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REPORT AND RECOMMENDATIONS OF THE ECLA/ILPES MISSION ON THE EARTHQUAKE IN PERU ON 31 MAY 1970

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/Letter

Mr. Carlos Quintana
Executive Secretary
Economic Commission for Latin America
Santiago

Mr. Executive Secretary,

In accordance with the mission, jointly entrusted to us by Mr. Raúl Prebish, Executive Director of the Latin American Institute for Economic and Social Planning, and yourself, which was to prepare a technical report to serve as a basis for discussion at the extraordinary session of the Committee of the Whole to be held on 22 and 23 June - a session convened to examine the situation caused by the earthquake which devasted the Departments of Ancash, La Libertad, Huánuco and part of Lima in Peru - we have the honour to submit the present report.

In this report, we have endeavoured to summarize the observations made during our brief mission which reflect the magnitude of the disaster, both in human and in economic terms, and indicate Peru's urgent need for effective and adequate external assistance both from the international technical assistance agencies and from those that are in a position to offer their financial co-operation in the reconstruction and rehabilitation of the affected area.

Our final recommendations also express our view that there is a need to set up more flexible machinery for dealing with such natural disasters - which are, unfortunately, of increasingly frequent occurrence all over the world - with due regard for the special urgency involved and the necessity of making good losses that represent a setback for development.

In view of the speed with which this report had to be prepared, we remain at the disposal of Mr. Prebish and yourself to complement the data it contains with any oral clarifications that may be required. We are convinced that the stark figures on their own, and the incompleteness of

some of the data owing to the short time that has elapsed since the catastrophe, prevent our report from conveying a proper idea of the tremendous human tragedy that this disaster represents for hundreds of thousands of Peruvians.

We have the honour to be, Sirs, very truly yours,

Raúl Sáez

Jules Dekock

Eduardo García C.

Jorge Rose

Juan Ayza

ECLA/ILPES MISSION

REPORT AND RECOMMENDATIONS OF THE ECLA/ILPES MISSION ON THE EARTHQUAKE IN PERU ON 31 MAY 1970

The present report is only a very rough preliminary technical appraisal of the effects and repercussions which have already been produced by the earthquake which devastated a large area of Peru on 31 May 1970, and of its future consequences.

The short time which elapsed between the occurrence of the earthquake and the visit of the ECLA/ILPES Mission, the scale and difficulty of the emergency operations which the Peruvian authorities had to carry out at all levels, and the short duration of the Mission's stay in Peru owing to the date fixed for the extraordinary session of the Committee of the Whole of the Economic Commission for Latin America, to which the present report is to be submitted, all go to explain the inadequacy of the data contained in the report and the undeniable shortcomings of some of the estimates. Notwithstanding these limitations, it is felt that this document will give a good idea of the magnitude of the disaster.

The report is subdivided as follows:

1. General description of the catastrophe
2. Economic and social conditions in the region affected by the earthquake
3. Preliminary appraisal of the earthquake damage
4. Organization of emergency operations and the Reconstruction and Rehabilitation Committee
5. Some prospects for rehabilitation
6. Recommendations of the ECLA/ILPES Mission.

/1. General

1. General description of the catastrophe

At 3.23 in the afternoon of Sunday 31 May, Peru suffered a violent seismic disturbance which was felt by the inhabitants of a vast area stretching from the Amazon port of Iquitos in the north to the coastal region some two hundred kilometres south of Lima. Hours later the country and the world learned that an earthquake of major intensity and magnitude, with its epicentre on the continental platform about 80 km from the coast, between Chimbote and Casma, had severely affected the Department of Ancash and brought extensive destruction to the Departments of La Libertad in the north, Huanuco in the east, and part of Lima in the south, extending over an estimated total area of 83,600 km^2.

Although at the time of preparing this document the ECLA-ILPES Mission has not had access to a scientific report on the earthquake, it can be confirmed that the most severely damaged area is one of Peru's most active seismic zones, the Huaylas valley, which, together with the Arequipa valley, is one of those where earthquake intensity is greatest. The nature of the destruction observed by members of the Mission both in Chimbote and in the Huaylas valley, suggests that the intensity of the earthquake was probably between VI and VII on the corrected Mercalli scale, while the damage caused in certain very restricted areas would indicate an even greater intensity, due partly to the faulty construction or foundations of the buildings affected. An intensity of this degree would correspond to an approximate magnitude of between 6 and 7 on the Richter scale. *

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* The "magnitude" of an earthquake is independent of the epicentre or location of the seismographic station and is determined by recording instruments. "Intensity" is based on the reactions of people and the behaviour of buildings and natural objects in a given locality.

