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DISASTER PREPAREDNESS AND PREVENTION
IN
ECUADOR AND PERU

REPORT ON FACT-FINDING MISSION

by

John Tomblin

13 - 21 November 1984

UNDRO, Geneva

19 December 1984

BACKGROUND

In recent years, UNDRO has received an increasing number of requests for assistance in pre-disaster planning and prevention activities. We do not have sufficient staff working in this field to maintain, in any single year, technical assistance programmes in all of the countries from which requests are received. To achieve the most efficient use of human resources and available funding, we are obliged to accumulate country requests for assitance in prevention and preparedness over a period of time, and then to develop a programme of co-ordinated regional or sub-regional activities.

The purpose of the mission here described was to review the needs of two countries which are among the most severely affected by disasters in Latin America. Visits to other countries of the region which have requested assistance will take place in the near future by UNDRO and by a consultant funded through the Latin American Economic System (SELA) in liaison with UNDRO, in order to assess the status of disaster preparedness and identify future priorities for action. Once these are established, it is planned to develop, in co-operation with ECLAC, PAHO and SELA, a programme of technical assistance to all countries of the region which are interested in improving their capacity to cope with disasters. It is intended that this programme will include not only in-country activities to deal with specific national needs, but also regional seminars or workshops on disaster management and prevention topics of general interest, in order to provide opportunities for the exchange of experience and sharing of expertise between the countries of the region, combined with specialized training from external consultants where appropriate.

My missions to Ecuador and Peru were followed by two days (22-24 November) in Caracas during which, jointly with Mr. Julio Grieco of UNDRO, I met with the Headquarters staff of SELA and helped to brief their consultant, Mr. Hecio Tibery, and prepare a detailed questionnaire for him to use as a basis for investigating, during January-February 1985, the status of disaster preparedness and prevention in six more countries of South America.

ECUADOR

13 - 16 November 1985

Introduction

During 3½ working days (13-16 November) in Ecuador, I held meetings with the various national and external services or agencies involved in disaster preparedness and prevention. A list of these, and the individuals whom I met, is attached as Annex 1. A review of the main issues which arose during the course of my discussions with these agencies is given below.

Initial meeting with Civil Defence and other National Services

The main responsibility for pre-disaster planning in Ecuador lies with Civil Defence, which has a headquarters staff of some 12 full-time professionals, 6 of whom occupy established posts whilst the others have short-term contracts. In addition, each province of the country has one full-time Civil Defence Co-ordinator. My first meeting was with the Director of Civil Defence and his senior staff, together with representatives of the Ecuadorian Red Cross, fire and police services (see Annex 1). After receiving a warm welcome from the Director, General Moral, I outlined the purpose of my visit and gave examples of the types of preparedness and prevention activities which UNDRO hoped to include in a regional technical assistance project. All parties present showed a very positive interest, and after answering various questions, I proposed to the Director that with his staff he should identify specific topics with which they would like to receive external support, and that he should prepare a memorandum requesting such assistance from UNDRO. This was duly prepared and handed to me (see Annex 2) on my final visit to Civil Defence.

In addition to my several contacts collectively and individually with Civil Defence staff, I held a series of meetings with the various government and independent technical agencies in the country which are involved in monitoring natural hazards and in disaster prevention. The names of these agencies and their staff members whom I met are included in Annex 1.

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Prevention

According to the National Security Law, Civil Defence is responsible not only for disaster relief and preparedness but also for developing hazard warning systems, risk evaluation studies, and the identification and implementation of appropriate prevention measures. In practice, Civil Defence does not have the necessary staff, and has transferred various of the above responsibilities (e.g. for earthquake and volcano monitoring to the National Polytechnic School, and for volcanic hazard mapping in part to the Directorate of Geology and Mines within the Ministry of Mines and Natural Resources). Hazard maps have been made for eight of the higher-risk volcanoes, but these lack certain important elements such as information from radiocarbon analyses on the dates of past eruptions, which are essential in order to establish the probable frequency of future eruptions.

