



Institut des Sciences et Techniques de l'Équipement et de l'Environnement pour le Développement

ISLAND

Information Systems for Local Authorities Needs to face Disasters

**VN/Asia-IT&C/01
(88121)**

Presentation of ISLAND System

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1. Introduction

The aim of the ISLAND project is to protect the populations of South-East Asian countries (Cambodia, Laos and Vietnam) from natural disasters, especially through the use of recent Information and Communication Technology (ICT).

Initially, ISLAND was created to adapt the existing OSIRIS system to the needs of these countries. However, after an estimation of the relevance of this existing tool to the situation in each of the considered countries, it has been decided to develop a simpler but more finely adapted system.

The aim of this document is to describe the prototype that will be presented during the Workshop in Hanoi the 31st of January 2007 and the 1st of February 2007. Based on this presentation, partners of ISLAND are invited to think about modifications, improvements and evolutions that could be done in order to have a final product that fits to the needs of each country.

The document is presented as followed:

- In Part 2 will be presented the actual alert and meteorological system of each country and what are the points on which ISLAND can propose a solution and improve the current situation
- In Part 3 will be presented a general ICT solution.
- In Part 4 will be presented an actual solution based on the Vietnamese case.
- In Part 5 will be presented more precisely the components of the prototype.

2. Overview of existing systems in each country

In each country, there exists an organization that is responsible for educating and helping populations that deal with crisis situations, and an organization that transmits meteorological data and alert messages to the populations. Sometimes a same organization fulfills both roles.

The organization responsible for crisis management in villages is active at different periods.

First, before any crisis, authorities organize prevention actions. This phase consists in educating groups of people in each village about the way to avoid catastrophes, and the proper behavior to adopt in case of crisis. In each of the countries our project is concerned with, at least one day every year is dedicated to that education. During that day, persons in charge are designated, action groups are defined, alert plans are decided, etc.

The second time of action for the organization concerns the actual crises. Persons in charge have to transmit precise information about the alert, what is happening, what is the foreseeable evolution, what rules apply, etc.

The last phase is the assessment, after the crisis, which is carried out with the population to improve the effectiveness of the response for future alerts.

The organization, responsible to transmit physical levels, informs the population everyday about actual climatic indices and forecast values. Then there is a dataflow between the local person who collects, for example, the water level, the person who analyzes this value, the person who computes a forecast based on different parameters and finally the person who transmits the value to the population. Depending on the country, there could be another exchange with the alert organization, which can decide to set an alert based on the value.

All these organizations are already working in each country, but the efficiency of data transmission and enhancement could be surely improved.

The first issue concerns the support to transmit information, which currently uses classical means like land phone, fax, radio, post mail or even someone on a motorbike. This point implies a lost of time which can be crucial in case of crisis.

The second point concerns the information itself, for which both the quantity and the content are limited, with few possibilities of evolution.

For example, in Vietnam there are different types of hydrological stations which can provide many information such as water level, discharge, velocity, water temperature... but only water level is transmitted. One reason is the difficulty to transmit all information by phone.

3. Proposition of ISLAND Solution

According to the overview of existing systems in each country and especially about the case of Vietnam, the ISLAND team proposes the following solution.

3.1. Goal of the solution

The solution, using new ICT and multimedia support, will help the officials to send information at any time, directly to the right person, in a fast and safe way, in order to finally reach a wider population panel with relevant information concerning potential or real risks.

It will be developed in such a way that it fits to the current system, improving some existing points but also offering new possibilities and services.

3.2. Components of the solution

The solution is divided in different components: the user profiles, the data, the means of transmission, the device and software for data acquisition, the device and software for displaying the end-user information.

The user profile

It allows to have different types of users in the network, each one with specific capacity of intervention. For example: the official person in charge of alert, the official for climatic indices and the end-user. We have to determine all their actual needs, the wishes/constraints they have and the new possibilities that the solution can introduce to help them transmit and enhance information.

Data

We have to determine all the data needed to be sent to the population or the end-users. The main information is about physical indices and alerts. But the system can also be used to transmit prevention advice, notices, and advertisement...

Means of transmission

As the solution has to improve the quality of transmission, different supports have been proposed :

- Internet, which is already in use in some countries.
- GSM, which allows to reach villages not covered by the Internet network.
- For other villages, not reachable by either network, it is possible to use older system such as loudspeakers, radio...

Acquisition software

The different users of ISLAND who need to send data to the end-users will use this software. There will be different user profiles and interfaces, depending on the information to be sent.

Displaying software

This software will receive the information of the acquisition software and display the information on the screen.

Terminals

The aim of the project is to send information to the population in countryside.

For that the "ISLAND terminal" has been proposed. It merges different high-tech devices to solve the different problems.

The information has to be transmitted to as many people as possible, in countryside where electrical and information network are not well developed. The information will be displayed in such a way that many people can see, hear, and understand it without an advanced training.

The "ISLAND Terminal" is composed of a wide screen, which can be seen from far and can play sound. It is connected to an embedded PC associated with a UPS (Power Supply). The embedded Pc is specifically developed to be used in a hard context. The UPS will supply power in case of power cut. If needed, the "ISLAND Terminal" will be equipped with a GSM modem.

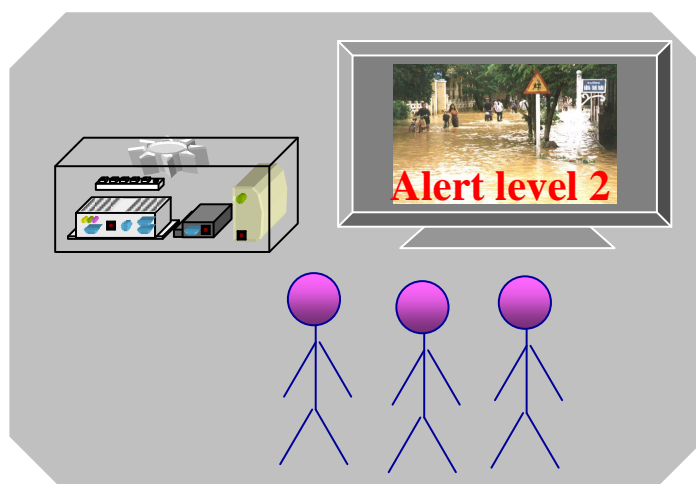


Figure 1 Population watching ISLAND information on a wide screen

4. Description of the Vietnamese Case

According to the different parts of the solution, we developed an application adapted to the Vietnamese case. Nevertheless, this solution is not dedicated only to Vietnam; it is also developed to be open and adaptable to other situations.