The Mission hopes it will be excused for putting forward its own appraisal of the situation while valuable scientific studies conducted by Peruvian and foreign agencies which will provide useful background data are still in progress.

/The destruction

The destruction wrought by the earthquake, which for the reasons given and because of the design and the type of materials employed caused extreme damage to dwellings and other buildings, was greatest in the mountain areas on account of localised landslides, rockfalls and avalanches which prevented the water from draining away. Above all, an immense "huayco" (avalanche) which occurred when a gigantic cornice of ice was detached from the north side of the peak of the Huascarán mountain and descended the Llangunaco ravine, burying the village of Ranrahirca - recently rebuilt following a similar avalanche in 1962 - and the large town of Yungay - with an estimated population of 18,850 - under a mass of mud, ice, water and rubble. To appreciate the magnitude of this catastrophe, it should be borne in mind that the cornice of ice which broke away was situated at roughly 2,500 metres above the town and at a horizontal distance of 10 km up the ravine, which meets the Santa river at a right angle. The Santa valley is at present full of debris brought down by the avalanche which, judging by eye from the air, would appear to cover an area of at least 10 to 12 km^2, to an average depth of around 3 to 5 metres. (The depth was estimated both from the channel cut by the river itself through the material deposited by the avalanche and from the trees and other signs.) The amount of mud deposited on the buried villages and in the ravine itself would suggest that the mass that swept down it in a few minutes must have been between 100 and 150 million m^3 in volume. It probably built up in the narrow neck of the ravine to form great waves which flooded or "jumped" over the hill running parallel to the ravine, which, rising to some 200 metres, appeared to protect the town of Yungay on the south from any accident of this nature.

The water of the Santa river rose as a result of the avalanche, producing a huge wave fifteen metres high, which swept through the narrow Del Pato canyon, causing considerable damage to the Huallanca-Chimbote railway line. Several sections of the railway were buried in the mud from this wave, and many parts of the line were virtually torn up by the foundations.

/The seismic

The seismic activity in the area has continued with tremors of varying intensity set off by the earthquake, which are undoubtedly still producing side effects such as landslides and earth-falls. Fortunately, the phenomenon was not accompanied by a tidal wave or by "tsunamis" and the Mission was informed that so far no unheavals, cave-ins or settling had been observed which might indicate other changes in the local topography than the landslides and avalanches already reported and possibly the emptying of some lakes.

/2. Economic

2. Economic and Social Conditions in the Region affected by the Earthquake

In order to assess the general effects of the earthquake on Peru's economy and social development, it is imperative to have some knowledge, even if only superficial of what the Departments concerned represent in relation to the whole country. Unfortunately, there are no sufficiently up-to-date and detailed marcoeconomic data to achieve this objective completely.

In spite of this serious difficulty, and even at the risk of committing some errors, the Mission will try, in this section, to present an over-all view of this kind.

It reveals that Ancash and La Libertad are very important to the economy, and that until the sources of production in the area are re-established the Peruvian economy will sustain very substantial losses which may slow down the present trend towards a more accelerated economic growth rate.

(a) General considerations

The usual difficulties in making an economic and social appraisal of the results of a disaster such as that which took place in Peru are aggravated by the fact that the earthquake area has been only partially surveyed, and that the 83,600 square kilometres it covers present a wide variety of economic patterns. It comprises one of the main grain-producing regions in the country; a region where a spontaneous process of land settlement has been going on since the last census, in 1961, with the migration of a large number of inhabitants from surrounding areas; two cities where industrial development has been extraordinarily rapid in the last few years; and the coastal region, where export agriculture is based on a substantial increase in irrigation with groundwater. Another obstacle to any economic appraisal of this kind is the fact that the macroeconomic and sectoral statistics always appear with some delay.

/In terms

In terms of territory, the earthquake has seriously affected the economy of the Department of Ancash, the provinces of Santiago de Chuco, Huamacucho and Otuzco in the Department of La Libertad, and all the Andean provinces in the Department of Huanuco. In the provinces north of Lima, which, like those mentioned above, are adjacent to the Department of Ancash, there was damage to some villages and in their communications.