Precise information on the earthquake hazard in different parts of the country is lacking, due to the absence of a country-wide seismic monitoring network. The only instruments at present in operation are located close to Quito. However, a proposal has been sent recently by the Polytechnic School to the United States Geological Survey requesting the necessary equipment, whilst a second project, for the construction and equipping of an observatory for Pichincha Volcano (close to Quito), is currently being considered by the Italian Government. If and when these two projects are successfully implemented, knowledge of earthquake hazards throughout the country, and the provision of early warning of volcanic eruptions, will be greatly improved.

In order to delineate more precisely the risks within the Province of Pichincha (i.e. in and near Quito), a plan has recently been drawn up for the making of a series of geotechnical maps during the next three years by the Polytechnic School and the Directorate of Geology and Mines. However, it seems doubtful whether the necessary funds, and all of the relevant technical expertise, will be available within the country. This is an area which urgently needs attention, and one in which the provision of external assistance would be helpful. I invited the representatives of the Polytechnic School and the Geology and Mines Directorate to submit proposals for assistance in subject areas related to the above needs for which national expertise was lacking. A written request from the Polytechnic School (Annex 3) was handed to me before my departure from Ecuador.

On the subject of flood and drought prevention, I visited the USAID office in Quito (Engineer Betty Facey) who described a project in the coastal region, involving a US$5 million contribution from AID, to build a reservoir which will help to limit

flooding during the rainy season, and will provide water to maintain agricultural production during periods of drought as at present in certain coastal areas. It is clear that the most urgent aspects of flood and drought mitigation are already receiving attention. Hence there is less need for further technical advice in this field. In any case, the provision of further advice without a corresponding major input of funds for the construction of flood defences (beyond the scale likely to be available through an UNDRO project) would not result in improved prevention.

Preparedness

The only office with responsibility for disaster preparedness activities in Ecuador is Civil Defence. There has been little continuity in the staffing or work programme of this office. For example, I learnt that soon after the UNDRO/UNESCO mission of September 1981 concerning the emergency at Pichincha Volcano, and in accordance with one recommendation (at Annex 5 of the 1981 report) addressed specifically to Civil Defence, some studies were carried out on procedures for evacuating the populated areas on the immediate flanks of the volcano and for maintaining essential services in Quito in the event of heavy ash fall and mudflows. However, no written plan could be produced, and the copy of the UNDRO/UNESCO mission report of 1981 had apparently been mislaid.

It is clear that the subject of preparedness for the various common disaster types in Ecuador is one which needs urgent attention, and one for which UNDRO could provide guidance through the prescription of specific planning activities and the provision of technical advice. It would also be desirable for Civil Defence staff to attend seminars or receive on-the-job training in other countries of the region where preparedness activities are more fully developed.

Recommendations for future action

Civil Defence already has by law the responsibility, although in reality it has not yet established sufficiently systematic and detailed plans, for co-ordinating the military, police, fire, public works, health, social and other emergency services in the event of a major disaster. Consequently, in the event of a large-scale disaster such as the Guayas River basin floods of 1983, the Civil Defence was unable to carry out the overall co-ordinative role which it should have done and for which there was apparently a need. If Civil Defence is to fulfil this kind or role in the future, it will have to focus detailed attention in turn on each different probable disaster

scenario. After studying carefully past cases of such events in Ecuador and other similar environments, it must develop a detailed plan of the decision-making, warning, rescue, relief and other aspects of emergency management. In the process of working out the details of the necessary logistical plans in co-operation with the Government and other agencies whose services will be needed, and after having printed and distributed copies of these plans, the Civil Defence will automatically establish its capacity and authority to take full command of future disasters or potential disaster situations. UNDRO could assist by providing background information on relevant case histories, by identifying the detailed sequence of steps to be followed in preparing an emergency plan for each disaster scenario, and by providing external technical evaluation and assistance where necessary.

In the area of disaster prevention, including the establishment of appropriate early warning systems and procedures, there is a need to study previous cases of disaster, in order to identify where previous deficiencies arose and how these could be avoided in the future. Although Civil Defence does not necessarily have the technical expertise among its staff to prescribe how disaster prevention procedures can be improved, it should assume the responsibility for identifying disaster types for which a review of vulnerability and potential mitigation measures is desirable. It should also develop specific contracts with national experts in these subjects, or through UNDRO with external specialists if and where necessary, to carry out the required field surveys and planning activities. UNDRO could assist where necessary in developing a calendar of activities, evaluation of priorities and the provision of external technical assistance.