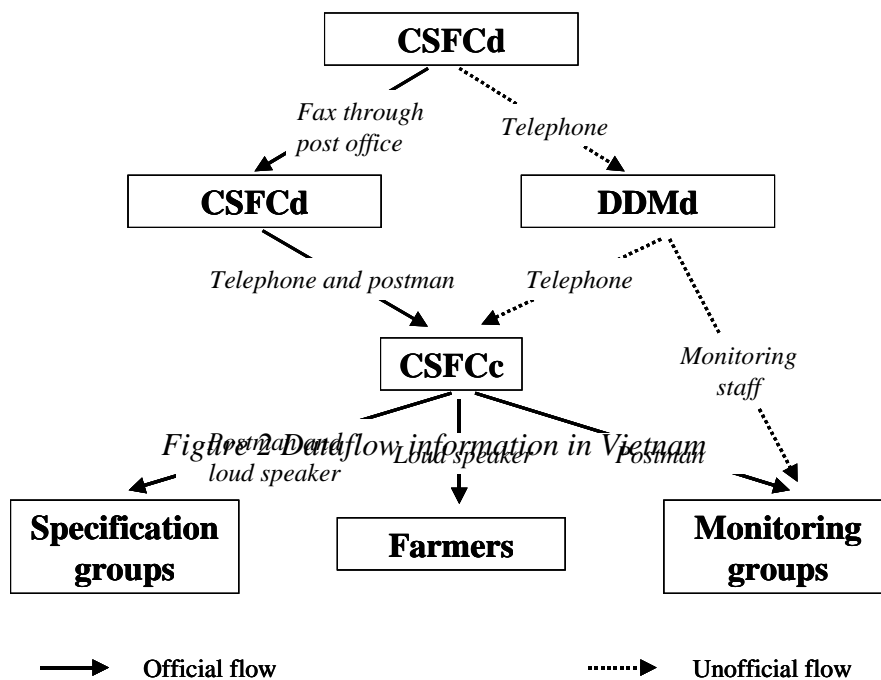
4.1. Current system in Vietnam

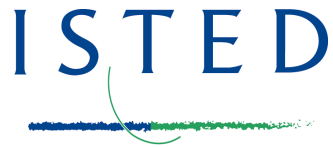
Currently, the organization in charge of transmitting information to the population is CSFC Committee of Storm and Flood Control. This organization collects information of water levels, compares it to thresholds of alert and then send corresponding information to the population.

The members of CSFC are divided into 4 levels : national, province, district, and commune.

Data that members transmit concern meteorological indices and alert messages. All this information will be detailed further in the document.

The way to transmit information is represented by the following picture:





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During the flood season from 15th May to 15th October, hydrological stations in the province inform about water levels at 7h00 AM to the CSFCP by telephone. The province official receives information and then transmits it to the district official using fax or post office. The district official transfer the information to the communal official using land phone, if needed he can add information. Finally the communal official transmits information to the population using loudspeaker or other means.

In parallel of this dataflow is another one with DDMD (Department of Dyke Management district). But this dataflow is considered as unofficial.

As result of this architecture we can see that there is a lost of time between the reception of the information and the reception by the population, especially due to the means of transmission. The use of telephone alone like in the present situation makes it difficult to broaden the utilization of monitoring and forecasting information.

4.2. Description of ISLAND components in Vietnam

Based on the current system in Vietnam and in relation with Vietnamese partners we developed the following prototype which apply to Vietnamese needs

Presentation of the main users for Vietnamese Case



The administrator, responsible for setting up the network in the country.



The climatic official, responsible for sending actual physical data and forecast.



The alert official, responsible for sending alert message or for adding orders to the population in case of crisis.



The prevention official, responsible for sending prevention message in order to educate the population.

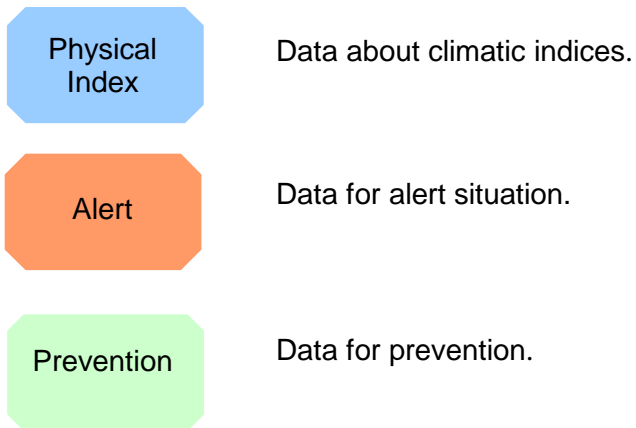


The end users who receive information.

There are 5 different profiles of users but in practice one person can assume different profiles. For example one official can be responsible to manage alert and climatic indices.

Presentation of the data needed for the Vietnamese Case

The main data are Physical Index, Alert message and prevention. They will be detailed later in the document.



Presentation of the transmission support



In the current CSFC network, the transmission support used is Internet. At the moment the prototype is based on this characteristic.

Presentation of the different frames

For each data, a frame has been studied in order to provide the information in the easiest and more understandable way.

They will be detailed later in the document

4.3. Application of ISLAND to the Vietnamese Case

We have determined what are the needs of the Vietnamese prototype, we will now determine how they will interact together according to CSFC system.

