster reduction systems (judicial systems, organizations, basic plans, and manuals on managing disasters, etc.)

② Actual cases of disaster countermeasures (measures taken during major disasters in the past, etc.)

③ Information on natural disasters (descriptions and damage incurred by earthquakes, floods, cyclones, and other natural disasters)

④ Human resource information (disaster reduction administrators, experts, international organizations, private companies, NGO members, etc.)

3-1-2. Collecting Information from Member Countries, Etc.

In fiscal 2001, as in the previous year, ADRC collected disaster reduction related information on various counties through the following methods:

1) Questing information from member countries

While gaining the understanding of each member country on the purposes of establishing the ADRC and the need for multinational disaster reduction cooperation, we have been asking member countries to provide natural disaster information, as well as information on actual disaster cases and disaster reduction systems, and have been receiving such information from these countries.

2) Survey of member countries

We toured two member countries (Kazakhstan and Myanmar) during this fiscal year to verify the persons in charge of disaster reduction in this counterpart country, explain the purpose of ADRC's activities, obtain basic information on disaster reduction, and ask for the continued support of member countries.

As a result, Kazakhstan pledged its support in providing information to ADRC and, at the same time, requested active exchanges of information on disaster reduction be made through guest researchers from Kazakhstan to ADRC in the future. As for Myanmar, we met with the country's disaster reduction officer directly for the first time since ADRC opened and were able

to exchange information concerning Myanmar's natural disasters, their national system and measures for disaster reduction, etc.

3) ADRC International Meeting

At the Fourth ADRC International Meeting (January 22 and 23, 2002), member countries, and advisor countries, and countries and organizations participating as observers provided reports and other materials that include natural disaster information, actual case studies for dealing with disasters, and disaster reduction systems. They also voiced their requests concerning the activities of ADRC. As this meeting was followed by the Asian Meeting on the ISDR which was held in the same venue, it was highlighted by the participation of representatives from United Nations organizations involved in disaster reduction such as the United Nations Office for the Coordination of Humanitarian Affairs(Kobe Office, India Office), UN-HABITAT Serving Asia and the Pacific, Food And Agriculture Organization of the United Nations (FAO), the India Office of the United Nations Development Program (UNDP), the United Nations Secretariat of the International Strategy for Disaster Reduction (ISDR), and the Asian Development Bank (ADB). The meeting proved to be a significant opportunity to strengthen potential multinational disaster reduction cooperation in the Asian region in the future.

4) Use of WWW (World Wide Web)

(1)Disaster reduction information in each country

Following the last fiscal year, ADRC has been using the Web to collect information on the disaster reduction systems of various countries, as well as related information from administrators in charge at international organizations and countries. In particular, India has been sending e-mails and disaster management information via the Web since the Gujarat earthquake, which the ADRC places, on its homepage as needed.

In the future, it will be important to track the trends of disaster reduction information supply in various countries, as well as support the active construction of information supply systems from various countries through technical support for the construction of mirror sites and disaster information databases.

(2)Disaster reduction information of academic research institutions and international organizations

In addition to these efforts, international organizations and research centers are actively collecting and providing disaster reduction information from various perspectives. Through the spread of Internet services, there has been a gradual establishment of systems able to share this information over the Internet.

Among the many organizations and research centers, the Center for Research on the Epidemiology of Disaster (CRED), Louvain Catholic University, Belgium, has a disaster database (EM-DAT) carrying statistical data on natural disasters in the world, which is available on the Internet.

While the EM-DAT serves as a database on statistic figures, OCHA provides information on natural disasters and reliable information on disaster measures and management in an effort to support humanitarian activities during disasters at its Relief Web site on the Internet.

ADRC, in order to further promote sharing of such information on disaster mitigation, proposed the use of common disaster ID's and started more specific activities concerning the GLIDE (GLobal IDEntifier) number project this year with consensus of other disaster reduction-related organizations such as the Office of U.S. Foreign Disaster Assistance (OFDA) and the Food and Agriculture Organization of the United Nations (FAO). Use of a GLIDE number on an incident or disaster will allow easy collection and use of information dispatched by various disaster reduction-related organizations concerning the same disaster occurrence.

3-1-3. Other Efforts

["ReliefWeb Project" Kobe Office Opens for the United Nations Office for the Coordination of Humanitarian Affairs]

The Kobe Office of the "ReliefWeb Project" of the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) was established in ADRC on August 16, 2001. ReliefWeb (www.reliefweb.int) is a project of the UN whose beginning of activity dates back to 1996 and now posts their activities on its website at the earliest possible time. The latest information on international efforts of humanitarian assistance toward damage and losses caused by natural disasters and conflicts with which OCHA is involved, including situations and conditions is updated on the website. The information including what is needed, who is providing what kind of aid and at what places, ... etc. is collected from more than 600 partners. Having their Kobe office located physically close to the ADRC office, members from the two offices can meet more often for the exchange of ideas on how information can be better collected and provided. We hope to make more specific proposals on our cooperation in the future.

Fig.3-1-3 OCHA ReliefWeb Internet Site: http://www.reliefweb.int/w/rwb.nsf

3-2. Information on Disaster Reduction Systems

3-2-1. Scope of Information

Elements composing the disaster reduction systems of different countries include: judicial systems for laying down the basis for implementing measures to deal with disasters, organizations which actually implement these measures, and basic plans for continually establishing disaster reduction systems. Other elements include disaster reduction actions for each disaster, and disaster manuals, which describe disaster measures.

1) Judicial systems

Not all countries have fundamental laws like Japan's "The Disaster Countermeasures Basic Act." Some countries prescribe disaster reduction systems in accordance with government decrees and rules of specified organizations. Taking into consideration the respective situation of each country, it is not easy to determine which is a better method. However, the sharing of national information concerning laws and regulations is considered a useful reference to countries that are attempting to establish legal systems or improve their current systems.

2) Organization

Usually different disaster measures are taken according to the situation of the countries. Like judicial systems, the sharing of information should prove useful when devising measures to deal with similar disasters.

3) Basic plans

Only a few member countries, including Japan, have disaster reduction plans. Again, the information shared on disaster reduction plans should serve as a reference for countries intending to draw up such plans in the future, and is therefore highly likely to contribute to the reduction of damage caused by natural disasters.