ANNEX 1

LIST OF MEETINGS HELD

Tuesday 13 November:

15.30h NATIONAL POLYTECHNIC SCHOOL - GEOPHYSICS INSTITUTE
(Apartado 2759, Quito - Tel: 231-082)

- Prof. Minard L. HALL — Technical Director

Wednesday 14 November:

09.00h UNDP (10 de Agosto 5470, Quito - Tel: 459-014)

- Ms. Paulina de SAENZ — Secretary to Resident Representative

10.30h CIVIL DEFENCE (Ave. Amazonas y Villalengua - Tel: 454-358/245-752)

- Gral de Division Antonio MORAL Moral — National Director
- Crnl. Federico GORTAIRE — Sub-director
- Dr. Rafael MELGAREJO — Advisor on Evaluation
- Crnl. Marco JIRON — Director, Finance Dept.
- Dra. Marcela COSTALES — Chief of Public Relations

Others present at the same meeting included:

QUITO FIRE BRIGADE

- Commander Galo CISNEROS
- Commander René RAMIREZ

NATIONAL POLICE

- Major Mario FUENTES

DIRECTORATE OF GEOLOGY AND MINES

- Ing. Gabriel UNDA — Sub-director

ECUADORIAN RED CROSS

- Dr. Luis GRANJA Ochoa — National Director
- Dr. Alejandro SANTANDER

14.30h DIRECTORATE OF GEOLOGY AND MINES (Carrión 16 y Paez)

- Ing. Gabriel UNDA — Sub-Director
- Ing. Raúl MONALVO — Engineering Geologist

Thursday 15 November:

10.00h MINISTRY OF EXTERNAL RELATIONS (Ave. 10 de Agosto y Carrión - Tel: 541-682)

- Ambassador Patricio MALDONADO — Director-General of Technical Co-operation

11.00h NATIONAL DEVELOPMENT COUNCIL (CONADE) (Juan Larrea y Arenas)

- Economist Patricio DAVALOS — Chief, Division of Technical Co-operation

13.00h ITALIAN EMBASSY (La Isla 111 y Humberto Albornoz - Tel: 522-015)

- Mr. Giulio MARONGIU — Second Secretary

14.30h USAID (Ave. Colombia 1573 y Queseras del Medio - Tel: 521-100)

- Engineer Betty FACEY — Mission Disaster Relief Officer

19.00h CIVIL DEFENCE

- Dra. Marcela COSTALES — Chief of Public Relations

Friday 16 November:

08.30h ECUADORIAN COMMITTEE OF GEOLOGICAL ENGINEERING

- Ing. Jorge SEVILLA

11.00h CIVIL DEFENCE

(Second general meeting, with same officers as on 14 November at 10.30h)

13.00h NATIONAL POLYTECHNIC SCHOOL - GEOPHYSICS INSTITUTE

- Prof. Minard L. HALL

18.00h FRENCH BUREAU OF GEOLOGY AND MINING RESEARCH - South American Regional Office (Calle Baron de Humboldt 303 y San Ignacio - Tel: 550-562)

- Dr. Philippe MASURE Director

SECRETARIA GENERAL
DEL CONSEJO DE SEGURIDAD NACIONAL

Av. Amazonas y Villalengua
Telfs: 245752 - 454358
Quito - Ecuador

DIRECCION NACIONAL DE DEFENSA CIVIL

M E M O R A N D O

DE: General de Div. E. Antonio Moral Moral
DIRECTOR NACIONAL DE DEFENSA CIVIL

PARA: Señor John Tomblin- Oficial Coordinador- UNDRO.

ASUNTO: Algunas de las posibles áreas de cooperación técnica de la UNDRO para Defensa Civil.

FECHA: Quito, 16 de Noviembre de 1.984

La Dirección Nacional de Defensa Civil Ecuatoriana, siempre se ha empeñado en llevar adelante toda una serie de actividades sistemáticas para la prevención y atención de casos de desastre. Realmente, podemos decir que el campo de trabajo es enorme, porque en países como el nuestro inciden además de los factores físicos o naturales, los problemas socio-económicos y culturales que en determinados momentos son agravantes en las-situaciones de catástrofes.