4.3.1. Architecture of ISLAND in Vietnam

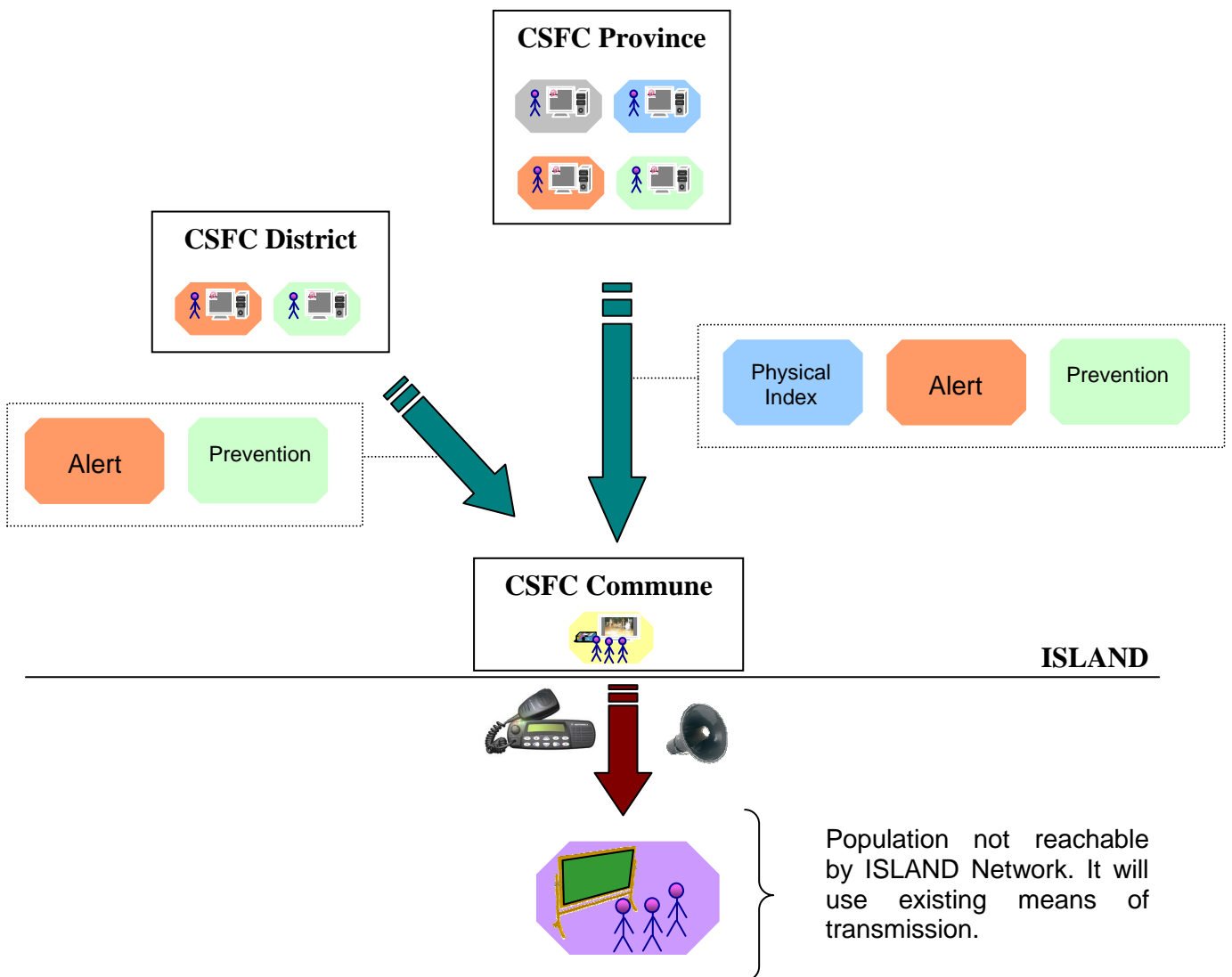


Figure 3 ISLAND network in Vietnam

The Province system is composed of different persons in charge who manage physical index, alert, prevention and administration of the system. Then the information allowed to be transmitted from Province is physical index, alert message, prevention message and configuration of the network. The information will be sent to the Commune using Internet.

The District is composed of alert and prevention officials, they will send climatic or alert information to the Commune using Internet.

The Commune will receive information and then transmit it to the population using traditional means of communication or an ISLAND terminal when possible.

4.3.2. Daily information

Illustration of daily information sent in normal situation. In this case the Province and District officials send information relative to the current climatic indices and the prevention messages.

Legend:

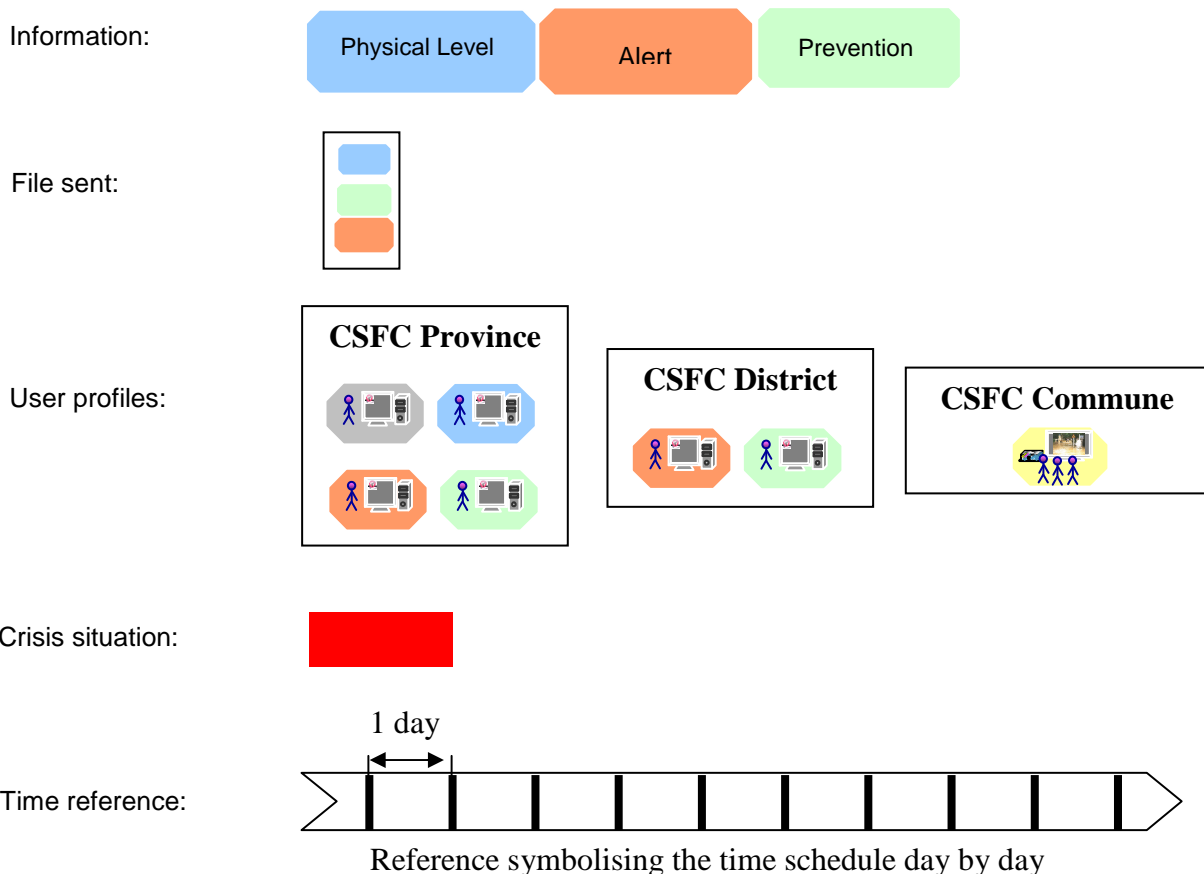
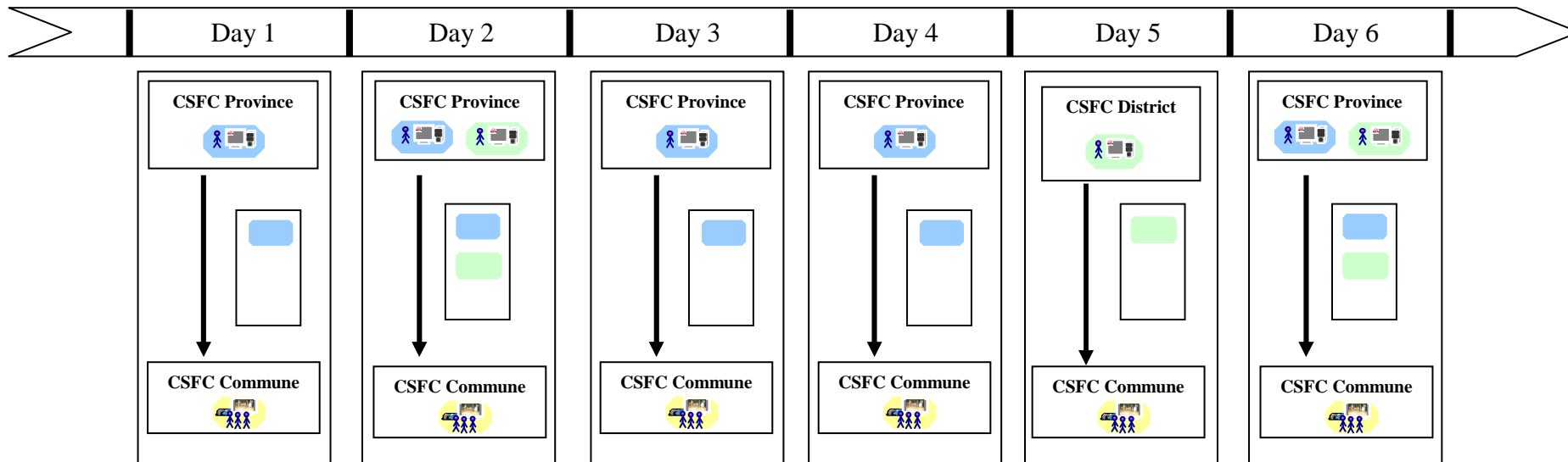