4) Disaster manuals

Most disaster manuals are compiled by countries and regions based on the natural disasters that the region or country has experienced, or by the type of natural disaster specific to that country or region. Since regions and countries deal with natural disasters independently, they often do not share their experiences and measures even for common natural disasters. This has resulted in a lack of proper or sufficient disaster countermeasures in some countries and regions. ADRC has thus been making efforts since the previous fiscal year to collect information to enable the sharing of these existing disaster measures and disaster manuals. Further efforts are required. ADRC will continue promoting the inter-regional and international sharing of experience, knowledge, and views on measures for specific disasters that have been formed and accumulated in different countries and regions.

3-2-2. Level of Information Source

The information needs to be collected not only on the national governmental level, but also at levels of local, regional, and even municipal governments if the information is useful. As a rule, when a disaster hits, it is the local government (regional, municipal), which implements the disaster measures. If the scale of the disaster exceeds the capability of the local level, the central government or international community will intervene to provide support in disaster management and relief. This means that the establishment of regulations, organizations, and systems by the central government do not always improve the disaster reduction and disaster measure abilities at the local or grass-root level. Therefore, it is essential to share useful information at all levels.

3-2-3. Information Accumulation Methods

As indicated in 3-1-2, since the last fiscal year, ADRC has been accumulating information on the disaster reduction systems of different countries by requesting information from member countries, implementing field surveys, holding international conferences, and by its own unique

methods using the Internet.

3-2-4. Future Tasks

Concerning future tasks, the ADRC plans to further reinforce and expand its database, analyze information collected, and based on the data acquired, pinpoint the needs of different countries to promote multi-national disaster reduction cooperation.

1) Reinforcement and expansion of the disaster reduction database

In order to share the information between countries concerning disaster reduction systems accumulated at ADRC, the ADRC constructed a database on its homepage to enable free retrieval and access of information on disaster reduction systems. It enabled many countries and regions to establish and improve their own national or regional disaster reduction systems while referring to actual examples from other countries. The ADRC will continue its efforts in updating and enhancing the contents of the database with the cooperation of member countries to realize a more user-friendly disaster reduction database system.

2) Analysis of information and dealing with the needs of countries

Analysis of information collected helps clarify the specific situations and needs of various countries. It is apparent that countries like Japan, Russia, and Singapore already have national level disaster reduction systems, while others such as Nepal, Laos, and Papua New Guinea are currently preparing to establish disaster reduction systems. We believe that the former countries need to implement various improvements to enhance and reinforce their existing systems, and that priority should be given to help the latter group of nations to complete disaster system development, which is the common challenge of intra-region collaboration.

In order to reduce Asia's vulnerability to natural disasters, it is essential for countries to consider disaster reduction measures in their basic national long-term plans. To realize this, it is first necessary to heighten the disaster reduction awareness of the government as well as among the people. The sharing of information on disaster reduction between countries, including its systems, should be achieved at an early stage; while lawmakers, policy makers, and planners should appropriately prioritize and continue to always include the disaster reduction issue in the basic plans of their country and region.

3) Promotion of cooperation

As agreed at both the 4th International Meetings, it is vital that disaster reduction administrators and specialists of member countries exchange the latest information on disaster reduction systems and measures by continuing to hold regular meetings. It is equally important that researchers from member countries working at ADRC help to promote active personnel and information exchanges in the Asian region taking advantage of the guest researcher program, which started in July 1999. In addition, to reduce the damage from natural disasters in Asia, while serving as a mediator, the ADRC is required to form a network of disaster reduction staff, technologies, and physical resources between Japan and the other countries of Asia, in order to stimulate exchanges.

3-2-5. Understanding needs for promoting information technology for management of disaster reduction-a survey with questionnaire

In order to grasp the needs for the promotion of information technology for disaster mitigation in each member country, a survey with a questionnaire was conducted among the counterpart organizations of the member countries. The result illustrated needs in each country. The questionnaire forms were sent out, together with an invitation for the Fourth ADRC International Meeting, to the counterpart organization of each member country requesting a response. The questions were asked in relation to current situations and problems in each organization in terms of promotion of information technology for the management of disaster reduction efforts. It also asked what they expect ADRC to do to help the promotion activities. The respondents were provided with multiple choices to answer the questions. (multiple selections allowed).

In total, 14 countries returned their responses out of the twenty member nations and two observer countries that attended the International Conference. The responses are shown in Table 3-1-3-2.

The result of the survey indicates that almost all organizations have some kind of database for the purpose of managing disaster reduction. Especially, records of past disasters are kept in the databases by more than half the organizations. However, financial problems as well as the lack of technology and information have kept roughly 60% of the respondents from making the information available to the public. While ADRC promotes information sharing by use of worldwide common ID numbers (GLIDE) given to disaster data, we consider it necessary to sort out such information that is currently held by each country to prepare for shared access.

Use of remote sensing data and geographical information systems (GIS's) for management of disaster mitigation has been attracting interest from many organizations and already more than half of them started using such methods, however, it is clear that there still are many difficulties in making effective use of them. While the organizations wish to promote the use of such technology, the high costs involved in obtaining necessary data and equipment/software presents a large obstacle in terms of finance. Additionally, there are still unknown factors concerning how effective the use of such information technology can be to provide good results in disaster reduction, emergency assistance, and disaster measures, thus it seems that the use of information technology at the present time is given a low priority in relation to the small return on the investment.

Among Asian countries, many have not sufficiently developed their access environment to the network and voiced requests with ADRC for support in preparing the necessary infrastructure. So far, as a means to resolve problems in the use of data caused by insufficient hardware and software, the ADRC has promoted a provision of "VENTEN", an Internet-based GIS service. However, we think it is necessary to consider the preparation of an infrastructure to use such Internet services from now on. Furthermore, active provisions for training occasions to enable effective use of disaster reduction technology will be required in the future.