De la reunión con usted sostenida, Señor Tomblin y del conocimiento de actividades anteriores, pensamos que la UNDRO podría generar -- con relación a nosotros, una serie de tareas para la misión específica de -- prevenir y remediar desastres.

Resumiendo los aspectos que en este momento nuestra Institución considera de mayor importancia para ser reforzados o emprendidos, según el caso, tenemos las siguientes necesidades:

a) Capacitación de personal de Defensa Civil, en los aspectos de Planificación en la prevención y atención de desastres.

   La Planificación deberá estar sometida a una sistematización y utilización adecuada de conocimientos técnicos, así como a una metodología que garantice eficiencia y posibilidad de amplia cobertura con la optimización de los recursos disponibles y de las ayudas que se pudiesen recibir.

b) Financiamiento para realizar estudios especializados sobre zonas susceptibles de ser afectadas por desastres en el área circundante a la capital de la República, Quito. Estudios que constituyen ya una necesidad de emergencia para implementar una serie de medidas encaminadas a prevenir riesgos.

SECRETARIA GENERAL
DEL CONSEJO DE SEGURIDAD NACIONAL

Av. Amazonas y Villalengua
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Quito - Ecuador

DIRECCION NACIONAL DE DEFENSA CIVIL

Este tipo de actividad podría en el momento oportuno, hacerse extensiva para otras zonas y ciudades del país que lo requiriesen.

c) Cooperación para la publicación de folletos, materiales, manuales, etc, con aspectos relativos a la prevención de desastres, a la educación en Defensa Civil, auto-protección, etc, pues consideramos que la única manera de fortalecer y puntualizar las acciones de nuestra Institución, es llegando acertadamente a la población, para incentivarla día a día a tomar conciencia del propio papel frente a las diferentes emergencias.
El material para difusión y divulgación lo necesitamos en cantidad suficiente para cubrir amplios sectores y a diferentes niveles: estudiantes, profesionales, amas de casa, obreros, maestros, etc.
Sería posible que pudiésemos utilizar en algunos casos las propias publicaciones de la UNDRO y en otros debemos hacer las nuestras, ajustadas a las particularidades del Ecuador y su población.

Creemos que la acción de la UNDRO es de vital importancia, pues sin duplicar la ayuda de otros Organismos, provee a los países que necesitasen de la cooperación a niveles técnicos y económicos, el apoyo requerido en situaciones de prevención y atención de desastres.

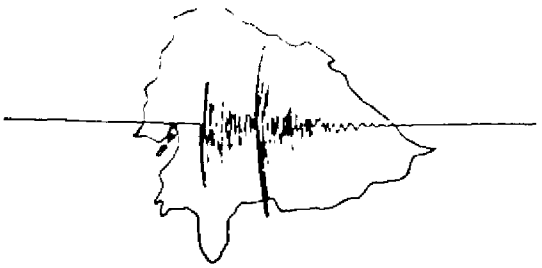
Nuestra principal misión en el momento actual, es realmente la prevención, fase en la que debemos emplear nuestros recursos, capacidades y toda la ayuda que podamos canalizar, pues con la adecuada prevención garantizamos un menor impacto de los desastres en el contexto del desarrollo nacional y sobre todo en el costo de vidas humanas.

Esperamos que los objetivos de la UNDRO, de lograr una mayor inter-acción y cooperación, ayuda mutua e intercambio entre los países de nuestra región, se logre factibilizar y llevar adelante, pues únicamente esto puede ayudarlos a aprender sobre las propias experiencias y a mejorar día tras día los Sistemas de Defensa Civil en cada uno de nuestros países.

Atentamente,

E. Antonio Moral Moral
General de División
DIRECTOR NACIONAL DE DEFENSA CIVIL.

MC/sji.



INSTITUTO GEOFISICO
ESCUELA POLITECNICA NACIONAL
APARTADO 2759 TELEX 2650 ESPONA TELEFONO 231 082
QUITO - ECUADOR

15 November 1984

To: Dr. John Tomblin
United Nations Disaster Relief Organization

From: Dr. Minard L. Hall
Director
Instituto Geofisico
Escuela Politecnica Nacional
Quito, Ecuador

Ref: **Proposal for the Mitigation of Volcanic and Seismic Hazards in Ecuador**

A. Mitigation of Volcanic Risk in Ecuador

1/ Active Volcanoes

Volcanic risk evaluations of Cotopaxi, Tungurahua, Guagua Pichincha, Antisana, and Reventador volcanoes have been carried out during the past 8 years, but not completed. Lack of funds did not allow us to do the radiocarbon dating nor the representative chemical analyses required to finalize these studies. The completion of these evaluations deserves immediate attention.