Figure 4 Legend



Day 1 : Daily Climatic Level

ex : water level of **10** m with an alert threshold at **15** m. From CSFC Province

Day 2 : Daily Climatic Level and a message of prevention to educate population in case of crisis

ex : water level of **10** m with an alert threshold at **15** m. From CSFC Province

We are in flood period, you should remind the alert plan. From CSFC District

Day 3 : Daily Climatic Level

ex : water level of **12** m with an alert threshold at **15** m. From CSFC Province

Day 4 : Daily Climatic Level

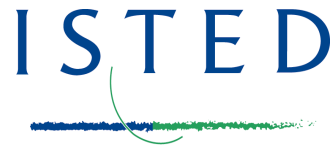
ex : water level of **12** m with an alert threshold at **15** m. From CSFC Province

Day 5 : Daily Climatic Level and a message of prevention to educate population in case of crisis

ex : water level of **11** m with an alert threshold at **15** m from CSFC Province

if alert level 2 you should prepare food for 3 days. From CSFC District

Figure 5 Schedule for daily information

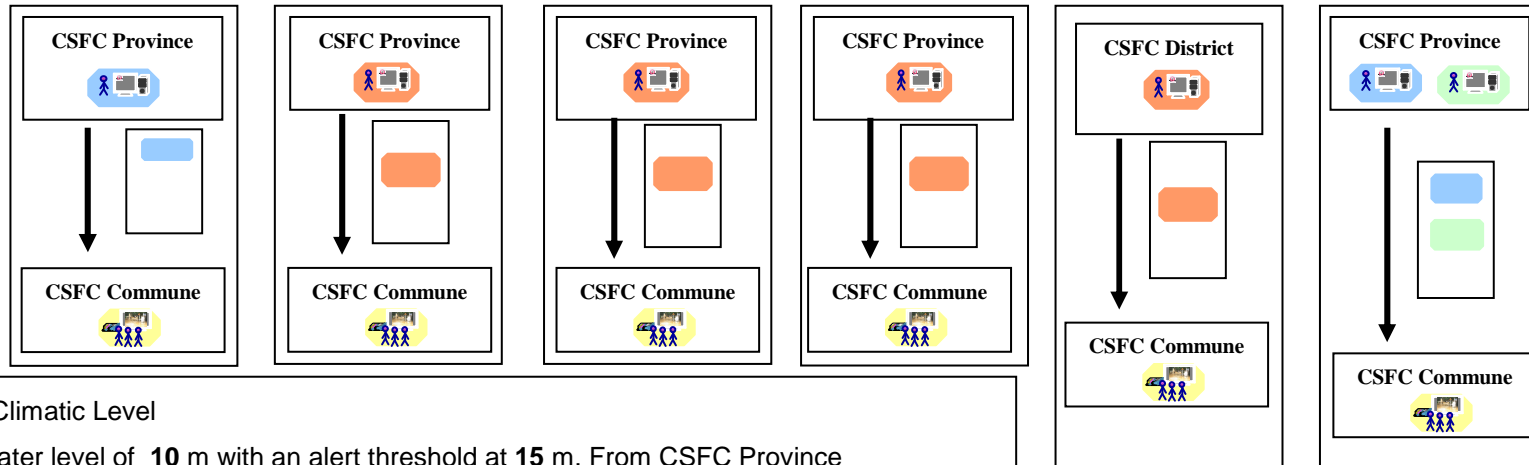


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4.3.3. *Crisis situation*

Illustration of alert information sent in crisis situation. In this case the Province and District officials send urgent information to the Communal official.

Thanks to the forecast, the alert message should prevent the Communal official of the disaster before it appears, and then during the crisis the official receive information about the rules to apply.



Day 1 : Daily Climatic Level

ex : water level of **10** m with an alert threshold at **15** m. From CSFC Province

Day 2 : Alert message

ex : Alert level 1: tomorrow water level of 15m, protect your house. From CSFC Province

Day 3 : Alert message

ex : Alert level 2 : the water level will increase also tomorrow, secure all your things . From CSFC Province

Day 4 : Alert message

ex : Alert level 2 : water level will decrease, still be aware. From CSFC Province

Day 5 : Alert message

ex : Alert level 1 : join action groups to help people who need. From CSFC Province
 action groups in Hai Duong are managed by M Nguyen. From CSFC District

Day 6 : Daily Climatic Level and a message of prevention to educate population in case of crisis

ex : water level of **11** m with an alert threshold at **15** m. From CSFC Province
 if alert level 2 you should prepare food for 3 days. From CSFC Province

Figure 6 Schedule in crisis situation

5. Description of components of the Vietnamese prototype

5.1. Initialization

At the beginning, the administrator of the network will create all the entries corresponding to the terminals installed in the country. He will configure all terminals, user profiles, physical indices, alerts, etc and associate them.