Table 3-1-3-2 Result of Survey

Q1. Concerning the Disaster Information Database					
(1) Do you have a database of information concerning disaster reduction?		Yes	93%	No	7%
(2) What kind of information is kept in the database (select all that applies)?					
	Disaster Management Information (Organization, Laws, Plans, Measures).	54%			
	Past Disaster Data.	62%			
	Personnel Information.	31%			
	Training Information.	31%			
	Hazard Map.	54%			
	Others.	8%			
(3) Is the database open to the public?		Yes	43%	No	53%
(4) If the database is not open to the public, why?					
	Lack of technical knowledge and/or expertise.	13%			
	Lack of finance.	25%			
(5) Are you receiving any assistance from other organization(s) to allow public access to the database?		Yes	29%	No	71%
Q2. Remote Sensing Data					
(1) Do you use remote sensing data from satellites and aircraft for disaster management and/or database?		Yes	62%	No	38%
(2) If you answered "yes" to (1) above, what applications do you use it for?					
	24-hour monitoring.	50%			
	Understanding the situation when an emergency occurs.	88%			
	Planning disaster management.	50%			
	Creating a hazard map.	50%			
(3) If you answered "no" to (1) above, why do you not use it?					
	It has lower priority than other technology.	17%			
	There is technical problem(s).	50%			
(4) What are the problems in using remote sensing data (select all that applies)?					
	Not enough information available.	22%			
	Lack of technical personnel.	22%			
	Lack of technical knowledge and/or expertise.	67%			
	High cost of obtaining data.	67%			
	High cost of software to use data.	78%			
	High cost of hardware to use data.	67%			
(5) Would you use remote-sensing data more if the problems above were resolved?		Yes	71%	No	29%
Q3. Use of Geographical Information System (GIS)					
(1) Do you use GIS for managing disaster information?		Yes	64%	No	36%
(2) If you answered "yes" to (1) above, what applications do you use it for?					
	Understanding the situation when an emergency occurs.	56%			
	Planning disaster management.	33%			
	Creating a hazard map.	78%			
	Recording past disasters.	78%			
(3) If you answered "no" to (1) above, why do you not use GIS?					
	There is not enough need for it.	40%			
	There is technical problem(s).	60%			
(4) What are the problems in using GIS (select all that applies)?					

	Not enough information available.	44%			
	Lack of technical personnel.	67%			
	Lack of technical knowledge and/or expertise.	44%			
	Digital geographical data not available.	56%			
	High cost of building database.	67%			
	High cost of software to use data.	56%			
	High cost of hardware to use data.	44%			
(5) Would you use remote-sensing data more if the problems above were resolved?		Yes	64%	No	36%
Q4. Concerning VENTEN System					
(1) Have you used "VENTEN"; a GIS developed by ADRC?		Yes	7%	No	93%
(2) If you have not used it, why (select all that applies)?					
	Did not know it was available.	46%			
	Network environment not ready for use of the Internet (insufficient infrastructure)	38%			
	Insufficient number of computers.	15%			
	Method of use too difficult.	15%			
(3) Do you wish to use VENTEN if it was available as a stand-alone system (such as on CD-ROM)?		Yes	64%	No	36%
(4) We need more data to improve service provided by VENTEN. Can you cooperate with us in this regard?		Yes	64%	No	36%
Q5. What do you expect ADRC to provide for more effective use of information technology in the future (select all that applies)?					
	Occasions of training.	79%			
	Provision of user-friendly system.	64%			
	Data provision (remote sensing data, GIS data).	71%			
	Support for infrastructure preparation for IT promotion.	64%			
	Support for hardware and software preparation.	64%			
	Development of monitoring system.	57%			

3-3. Construction of Natural Disaster Database Linked to GDIN

It is extremely important to know what kind of counter measures have been taken against what scale of disaster, what effects/review points/lessons have been obtained regarding catastrophic disasters that had occurred in the past in order to devise various disaster reduction counter measures in the future. The consolidation of such information on disasters, which occurred in Asia this century in a database, will serve as an invaluable asset in the next century.

At present, the statistical data regarding natural disasters that occurred in this century are accumulated in the Center for Research on the Epidemiology of Disasters, Louvain Catholic University (CRED) in Belgium. Disaster related information is transmitted on the Internet from various organizations beginning with the circumstantial report on the main disasters since 1980 from the United Nations Office for the Coordination of Humanitarian Affairs (UN-OCHA).

The Asian Disaster Reduction Center (ADRC) confirmed the necessity for constructing while cooperating, a comprehensive database on natural disasters that had occurred in the 20th Century by effectively utilizing these existing databases at the ADRC International Meeting (Member Country Meeting) held in December 1999. Furthermore, in order to positively promote such global activities, the ADRC participated in the GDIN and proposed world-wide use of common disaster ID's at the Canberra Assembly in March 2001 and then started actual operations in fiscal year 2001.

3-3-1. Current Situation of Sharing Disaster Reduction Information

At present, the majority of organizations are conducting data collection and studies solely related to themes assigned to them and transmitting the results on the Internet and by other means. Additionally, partial sharing is being planned through linking of related organizations on the Internet.

Amongst these, the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) is already promoting and tackling the sharing of reliable disaster reduction data and have set up the ReliefWeb to issue various global data related to disasters onto the Internet. Detailed Situation Reports particularly those regarding major disasters after 1980, are stored so that outlines and countermeasures can be documented and tracked.

The ReliefWeb Kobe Office was opened in August 2001 to setup and begin an around-the-clock information dissemination system with bases in three cities: New York, Geneva, and Kobe.

In addition, the Center for Research on the Epidemiology of Disasters, Louvain Catholic University (CRED) in Brussels, Belgium, is collecting statistical data on natural disasters and human disasters centered on disasters totaling over 10 deaths that had occurred worldwide after 1900 and transmitting the information on the Internet.

Others in universities and research organizations worldwide own respective disaster information for each area or target fields and some parts of this information are available on the Internet.

However, since it is difficult to specify the dates for occurrence such as flood damage or droughts from past disasters, since information sources record different times and dates. Regarding the classification and names of disasters, since consolidated terms are not being used, in many cases it is often difficult to link the data transmitted from separate data organizations as being the same disaster, particularly those that are very old.

Regarding the disasters in Japan, the “Science Chart” and “Weather Almanac” cover past disasters in detail completely. There is also “Disaster White Paper” on the Internet where a list of major disasters can be downloaded but a database listing all disasters has not been publicized. Furthermore, when comparing these with the data from CRED, many cases have unclear corresponding relationships and discrepancies exist in the figures.

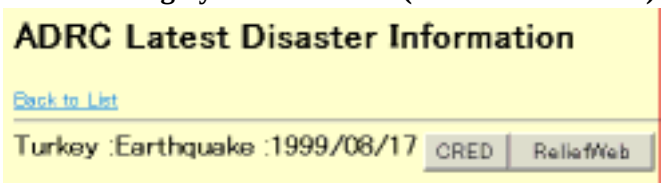
3-3-2. Databook of Natural Disasters in Asia in the 20th Century

ADRC signed an agreement on the memoranda with CRED and conducted verifications of CRED's EM-DAT. However, in most countries the information on disasters of the past 100 years seldom remain available and the truth is this verification process is extremely difficult.

In member countries, it is often the case when the data presently reported in EM-DAT is the only data on the history of natural disasters in each country. Since there is no background of this valuable data having been generally published and distributed in Asian nations, we published the "Asian Natural Disaster Data Book for the 20th Century" in July 2000 after adding individual tables, various calculations and analysis to the data collected in the EM-DAT on member nations, thinking that the verification process would be advanced by offering for them to the use of many persons needed as well as drawing the attention of many people. A revised version is planned for release in the fiscal year 2002.