2/ Probably Active Volcanoes

Numerous volcanic centers, that are located in or adjacent to the populated Interandean Valley, have only recently been reconnoitered. Geomorphologically young pyroclastic flows and lahars associated with these centers suggest that they are potentially active and therefore dangerous. It is recommended that a volcanic risk evaluation be carried out for these volcanoes, wich include:

Chiles	Pululagua
Chachimbiro (Ibarra)	Atacazo (Niñaguilca)
Cuicocha	Quilotoa
Imbabura	Chimborazo
Cayambe	Illiniza area
Mojanda	

The evaluation should entail the study of:

a/ Volcanic stratigraphy: in order to determine the sequence of events and consequently the history of the volcano, as well as its petrographic and chemical evolution

b/ Genetic interpretation of the stratigraphy: in order to characterize the nature of past eruptions

c/ Chronology: in order to determine the age of past eruptions by means of radiocarbon dating and thereby recognize the frequency of past eruptions

d/ Geological mapping: in order to determine the extent of areas affected during past eruptions, the volume of materials ejected, and the probable routes of future flowage deposits

3/ Requirements

- Volcanologist to work 3-5 man-months for each of the eleven volcanic centers for doing rough mapping, tephrachronology, and preparing a report
- Salary and per diem expenses for the volcanologist in the field
- one 4-wheel drive vehicle
- 10 whole rock chemical analyses for each volcano
- 6-10 radiocarbon dates for each volcano
- Financial aid for preparing and publishing risk maps and reports

4/ Monitoring of Potentially Dangerous Volcanoes

a/ Seismology

At present only Cotopaxi Volcano is being monitored instrumentally at an acceptable level. Because of their proximity to major urban areas, Guagua Pichincha and Tungurahua volcanoes should be monitored with at least one permanent seismograph. It is recommended that 2 short period seismographs with telemetry capability be installed as soon as possible on these two volcanoes. These will be tied into the small regional net that the Instituto is operating around Quito.

b/ Inflation Measurements

The monitoring of volcano inflation will require leveling equipment. An EDM instrument with the capacity to measure distances of several kilometers would be exceedingly helpful.

B. Mitigation of Seismic Risk in Ecuador

1/ Identification of Young or Active Faults

A lineament/fault map has recently been prepared for Ecuador. Field studies of the major fault features of the map are required to determine if these faults have been active during the Quaternary. Approximately 6 man-months of field work is estimated for this survey.

Requirements include:
- one 4-wheel drive vehicle
- approx. 20 radiocarbon dates
- salary and field costs to be covered by local funding

2/ Volcano Crises and Aftershock Studies

The operation of a network of portable seismographs immediately installed in the zone affected by a major earthquake can provide invaluable data about the fault and its seismicity that can not be gained by other methods.

Similarly once other methods suggest that a particular volcano may be entering a more active state, it is essential to install and operate a minimum of 4 short period seismographs arrayed around the volcano in order to properly monitor its activity.

Requirements:
- 4 Sprengnether MEQ-800 portable seismographs (or equivalent)
- salaries and field expenses to be covered by local funding

3/ Strong Motion Studies

Strong motion data, obtained from accelerograms, are non-existent in Ecuador. Such data are essential for determining ground motion as well as large building response to major earthquakes. While Ecuador has suffered major quakes in past years, the absence of proper instrumentation precluded our gathering of this valuable data.

Requirements:
- strong motion instruments (such as the Kinemetrics SMA-1)

  It is recommended to install at least one in each major city, as a beginning.
- a digitizer is required for processing the data obtained from the strong motion instrument

G. Additional Programs

1/ Specialized Training

Specialized training is needed in the following areas:

a/ Monitoring of Crisis Situations, such as pending eruptions and aftershock studies

b/ Processing of seismic and accelerogram data by micro-computer

c/ Strengthening of existent and future low-income housing in order to better withstand major quakes.