Finally, each terminal will be associated with an official, climatic indices and alerts. It will be also possible to associate terminal with locations: Province, District, Commune but also with specific areas: near river, down of a dike... so that we can send information to one terminal, one region or one area.

He will configure the database so that it can have an history of what was already sent to a terminal.

One aim of this initialization is that the other official users (who deal with alerts, prevention, or physical indices) will only have to select the terminal, fill the variable parameters and click to send.

5.2. Data

The data sent to the population concern physical indices, alerts and prevention.

Physical Indices :

Name of physical index

Place

Date

Time

Min-max : used to situate the actual value according to a reference

Alert threshold (1,2,3) : used to situate the actual value according to a reference

Value

Forecast

Alert :

Place

Date

Time

Level of alert

Regulation

: Rules to apply, advices for population

Name of responsible

Organization

: In order to know from where comes the information

Number of order

Prevention :

Text

Pictures

5.3. Frames

- Climatic Indices:

When the official in charge of physical indices provides updates values and forecast, the terminal will display the information as followed :

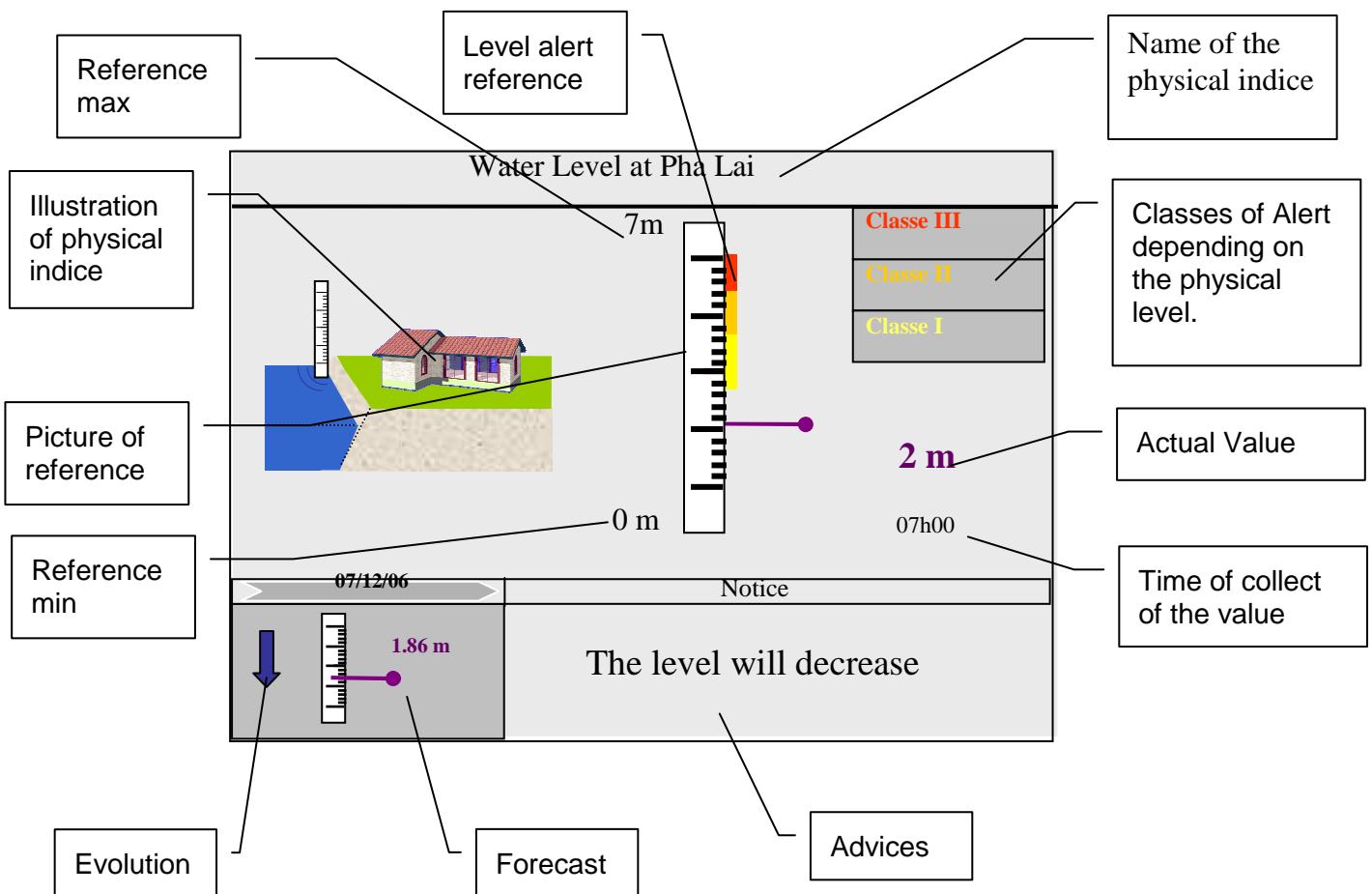


Figure 7 Frame for climatic indices

For Hai Duong Province, the physical indices selected are water level, tide effect, wind speed and direction, rainfall.