3-3-3. Proposal by ADRC <Unique ID Project (GLIDE)>

1)Disaster information sharing by use of GLIDE (GLobal IDEntifier) Number



Many disaster reduction-related organizations design and operate disaster databases, which are made available to the public. When a new disaster strikes, not only the organizations and mass media in the country stricken, but other countries also send out quite a few pieces of information over the Internet. ADRC is one such organization and, when a disaster occurs, it searches through Internet sites managed by research organizations and mass media from around the world and sends e-mail messages to contact persons in the disaster-stricken country to gather information concerning the disaster. Results are presented in the latest disaster information pages.

Some of the problems we have faced in our current operations are:

(1) Every time a disaster strikes, all related organizations need to be searched.
(2) Names that identify the same disaster are sometimes different among the organizations and using search engines such as Google and Yahoo may not produce hits.
(3) If structures of databases and/or web sites of the organizations are modified, Internet links to such databases or web sites may be lost.

If global identifier (GLIDE) numbers are used searches for disaster data in natural disaster databases of the past and recent occurrences will be substantially easier.

At the conference for the Global Disaster Information Network (GDIN) held in Canberra, Australia in March, 2001, a proposition by ADRC that all disasters that occur in the world should be identified with code numbers for management was adopted as a pilot project.

This project centered on OCHA ReliefWeb and CRED (the Center for Research on the Epidemiology of Disaster at Louvain Catholic University, Belgium). They were joined by ADRC and FAO, WorldBank, USAID/OFDA, NOAA, IFRC, UNDP, and ISDR Secretariat, covering reviews on structures of GLIDE and the measures to popularize and promote it.

The structure of GLIDE is determined as follows:
AA-BBBB-CCCC-DDD
AA: Disaster Type

Drought	DR
Earthquake	EQ
Epidemic	EP
Extreme Temperature	ET
Insect Infestation	IN
Flood	FL
Slide	SL
Volcano	VL

Wave / Surge	WV
Wild Fire	WF
Wild Storm	ST
Complex Emergency	CE
Technological	AC

BBBB: Year of Occurrence (four digits of BC/AD calendar)
CCCC: Sequential Number by the Year
DDD: Country Code Number (ISO Code) (Ex. JPN for Japan)

Temporary operation of GLIDE started in January 2002 according to the following procedures to generate and report a guide number:

1. Upon occurrence of a disaster, ReliefWeb generates a new GLIDE number and reports it to CRED by e-mail.
2. For disasters not covered by the above step 1, CRED generates a GLIDE number within one week.
3. CRED reports to ADRC and other related organizations by e-mail with a list of GLIDE numbers for each week including both cases of steps 1 and 2.
4. ADRC reports GLIDE numbers to each organization through the use of a dissemination route of Highlights.

The three steps to add common code numbers to a database are as follows:
(1) Add a column for GLIDE in the database.
(2) Download past disaster data (http://www.cred.be/emdat/disdat1.htm).
(3) Input numbers assigned to each disaster by CRED in the column created by step 1 above. Next, enable acquisition of data using GLIDE as a key.
(4) Create a program to search through the database and display data using GLIDE as a key. For an organization that has a database open to the public, minor modifications to the existing program would be necessary to effect this feature.
Additionally, provide a feature that allows a visitor searching the database to refer to related information on other sites.
(5) Create button links embedded with URL's to other organizations and GLIDE numbers.
Above steps provide the database with shared information from other databases in the world through the use of GLIDE.
In order to further promote GLIDE, ADRC will open and operate GLIDENUMBER.net which will have features like a description for GLIDE, searches for the latest disaster information, registration for the GLIDE mailing list, registration for participation with GLIDE, and a function for generating a new GLIDE number. When this web site becomes available, we hope that the use of GLIDE by member countries and disaster reduction-related organizations increases. The following merits could be considered by adopting this ID code:

- Disaster data owned by many organizations could be related easily at retrieval per item.
- By developing retrieval engines focusing on necessary items for the organization, the necessary data could be automatically retrieved / indicated on the same page without retrieving each item per organization. (Observe the problems in the next item)
- Thus, the inspection of the duplicate data will become possible by using this code for direct retrieval even when the database design had changed for each organization and changes in retrieval methods by the retrieving side could be conducted easily.

2)Problems on adoption

However we believe that it is necessary to clear the following problems for such a system to function effectively:

- Presently, the lack of data, particularly those in the older eras are prevalent in the CRED database, necessary addition/exclusion amendments are to be taken by rechecking the data brought together with each related organization.
-

- The participating organizations of GDIN will need to attach this ID code on their respective databases.
- When the insides of the database cannot be retrieved directly due to the server structure of each organization or security reasons, a new database with the ID code attached to the metadata (stored information location) of each organization would become necessary.

3)Further use of GLIDE

It is desirable to create an environment to facilitate retrieval by devising integration of other items to promote further data sharing in the future.

Effective extraction and comparative studies will become possible if each organization matches whatever data that can be standardized as much as possible, such as classified names for countries and disasters, statistical data items, contents, names of related organizations or order of data.

Regarding this standardization of disaster reduction data, a separate “Standardization Work Group” exists in the GDIN Work Group and the integration of items will begin initially to continue onto the tackling of further standardization in this Working Group.

3-4. Exhibition of Disaster Reduction Technologies

3-4-1. Need for a Disaster Reduction Database

When one wishes to purchase equipment for disaster mitigation or know what is available, there is no easy way to obtain such information. Disaster reduction technologies are broad ranging. There are numerous technologies and equipment available, and these include jacks for rescuing lives from damaged buildings, fixtures to prevent furniture from tumbling, temporary toilets at shelters, water purification devices for drinking water, machinery and equipment such as earthquake-absorbing devices at buildings, satellite communication systems and disaster reduction GIS for damage control, damage estimation system, forecast technologies, etc.

On the other hand, these technologies and equipment are not easy to develop because of their restricted purposes. If products are developed, however, they are not advertised very much due to the small size of the market. Still they are useful for enhancing the disaster reduction ability of the whole society. For this reason, it is important to broaden the market by letting as many people as possible from local public corporations, private companies, NGO's, and general households, etc. know about these technologies and equipment.

In order to promote these technologies and equipment, exhibitions on disaster reduction technologies and equipment have been held many times in Tokyo and Kobe since the Great Hanshin-Awaji Earthquake.