2/ Visiting Experts

Short term visits by knowledgeable experts are essential for improving and stimulating local initiative and their programs. Areas in which help would be most welcomed include:

a/ Volcano monitoring

b/ Volcano risk evaluation

d/ Improved low cost housing for seismic areas

e/ Evaluation of earthquake vulnerability

3/ Natural Hazards Meeting

In November 1985 the first international meeting to discuss natural disasters in the Andean countries will be held. It is being sponsored by the Instituto Geofisico and the Dept. of Geology of the Escuela Politecnica Nacional as well as by the Comite Ecuatoriana de Ingeniería Geológica (an ad-hoc group of geologists interested in natural hazards). It is the purpose of the meeting to draw attention, in part, to natural hazards and risks, but also to the recent advances in mitigation of those hazards. The meeting will be attended principally by Latin American scientists but hopefully invited experts from more advanced countries will also participate.

A major contribution of UNDRO would be to cover part of the cost of this meeting, especially the cost of bringing several experts to Quito.

PERU

19 - 21 November 1984

Introduction

I spent three working days (19-21 November) in Lima. A list of the agencies visited and persons met is given in Annex 1. Below is a summary of the main points discussed.

Civil Defence

In Peru, as in Ecuador, Civil Defence has formal responsibility for pre-disaster planning. The Peruvian Civil Defence has a very large complement of staff, totalling more than 100 persons and including 6 administrative, 17 professional and 24 technical staff on its permanent establishment, and a further 20 professionals on contract (the latter number varies according to the availability of funds). About half of the above staff are stationed at Headquarters (the National Committee for Civil Defence) in Lima, and the other half are distributed among the five regional Civil Defence offices in Piura, Lima (a separate building from the national office), Arequipa, Cuzco and Iquitos. Salaries are relatively low and there is a high staff turnover rate. Only one of the senior Headquarters staff members whom I met had been with Civil Defence for as long as four years.

Civil Defence has developed some disaster preparedness plans of a general nature, and has produced some simple public education materials, but has done little by way of detailed planning for specific disaster types in the more vulnerable areas. Civil Defence played a secondary role to the regular military services and the National Development Institute during the major floods in 1983.

In my first meeting with the Director-in-Chiefand four of his senior professional staff (see Annex 1), I explained the objectives of my mission and asked for information on the activities in which Civil Defence was currently involved, and on projects planned for the future. During the discussion which followed, I gave examples of some of the activities which might be included in a regional programme which

UNDRO hoped to promote. At the end of this meeting I proposed that we should meet again two days later, and that for this second session the professional staff prepare outlines of those preparedness and prevention activities which they considered most in need of future attention, and for which external assistance was required.

In the second meeting with the professional chiefs and with Ing. Kuroiwa (who is on the technical advisory committee for Civil Defence), I was presented with a number of outline proposals for assistance in areas including:

a) promoting a public education campaign on tsunami preparedness (recent correspondence with UNDRO in March and June 1984 refers to this);

b) establishing methodologies and procedures for post-disaster needs evaluation;

c) carrying out detailed vulnerability studies in selected high-risk areas;

d) developing techniques for public education, especially by audio-visual methods;

e) the provision of radio telecommunications equipment, firstly to link the five regional offices with Civil Defence Headquarters, and secondly to provide mobile equipment for use within each region;

f) preparedness planning for volcanic emergency at El Misti and Ubinas volcanoes, close to the city of Arequipa;

g) prevention of fires and industrial explosions (reference was made to the recent gas explosion in Mexico City and the existence of similar risks in Lima);

h) prevention of pollution in the River Rimac (the source of a large part of Lima's water supply) which is currently contaminated by lead and other heavy metals resulting from mining and related activities in the mountains near its sources.

Having received these requests (see Annexes 2-4) I explained that they would provide UNDRO with examples of the activities to be incorporated into a proposal for a regional project, and that such a proposal would be presented to potential sponsors early in 1985. I requested that the Director-in-Chief address a letter to Mr. Einhaus, referring to the discussions held during my visit and requesting assistance with as

many of these activities as UNDRO could find themeans to support.