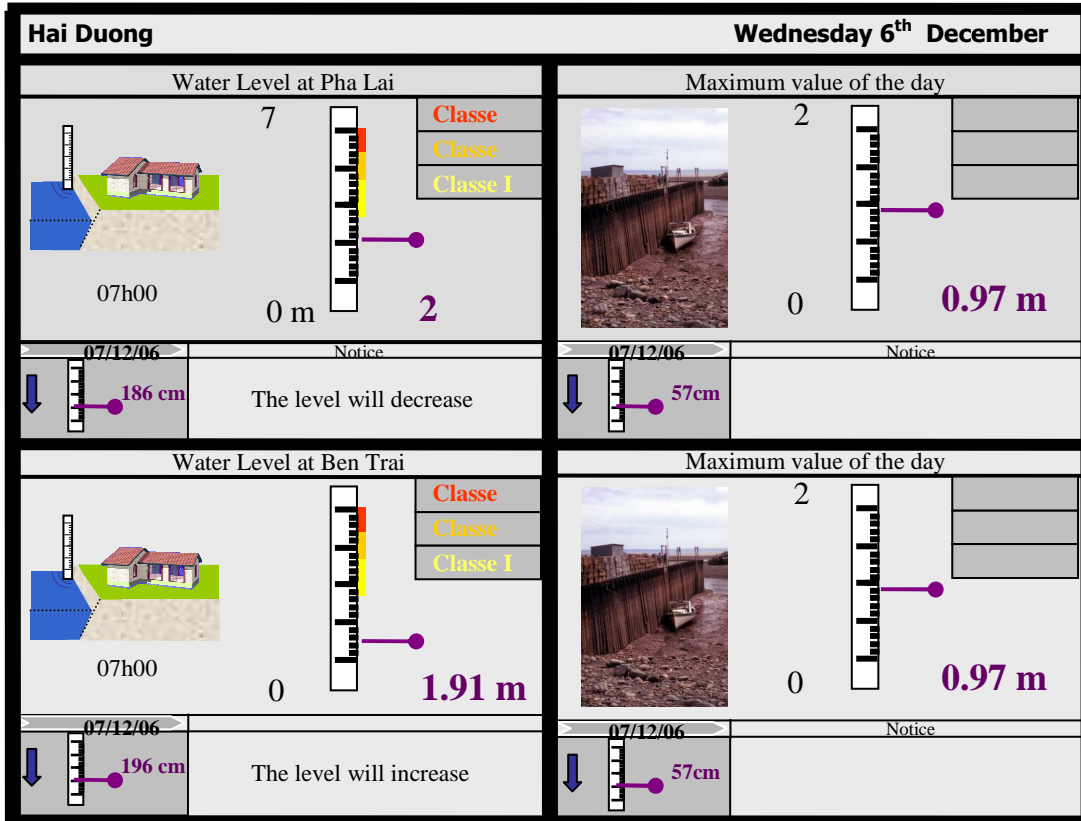


Figure 8 Frame of vietnamese indices(part 1/2)

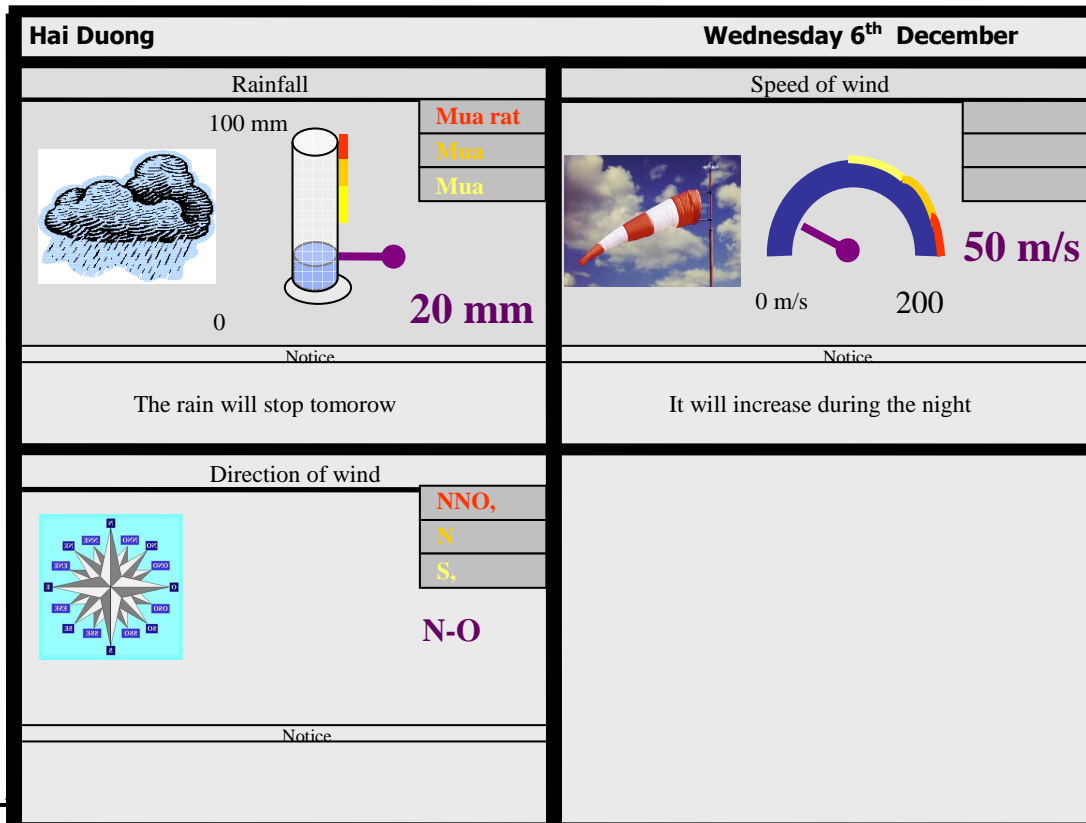


Figure 9 Frame of vietnamese indices(part 2/2)

In Vietnam, the end-user is the official of a commune, so the information must be understandable for him. The solution can be adapted so that the information is displayed with pictures, icons, etc to be understood by everybody. Furthermore, we know that each year there is a training day in each village. The ISLAND solution can be included in this day to explain all information provided on the screen. In this case the population will understand quickly the information provided on the screen in case of real crisis.

Here is the main alert frame.