While there were many visitors to the exhibitions as seen below, the effects of such exhibitions are limited only to those who actually visited, and not many disaster reduction related people in remote areas get the chance to know about such events.

With such situation in the background, ADRC opened the exhibition of disaster reduction technologies on the web so that people can access its database any time as necessary.

Table 3-4-1 Outline of Disaster Related Exhibitions

Place	Exhibition	Time	No. of Visitors	No. of Exhibiting Companies	No. of Booths
Tokyo	Tokyo International Fire Prevention and Disaster Reduction Exhibition	Jun. 4-9, 1998	214,064	260	1,380
	Disaster Relief Fair 2000	Apr. 20-23, 2000	51,668	70	900
Kobe	1st Earthquake Disaster Management Technologies Exhibition 1997	Jan. 16-17, 1997	4,264	130	230
	2nd Exhibition 1998	Jan. 13-14, 1998	3,220	115	215
	3rd Exhibition 1999	Jan. 13-14, 1999	3,830	120	135
	4th Exhibition 2000	Jan. 27-28, 2000	3,479	59	81
	5th Exhibition 2001	Jan. 18-19, 2001	3,541	50	72
	6th Exhibition 2002	Feb. 14-15, 2002	1,550	25	25

3-4-2. Disaster Reduction Technology Internet Virtual Exhibition

Since January 17, 2001, the ADRC has been holding a virtual exhibition of disaster reduction technologies available anytime on the Internet. Starting this year, each page of technology and equipment introduced is completely translated to English to facilitate access and use by member countries and other disaster mitigation-related organizations.

The entrance of the exhibition hall is located on the ADRC website. Visitors can select areas of interest from the menu and read about corresponding technologies and equipment. If more detailed information is required, they can refer to the homepages of organizations offering the disaster reduction technologies or equipment, and contact them by e-mail, phone, or fax.

The ADRC holds such virtual exhibitions in the aim to introduce disaster reduction technologies and equipment in the same way as actual exhibitions and spread and support these technologies and equipment. However many of the organizations and companies developing the disaster reduction technologies and equipment do not necessary have their own homepages. Even if they do, most are only in Japanese. By providing the human resources of the ADRC and facilitating information services with the use of a standard homepage design and handling of the English translation of introductory text at the ADRC, 203 items from 60 companies are currently exhibiting at the virtual exhibition as of the end of March 2002.

We hope to extend our coverage to disaster reduction equipment and technologies that are developed by Asian nations through researches to include them in our virtual exhibitions in the future.

3-4-3. Classifications of Disaster Reduction Technologies

Disaster stage, technology, and equipment as shown below classified the thesaurus of the database.

Table 3-4-2 Structure of Database

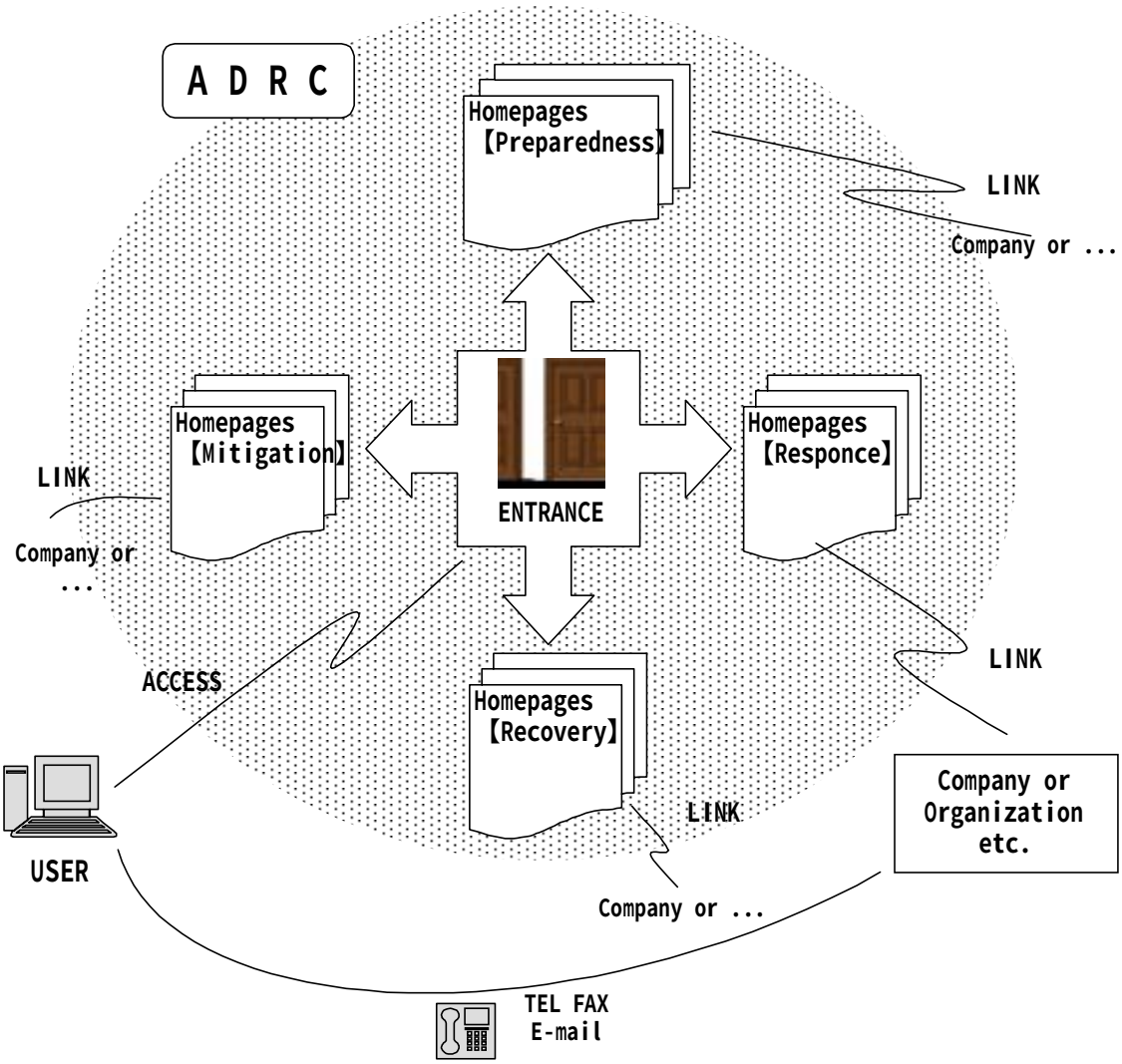
Stage	A. Technology	B. Equipment
Mitigation	a. Earthquake-resistance technology, quake-absorbing technology b. Earthquake-resistance evaluation	a. Fixtures b. Emergency shut off systems
Preparedness	a. Disaster reduction plans, damage estimation and forecast b. Training support	a. Various stocks
Response	a. Monitoring of disaster state b. Communication network	a. Rescue and relief b. Fire extinguishing
Recovery	a. Recovery support system	a. Remote control robot b. Life support

In order to realize a substantial database, the cooperation of organizations and companies with disaster reduction technologies is indispensable, and it is important to continue appealing for extensive participation in the future.