National Institute for Development (INADE)

In a meeting with Ing. Alfonso Vega of this Institute, I learnt of INADE's involvement in promoting the use of some of the funds provided through UNDRO for flood relief in 1983, for the construction of new school buildings (the project was actually implemented by ININVI, the Institute for Housing Research and Regulations). A video film had been made on the use of improved adobe building techniques in this construction project. I later suggested to Civil Defence that they should obtain and present copies of this video film in different parts of the country as part of their public information activities.

Other in-country offices

I also held meetings, in order to inform them of UNDRO's future intentions, with representatives of UNDP (Mr. Perez del Castillo, in the absence of the acting Resrep Dr. Ramirez-Boettner); the WFP (Dr. Karl Tippenhauer, Deputy Representative); PAHO/WHO (Dr. Miguel Gueri, Officer responsible for Disaster Preparedness project); and CERESIS (Dr. Alberto Giesecke, Director). Each of these officers showed interest in UNDRO's initiatives and promised to provide all possible support.

Recommendations for future action

The situation with regard to preparedness and prevention activities in Peru is similar to that in Ecuador. The guiding principles already outlined for Ecuador therefore apply equally to future developments in Peru. There is great interest and considerable expectation on the part of Civil Defence and its associated technical advisers, that UNDRO will help to prescribe, support and evaluate a future programme of technical assistance in the various priority areas of pre-disaster planning which have already been identified. The same people are keen to have opportunities to participate in and contribute to regional seminars and workshops in this field, noting that such events have been extremely rare in the past and that great benefits would be derived from exchanges of experience and methodologies between neighbouring Andean countries.

ANNEX 1

LIST OF MEETINGS HELD

Monday 19 November:

11.00h CIVIL DEFENCE (Esq. calles 1 y 21, Urb. Córpac, San Isidro Tel: 41-58-53)

- Mayor Gral. FAP	Carlos ARIAS Graziani	Director-in-Chief
- Gral. FAP	Juan SERSEN Rocovich	Deputy Director
- M. Econ.	Victor MURILLO	Director, Education and Reserch Unit
- Arq.	Lenguisa ANGULO	Chief of Operations
- Arq.	Augusto PERALES	Chief of Health Unit

14.00h REGIONAL SEISMOLOGICAL CENTRE FOR SOUTH AMERICA (CERESIS) (431 Avenida Arenales - Tel: 24-74-21)

- Ing.	Alberto GIESECKE Matto	Director

19.00h NATIONAL ENGINEERING UNIVERSITY - Department of Structures and Construction (Apartado 1301, Lima - Tel: 81-10-70)

- Ing.	Julio KUROIWA Horiuchi	Senior Professor

Tuesday 20 November:

09.00h UNDP (Avenida Central 643, San Isidro - Tel: 41-91-35)

- Mr.	G. PEREZ DEL CASTILLO	Deputy Resident Co-ordinator
- Mrs.	Rosemary VAN EHREN	Programme Officer responsible for liaison with UNDRO

09.30h FAO/WFP (Avenida Central 643, San Isidro - Tel: 22-07-04)

- Dr.	Karl TIPPENHAUER	Acting Representative

.../...

10.30h NATIONAL INSTITUTE FOR DEVELOPMENT (INADE)
(355, Camino Real, San Isidro - Tel: 40-37-39)

- Ing. Alfonso VEGA

13.00 CERESIS

- Ing. Alberto GIESECKE Director

16.00h PAHO/WHO (269, Los Cedros, San Isidro - Tel: 40-92-00)

- Dr. Miguel GUERI

Wednesday 21 November:

10.00h CIVIL DEFENCE

(Same officers as on 19 November, plus Ing. Kuroiwa)

20.00h Gral. Arturo DE LA TORRE and Ing. Julio KUROIWA

PROPUESTA DE INVESTIGACION PRESENTADO A UNDRO POR LA SECRETARIA EJECUTIVA DEL COMITE NACIONAL DE DEFENSA CIVIL - PERU

EL PROBLEMA POR ESTUDIAR Y SU IMPORTANCIA

En el verano y otoño austral (Enero - Junio), las aguas oceánicas y la atmósfera frente a la costa occidental de Sudamérica sufrieron profundas alteraciones, y la temperatura se incrementó entre 3 a 5° C sobre el promedio, causando - lluvias torrenciales en la costa norte del Perú y el sur del Ecuador. Este fenómeno se presenta de manera débil, todos - los años, en la época de Navidad por lo que se llama fenómeno del Niño. Cada 50 años aproximadamente, el fenómeno se presenta sumamente severo como ocurrió en 1925 y 1983, como la infraestructura urbana, vial y agrícola no estaban preparadas para soportar estas lluvias, los daños fueron muy graves sobre todo en los departamentos de Piura y Tumbes.