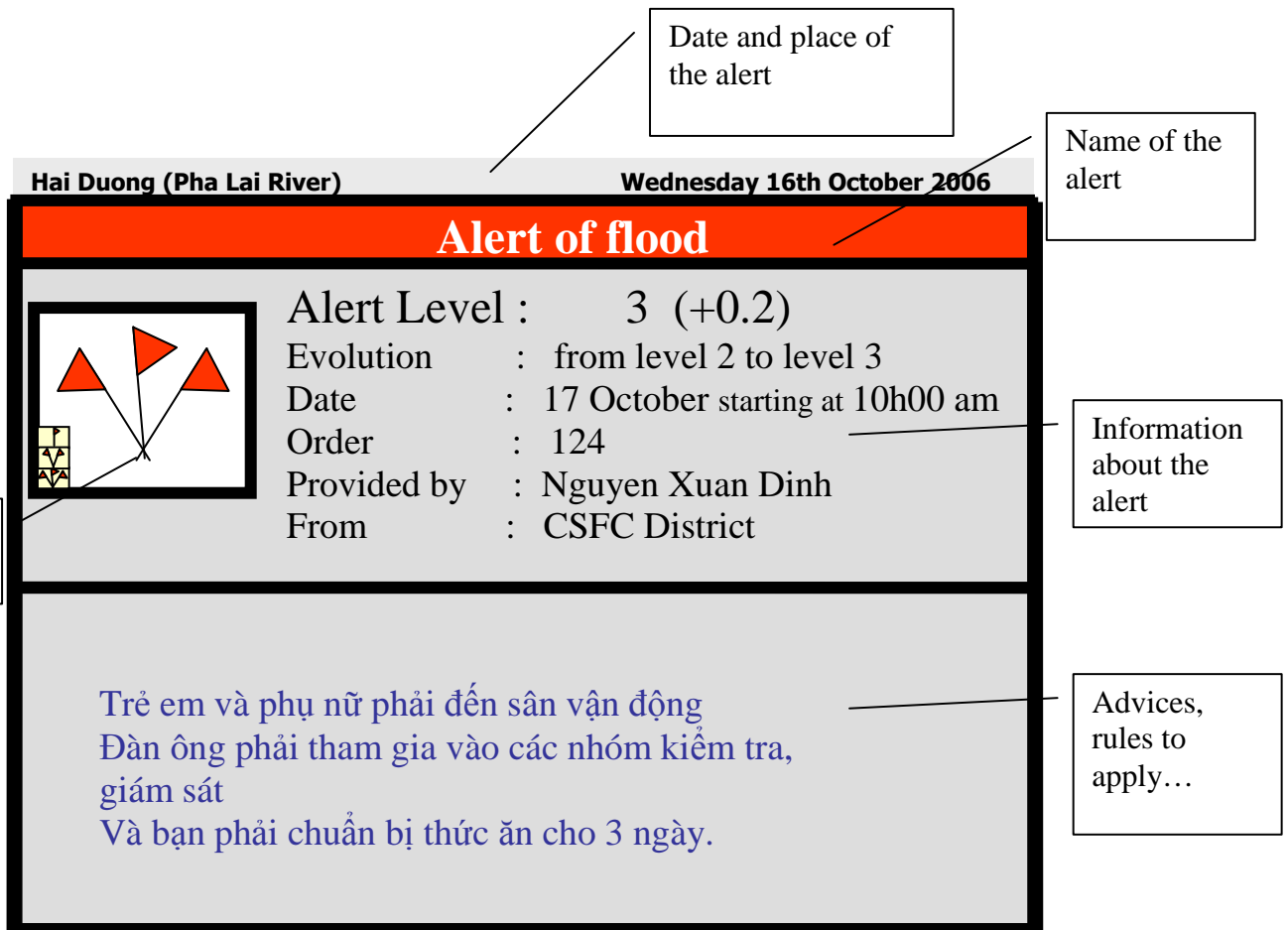


Figure 10 Frame for vietnamese alert

This second frame can be displayed when another alert official wants to add information or advice to the end user.



The diagram shows a rectangular frame for a Vietnamese alert. At the top left, it says "Hai Duong (Pha Lai River)" and at the top right, "Wednesday 16th October 2006". Below this is a red bar with the text "Alert level 3". Underneath the red bar, it lists "Provided by : Nguyen Xuan Dinh" and "From : CSFC District". The main body of the frame contains two lines of Vietnamese text: "Ông Nguyễn phải mang theo chiếc ô tô của mình để tham gia vào nhóm kiểm tra, giám sát." and "Ông Chang sẽ phụ trách khu vực quận 3". Callout boxes point to specific parts: "Date and place of the alert" points to the top right; "Name of responsible" points to the "Provided by" line; and "Advices, rules to apply..." points to the Vietnamese text.

Figure 11 Frame for vietnamese alert

- Prevention:

The system will allow an official to send whatever kind of information (prevention, education, notices, advertisement...) using text format or picture format. In the Vietnamese case, this information mainly concerns prevention messages outside a crisis but we can imagine other kind of information for other situations.

For the text format the frame will be displayed as followed.