Fig. 3-4-1 Examples of Exhibits of Disaster Reduction Technologies and Equipment on the Internet

Fig. 3-4-2 Internet Virtual Exhibition Hall Network

ADRC Disaster Technique Products Exhibition on the Internet Website



3-5. Internet GIS

3-5-1. Objectives of Internet GIS for Disaster Reduction Management

The objective of Geographical Information System (GIS) is to make full use (data input, analyzing, storing, and output) of spatial data beyond the limits of ordinary paper maps. The spatial data, in this case, means not only surface data such as elevation or land use but also data for managing locations, shapes, and attributes of administrative borders, buildings, roads, railways, rivers, etc. Use of GIS utilities such as visualization by arbitrary overlay of spatial data, extraction of areas of influence, and selection of the shortest path facilitates for users to make decision and to assess the influence of environment and disasters. Implementation of a GIS normally requires introduction of software and hardware, however an advantage of GIS constructed on the Internet is that a system that allows analyzing, displaying, and acquiring data through the Internet can be developed without having to install any special GIS software on the user side. This is very important in handling disaster information as it leads to suppressed investment on equipment and promote information sharing easily.

In recent years, the unevenly spreading the Internet has caused a problem called "digital divide". The member countries of ADRC show varying degrees of Internet availability and activity. However, some regions and countries are going to use the satellite communication technology to access the Internet, we expect for the Internet GIS as a disaster risk management system in an emergency more eagerly than ever.

3-5-2. Overview of "Development of Disaster Information Network System in the Asian Region"

ADRC, with financial assistance from the Japan Science and Technology Corporation, conducted the project "Development of Disaster Information Network System in the Asian Region" over a period of three years from September 1998 until September 2001. As a part of this activity, "VENTEN (Vehicle through Electric Network of disasTer gEographical informatioN)", the Internet GIS with disaster reduction management information, was developed. The outline of the entire project is as follows:

1) Project name

"Development of Disaster Information Network System in the Asian Region"

2) Field of assistance

Calculation Science Technology Applied-Specific Research and Development Promotion Project (specific field: Environment and Safety)

3) Research representative

Yujiro Ogawa (ADRC)

4) Administrator of research

Bambang Rudyanto (ADRC, from April, 2000 until September, 2001)
Hirotaka Suzuki (ADRC, from October, 1998 until March, 2000)

5) Project duration period

From September, 1998 until September, 2001

6) Major subjects of project

- Construction of a platform for sharing disaster reduction information via Internet GIS (VENTEN system)
- Construction of a search engine of disaster reduction information
- Geographical information database for disaster reduction (map of Asia, populations, NOAA satellite images, active faults, tsunami (historic data))

・Construction of information partnerships based on remote sensing analysis

7) Summary of project results

The major results from the project can be summed up in the following two points:

・Construction of the disaster reduction information platform, "VENTEN", for Internet GIS

・Construction of the disaster reduction information database

The following can be pointed out as the remaining problem for future research:

・Expansion and enrichment of the database

・Development of technology to use satellite data

・Interactive communication of real-time disaster reduction information

The Papers that resulted from this research project were published as the "Final Report of Development of Disaster Information Network System in the Asian Region: 'VENTEN' System" (ISBN 4-901614-01-0).

3-5-3. Development of "VENTEN (Vehicle through Electric Network of disasTer gEographical informatioN)"

3-5-3-1. Background of development of "VENTEN"

The improved reliability of information extracted from satellite images with the progress of image processing technology in recent years enables us to extract various kind of information via remote sensing at anytime and anyplace and also to apply the information to disaster management. At this point, no available system can be linked directly to the reduction of disasters and operate in conjunction with disaster reduction activities. This is due to the focus on technological breakthroughs by satellite image providers, which resulted in the lack of enthusiastic participation by those who are involved in the actual disaster reduction activities in this area. It is also due to the difficulty in using the information only extracted from satellite images in actual operations and the information is not useful unless in connection with general geographical information such as topography and natural conditions, and social information such as population, structures, and infrastructures. In the introduction of the geographical information system (GIS), which is the platform for analysis by overlay of this geographical information, high costs and skill are required and poses enormous hurdles in the ability to use satellite information for disaster reduction.

At the first ADRC Expert Meeting, held February 16 to 18, 1999, a workshop entitled “Utilization of Technologies” was organized to discuss the use of GIS and remote sensing for disaster reduction. The following conclusions were reached:

□ All member countries recognized the value of GIS and remote sensing, and their advantages in information management.

□ Future problems are acquiring real-time satellite images, acquiring satellite data at lower costs, technological support for introducing GIS and remote sensing, and acquiring technologies for extracting disaster reduction information.

Despite the high interest shown in GIS and remote sensing by the disaster reduction departments in each country, high costs and the necessary skills pose obstacles in the application of these technologies.

In order to resolve these problems, the ADRC developed VENTEN (Vehicle through Electric Network of disasTer gEographical informatioN), a Internet Geographical Information System for disaster reduction that can be accessed by anyone, anywhere, using the rapidly expanding the Internet.

3-5-3-2. Goal for the development of "VENTEN"

The goals in the development of VENTEN were to provide both a system and data. This

system can be used with a PC connected to the Internet and installed a browser for WWW.

Many international organizations and so on provide basic geographical information such as topography and natural conditions. In order to browse and analysis this information, it is necessary to convert the data format according to that used by GIS. Thus in developing VENTEN, various kind of geographical information was gathered and converted to a format which can be used easily on the VENTEN and provided together with the system.

Fig. 3-5-3-1 shows the placement of VENTEN. On the left, various space development agencies, research institutes and organizations to produce such as aerial photograph information, which provide the original primary data. In order to extract useful information for disaster reduction from this primary data, numerous image processing and overlays are required, as are the means to send this information to the persons handling the actual disaster reduction work. Disaster reduction researchers can also browse, analyze information, and add their results to VENTEN. The VENTEN system has database and analysis utilities for remote sensing information of disaster reduction management and serves as the information transmission route to persons working on disaster reduction. This enables to make full use of remote sensing information of disaster reduction in actual activities to reduce damage, the preparation of disaster reduction plans and the support of rescue activities.