Al ocurrir las lluvias torrenciales por varios días consecutivos, los ríos incrementaron grandemente su volumen, - causando daños por inundación, al desbordarse de sus cauces la erosión de ribera y de fondo de río arrastró puentes y viviendas construidas cerca de las orillas de los ríos. Al quedar - parte de la ciudad bajo 1 ó 2 mts. de agua por varias semanas, miles de viviendas de adobe quedaron destruidas. Estos problemas ocurrieron en Piura y Tumbes. Otras veces, las aguas quedaron retenidas por terraplenes de carreteras de 3 a 4 mts. de altura. La violenta ruptura de esos terraplenes provocaron la destrucción de edificaciones, pistas, veredas, sistema de agua y desague, tal como ocurrió en Sullana.

En Talara, arenas eólicas depositadas en el tablazo, unos 50 mts. sobre la ciudad y en las pendientes que la - rodean, al ser arrastradas por las lluvias aguas abajo enterraron un sector importante de esa ciudad.

Las carreteras, canales de irrigación, tuberías de conducción de agua potable asi como puentes quedaron destruidas al bajar por quebradas secas por décadas gran volumen de agua, lodo y piedra. Las poblaciones quedaron asi aisladas y la infraestructura agrícola destruida.

Cuando las lluvias finalmente cesarón en Junio de 1983 los daños causado al país por el fenómeno del Niño de 1983 se estimaron en 1,000 millones de dólares americanos - (US $ 1,000'000,000.=) dejando en miserables condiciones a miles de familias y en el país, las condiciones económicas ya con problemas, se deterioraron aún más.

Necesitando el país inversiones reproductivas, ha sido necesario distraer grandes sumas de dinero para rehabilitar la zona afectada.

2) OBJETIVO DE LOS ESTUDIOS

Los estudios que se proponen realizar tienen como principal objetivo recoger en el campo, las enseñanzas dejadas por las catastrofes lluvias de 1983, lo que permitirá diseñar infraestructuras para resistir lluvias intensas como - las ocurridas en ese año, al mas bajo costo posible.

Por otra parte las informaciones que se recogerán y las conclusiones a que se lleguen no solamente serán útiles para el Perú, sino también para países que se enfrentan con problemas semejantes.

3) PERSONAL A CARGO DE LOS ESTUDIOS

Los estudios serán efectuados por el Ing. Julio Kuroiwa H., profesor principal de la UNI de Lima y miembro - del Comité Científico de Defensa Civil. El Ing. Julio Kuroiwa ha concluido exitosamente un estudio sobre Tsunamis para las

costas de Lima Metropolitana, auspiciado por UNDRO.

4) CONOCIMIENTO DEL PROBLEMA

A la fecha se estan concluyendo 2 tesis de grado de Ingeniería Civil en la Universidad Nacional de Ingeniería que estan siendo dirigidas por el Ing. Julio Kuroiwa - y que son auspiciadas por Defensa Civil del Perú. Se esta estudiando los daños causados por las lluvias en las obras de Ing. Civil . Esto significa un avance en los estudios - que estan proponiendo.

5) PLAZO Y COSTO DE LOS ESTUDIOS

Dado el avance que se tiene a la fecha, se estima que los estudios pueden tener una duración de 15 meses, fecha en que se terminará la redacción de un informe que tendrá entre 90 y 100 pgs. donde se incluirá de manera resumida los resultados de los estudios y las recomendaciones para evitar daños similares a lo ocurrido, en el futuro.

Se estima que el costo de los estudios incluido 300 volúmenes del informe es de $ 19,000 dólares americanos. Este costo se incluyen todo el material necesario - asi como pasajes y viáticos a la zona de estudio y un viaje al exterior para la consulta de un asesor externo.