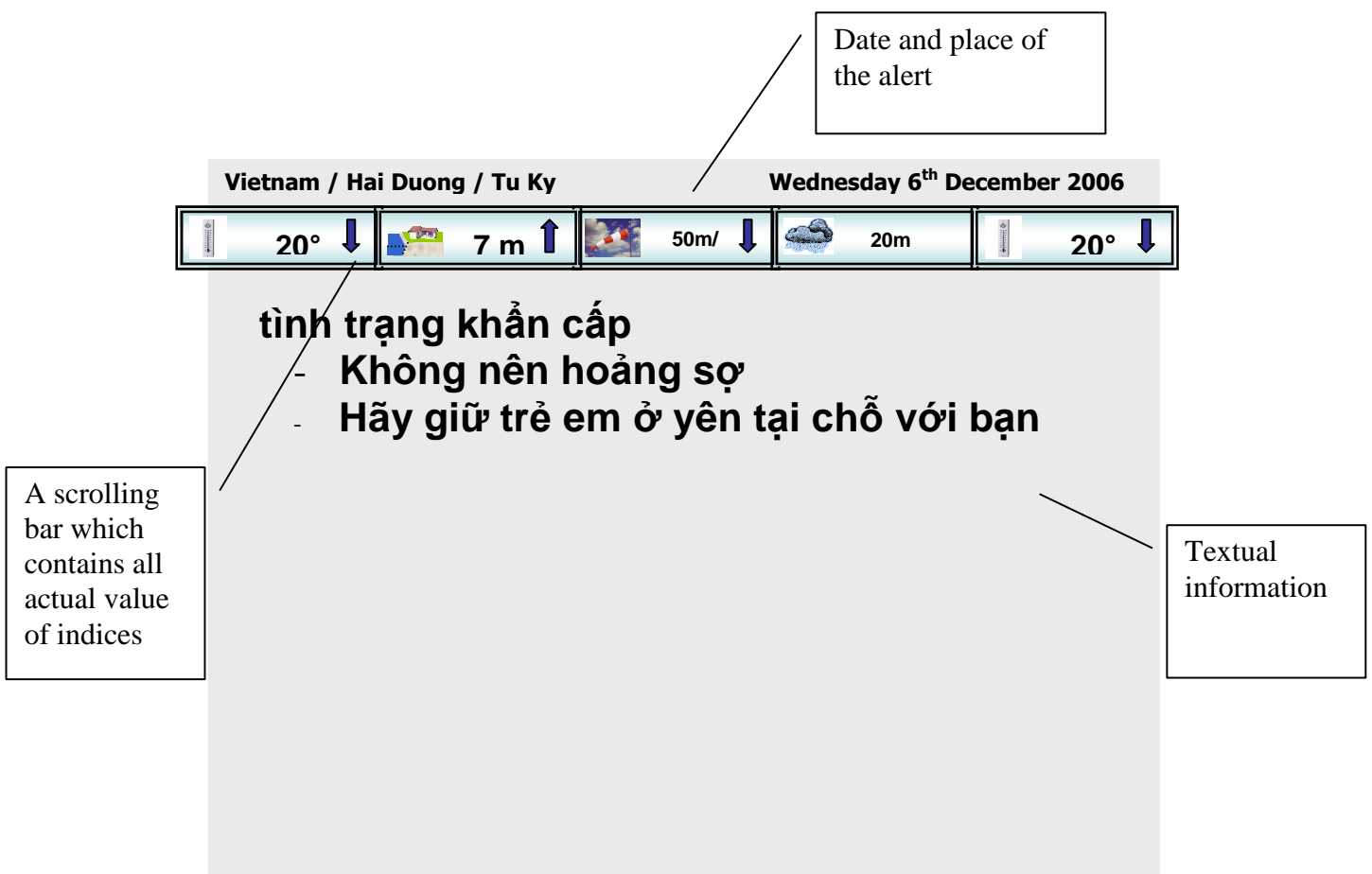
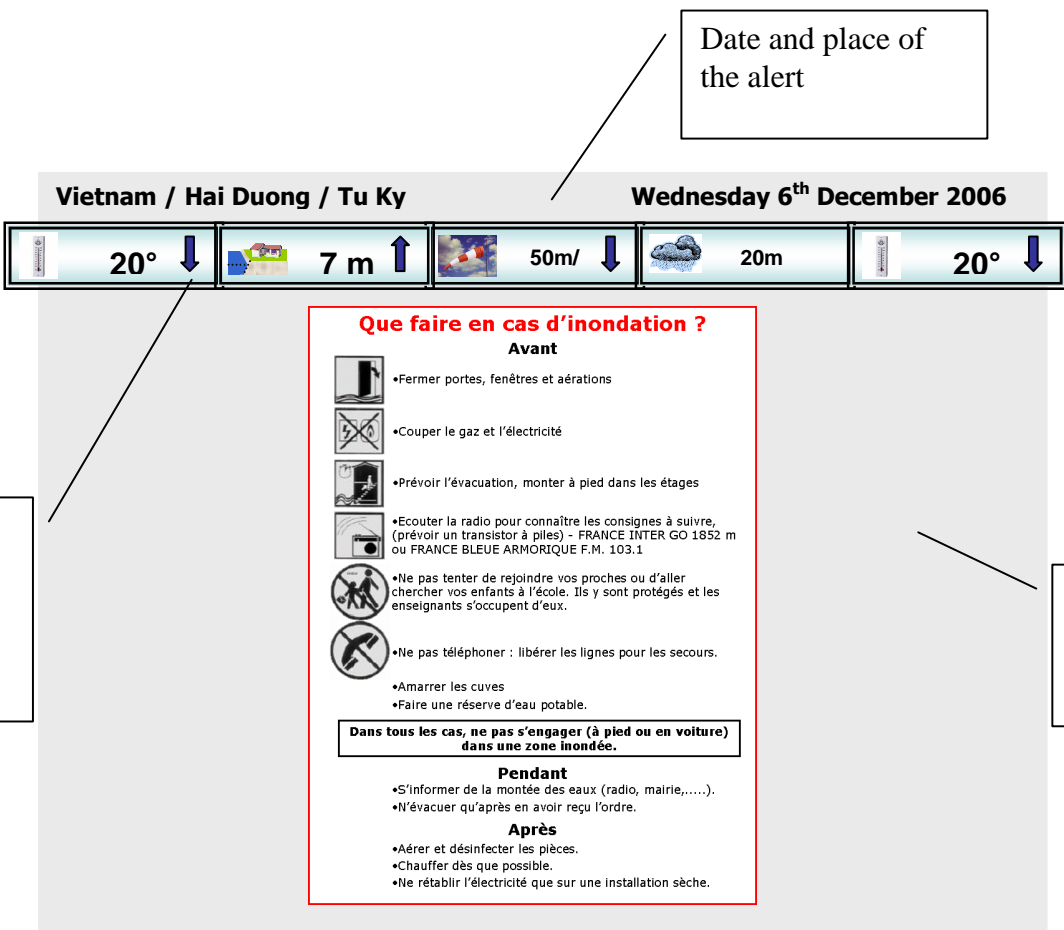


Figure 12 Frame for textual prevention

For the picture format the frame will be displayed as followed.



Vietnam / Hai Duong / Tu Ky **Wednesday 6th December 2006**

20° ↓ 7 m ↑ 50m/ ↓ 20m 20° ↓

Que faire en cas d'inondation ?

Avant

- Fermer portes, fenêtres et aérations
- Couper le gaz et l'électricité
- Prévoir l'évacuation, monter à pied dans les étages
- Ecouter la radio pour connaître les consignes à suivre, (prévoir un transistor à piles) - FRANCE INTER GO 1852 m ou FRANCE BLEUE ARMORIQUE F.M. 103.1
- Ne pas tenter de rejoindre vos proches ou d'aller chercher vos enfants à l'école. Ils y sont protégés et les enseignants s'occupent d'eux.
- Ne pas téléphoner : libérer les lignes pour les secours.
- Amarrer les cuves
- Faire une réserve d'eau potable.

Dans tous les cas, ne pas s'engager (à pied ou en voiture) dans une zone inondée.

Pendant

- S'informer de la montée des eaux (radio, mairie,.....).
- N'évacuer qu'après en avoir reçu l'ordre.

Après

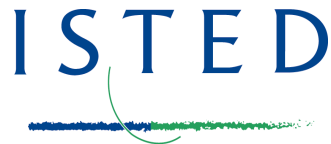
- Aérer et désinfecter les pièces.
- Chauffer dès que possible.
- Ne rétablir l'électricité que sur une installation sèche.

A scrolling bar which contains all actual value of indices

Picture information

Figure 13 Frame for picture prevention

In this case the sets of prevention pictures are based on the Terminal of the end-user, and the prevention official will choose which set to activate. For example, if there is the set of flood and the set of drought in the terminal, the prevention official will choose one of this set. Then the terminal will receive the order to play this set and will show it on the screen.



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6. Conclusion

In each country there is an organization in charge of managing alert and/or meteorological information. Unfortunately, it seems that these organizations don't have the adapted tools to allow an optimal use of this existing information.

With Vietnamese partners we have developed this prototype. We have specified people involved in the system, data needed, how to manage data from the official who collects it to the population and how to display them so that all information can be quickly and easily understood. We also developed the hardware solution with new ICT, which allows to optimize the system.

As it is a prototype, all functions have not yet been fully developed, and some aspects have been put in the background in order to stress on some priorities. The upcoming workshop to be held in Hanoi in January 2007 will be the ideal moment to discuss all these points.

The goal of this document has been to give all participants a clear understanding of the possibilities introduced by ISLAND, of the achieved work and of the development process for the adaptation of that prototype to the situation of a specific country. We hope that it can constitute a basis for reflexion towards the definition of adapted solutions for all the participating countries.