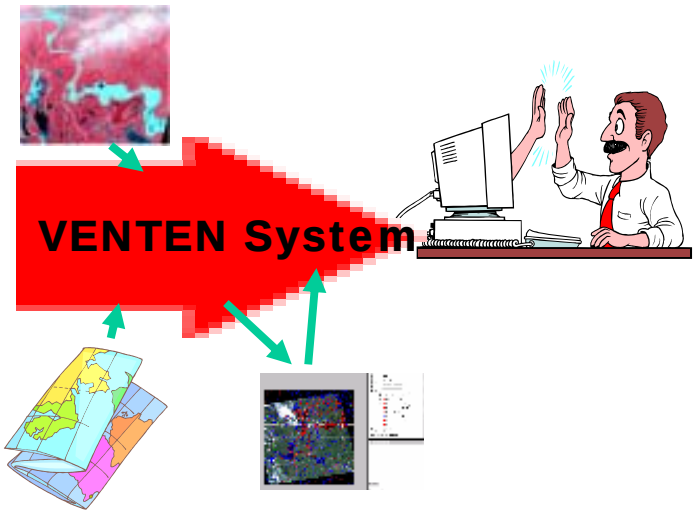


Fig. 3-5-3-1 Placement of VENTEN

3-5-3-3. Overview of "VENTEN"

1)Structure

VENTEN system consists of the Web server, GIS server and database server. Fig. 3-5-3-2 shows the information processing flow in VENTEN. First of all the request from users are accepted by the Web server. The Web server specifies necessary information including what kind of geographical data and what part of an area are needed (possible to specify multiple geographical data), for the GIS server. The GIS server, referring to the data server if necessary, extracts the subject from the geographical data those accumulated within it and then upload data to the Web server in a form of a raster data image. The Web server arranges a country selection menu, disaster information selection menu, show/hide selection button, scale and area management button to be displayed besides the geographical data. Then it sends users as a hypertext file including the raster image data provided by the GIS server.

The system is built with aiming that even first-time users can use easily, so jumping from the main page to the online manual, tutorials and database are available (Fig. 3-5-3-3). To display NOAA satellite images and contour images of land elevation are also available. Fig. 3-5-3-4 shows the home page of the VENTEN system.

There are a couple of systems for Internet

Fig. 3-5-3-2 Processing Flow of VENTEN

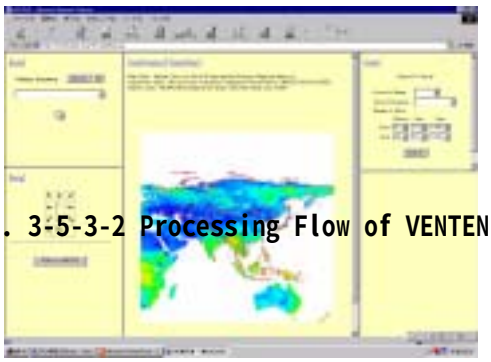


Fig. 3-5-3-4 VENTEN System Initial Screen

based GIS. One of them can be used by downloading an application program. Another system based on the image maps is used as just a viewer of geographical information. The method adopted by VENTEN can be positioned between those two systems in terms of functions. In other words, users can handle the vector data on VENTEN, but obtain only the raster data based on the vector data. Although it restricts users to obtain data, this system solves the problems of difference in response caused by different network environments of client machine at the time of operation, and of copyright for data. For Internet GIS, traffic load on the network sending data is problematic. However, since this system only sends fixed scale images of 470 x 470 pixels to be displayed at the center of the VENTEN screen, calculations on the server-side take longer time and differences in network environment between VENTEN and end users do not have a significant load of sending data. Most data processing is done by a server machine and all the client machine should do is display the data it receives, so that difference of performance in various client machines does not show significant influence. It is easy to persuade many data providers to join in this system because vector data, which is very close to the original information in its amount, is not given to users. The users will finally get only the raster data, but they can treat it as if they could directly access the vector data.

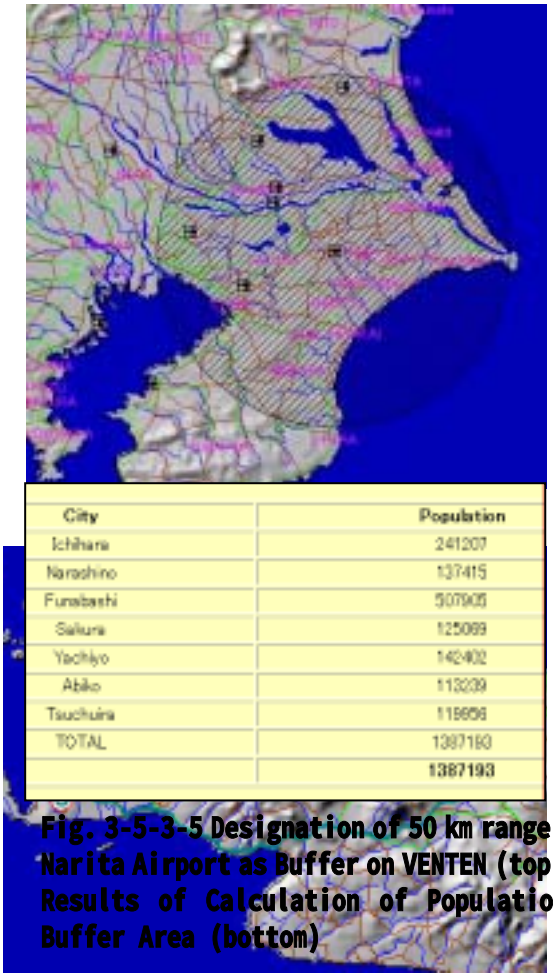
Fig. 3-5-3-3 VENTEN Main Page

2)Functions

VENTEN has GIS standard functions of "drawing a map in any scale", "buffering", "overlaying" and "searching by location and attribute". Fig. 3-5-3-5 shows a buffer area with extracted results of population of cities in the area. The buffer is set to 50 km with Narita International Airport as its center. The city names and their population in that area are displayed as shown.

The shortest route analysis function helps determine the shortest route for evacuation and transportation of supplies. To put it concretely, the source of the supplies is taken as the starting point S and the damaged area as the destination E. Among the many routes displayed, the shortest route is displayed in bold lines (Figure 3-5-3-6). This function is not only useful for searching the shortest route but also for searching routes to avoid the damaged area by the combination of other functions and the buffering function.

As described above, VENTEN provides the raster-formatted images to the end users, but the users can make various requests to process the vector data on the server.



City	Population
Ichihara	241207
Narashino	137415
Funabashi	507905
Sakura	125089
Yachiyo	142402
Abiko	113239
Tsuchiura	119656
TOTAL	1387193
	1387193

Fig. 3-5-3-5 Designation of 50 km range from Narita Airport as Buffer on VENTEN (top) and Results of Calculation of Population in Buffer Area (bottom)

Fig. 3-5-3-6 Results of Analysis of Shortest Route

3)Data

VENTEN gathers data for the 23 member countries of the ADRC. Collecting two types of information; one is the basic geographical information which is useful for not only disaster reduction, particularly topography and natural conditions, the other is geographical information of disaster reduction management on maps. Until now, the following information has been gathered (refer to Fig. 3-5-3-7):

①Basic geographical information

National borders (polygon), water systems (line, polygon), railroads (line), roads (line), airports (point), position of cities (point), city name (character strings), population (numerical value), shaded image based on elevation (raster image), contour map of elevation (raster images) (data source: DCW (Digital Chart of the World), GRID, GTOPO30) and NOAA satellite data of vegetation indices (of two terms, July and December 1998).

②Geographical information of disaster reduction management

The flooded areas of the 1998 Chang Jiang deluge, the affected information of houses around Nishinomiya Station at the 1995 Great Hanshin-Awaji Earthquake, the affected information for each sections at the 1995 Great Hanshin-Awaji Earthquake (by Building Research Institute, Government of Japan) and the active fault distribution map.

A menu on basic geographical information is arranged at the bottom right of the VENTEN screen, to enable user to control on/off of the information as the need arises. The vegetation indices with 16 km resolution (of two terms, July and December 1998) by NOAA satellite data has enabled to get the land use, which is indispensable for disaster risk management. Introduction of data from other satellites such as LANDSAT, SPOT, and ALOS is under consideration.

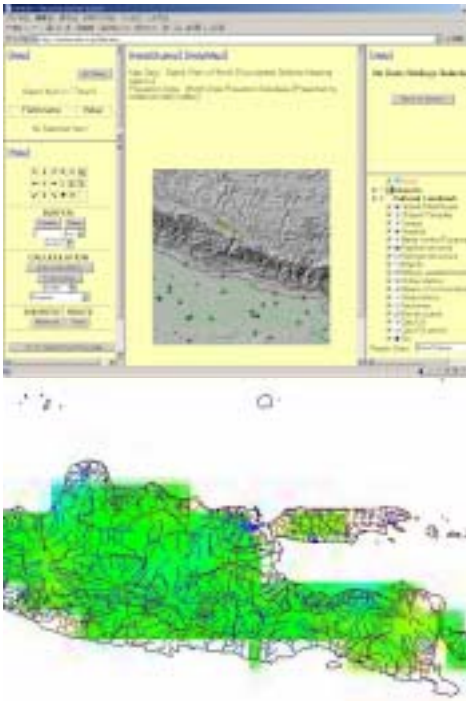


Fig. 3-5-3-7 Map of basic Geographical Information (top) and Maps including Satellite Data of NOAA Vegetation Indices (bottom)

3-5-3-4. Future development plan of "VENTEN"

1)Basic geographical information

Some countries among the 23 member countries of ADRC are now preparing their basic geographical information. Currently, ADRC is gathering such data. Then it will be modified and imported into VENTEN in the early time of the fiscal year 2002. (Refer to Tables 3-5-3-1 to 3.)

Table 3-5-3-1 Countries for Which Basic Geographical Information are preparing

No.	Country	Official Country Name
1	Azerbaidjan	Azerbaidjan Republic
2	Afghanistan	Afghanistan
3	Armenia	Republic of Armenia
4	Iraq	Republic of Iraq
5	Iran	Islamic Republic of Iran
6	Kyrgyz	Kyrgyz Republic
7	Georgia	Georgia
8	Turkey	Republic of Turkey
9	Turkmenistan	Turkmenistan
10	Pakistan	Islamic Republic of Pakistan
11	Bhutan	Kingdom of Bhutan
12	Brunei	Brunei Darussalam

Table 3-5-3-2 List of Basic Geographical Information (Vector Data)

Data Name		Data Structure
Airport Data	AEPOINT	Point
Cultural Facility Data	CLPOINT	Point
River (Polygon) Data	DNAREA	Polygon
River (Line) Data	DNLINE	Line
Land Use Data	LCAREA	Polygon
Coastline Data	POAREA	Polygon
City Name Data	PPPOINT	Point
Road Data	RDLINE	Line
Railway Data	RRLINE	Line
Transportation Facility (Line) Data	TSLINE	Line
Transportation Facility (Point) Data	TSPOINT	Point

Table 3-5-3-3 List of Basic Geographical Information (Raster Data)

Image File Name		Data Structure
Contour Image Data	Dem	Raster (Approx. 10km Resolution)
Shaded Image Data	Relief	Raster (Approx. 10km Resolution)
		Raster (Approx. 1km Resolution)

2)Geographical Information of Disaster Reduction Management

Information of active fault distribution in Asian countries is extremely important in earthquake disaster reduction. However, there are many difficulties to gather and arrange actual data due to the severe natural environment and economic and technical reasons. ADRC, in collaboration with the Disaster Management Planning Hyogo Office of the United Nations Center for Regional Development (UNCRD), is developing a data processing method to identify active faults found on the surface through stereoscopic vision of aerial photographs. This method has an advantage of revealing existence of conspicuous active faults without any geological survey of the subject areas. We are investigating to incorporate these data into VENTEN.

3)Linkage with satellite data suppliers

ADRC is currently conducting researches on construction of a disaster information network utilizing high-speed Internet satellite and mobile technology under cooperation with the National Space Development Agency of Japan (NASDA) and the Communications Research Laboratory (CRL). The purposes of this network are to instantaneously transmit information of disasters occurring in the Asian region to ADRC and to contribute to understanding situations of disaster-affected areas and deployment of international emergency assistance. In addition, it can be used as a real-time examination of images shooting by the crew on site to assess remotely risks concerning the collapse of buildings. Another subject of research is the method for VENTEN to use data from the Advanced Land Observing Satellite（ALOS）that is planned for launch in 2004.

4)User interface and function improvements

Some parts of the current version of VENTEN are yet to be improved to provide more sophisticated user-interface. It is necessary to make clear what points the end-users need improvement through questionnaires and workshops to support the administration of well-planned development.