Another section of this report describes the main material damage sustained. From the economic standpoint, one of the problems it has caused is the paralysation of all services in the Andean areas. This is a serious obstacle to a return to normal economic conditions and is causing the sudden migration of the most productive section of the population to areas such as Lima, where it will probably increase the proportion of disguised unemployment. This is already apparent in the sharp increase in the population of the town of Chimbote which, according to reports from the emergency committee in the area, has occurred since the earthquake.

As regards the national economy, the economic depression caused by the earthquake, even if only to start with, in the disaster area will necessarily result in a decline in real demand for manufactured products. It must be borne in mind that, in general, the inhabitants of those regions formed part of Peru's monetary economy. Therefore, in spite of the relatively low level of personal income, their demand for finished products was significant, since it was mainly for the products of industrial groups which have long exhausted the possibilities of import substitution. This economic setback will become less important and may even be offset by reconstructions and allied activities.

The Peruvian Government has naturally adopted emergency measures, followed by other measures for the economic rehabilitation of the area. It is thus forced to divert material and financial resources that were intended for the economic development and stabilization programme which it had successfully launched in late 1969. One of the most important aims of that programme was to eliminate, as far as possible, the open and disguised unemployment prevailing in most of Peru.

/(b) <u>The</u>

(b) The economy of the Department of Ancash

The available economic indicators show that the economy of the Department of Ancash has expanded faster than that of any other department in Peru over the past ten years. This is due to the steady growth of the traditional sectors, such as agriculture and services, and to the establishment of new industries in the Chimbote area.

Chimbote is the nucleus of the recent industrial expansion in this region. Industrial activity is based on the boom in fish processing and the steady expansion of steel making. The fishing industry in Ancash contributes more than 30 per cent of Peru's total fish meal production and is therefore an important source of foreign exchange.

The steel industry is giving rise to allied industries, such as the manufacture of metal, refractory and chemical products. Thus a new industrial centre is coming into being on the Peruvian coast, whose population appears to have grown at an annual rate of 13 per cent in the last ten years.

There is no up-to-date information available on the regional distribution of income in Peru. In 1961 it was estimated that Ancash accounted for about 9 per cent of the total domestic product. Judging from the above-mentioned trends, the proportion must have risen to about 14 per cent by the end of the 1960s. Moreover, with the amounts that had been or were to be invested in the Chimbote area and in industry in the sierra region, this Department's contribution to the national economy would no doubt have continued to increase in the future.

For a better understanding of the Department's economy and a proper assessment of the effects of the earthquake, it is necessary to distinguish between the two regions composing it. The Cordillera Negra constitutes a natural barrier between the coastal valleys and the Andean area. The latter comprises the Callejón de Huaylas and the eastern slopes of the Cordillera Blanca which drop down to one of the main tributaries of the Amazon. The coastal region, 11,000 square kilometres in area, is approximately two and a half times larger than the sierra. The coastal region has 310,000 inhabitants and the sierra 435,000. The two areas are briefly described below.

(i) The

(i) The economy of the coastal region of Ancash. The coastal region of Ancash, like that of the rest of Peru, is a desert strip crossed by a few valleys, through which flow the tiny rivers rising in the nearby Cordillera Negra, and the Santa River which is fed by the waters of the Callejón de Huaylas and flows into the sea near Chimbote. The highest part of this dry area is 1,500 metres, at which level rainfall is more abundant and therefore, there is more vegetation, and crops are grown.

The most important town in the Department of Chimbote lies north of this coastal strip, about 400 kilometres from Lima, with which it is linked by the Pan American Highway; the whole of this sector of the Highway which runs along the coast of Ancash is paved. Chimbote has a population of about 212,000 (28 per cent of the Department's total population) and it is the main centre of Peru's fishing and steel industries. As a result of its rapid growth, there are extensive shanty towns.

Owing to the aridity of this region, agriculture is confined to the river basins and can be extended only by means of irrigation, but this is limited in any case by the heavy investment required and the small amount of arable land available.

While the Ancash coastal area represents 8 per cent of the whole coastal area of Peru, only 6 per cent of the total cultivable coastal area lies within it, representing only 18 per cent of the whole area of the Department. This region therefore has a lower agricultural potential, even though intensive agriculture is practised there, with a proper use of fertilizers, and the yields are consequently high.

The principal crops, apart from subsistence crops, are sugar-cane (41 million soles in 1967), groundnuts and cotton. There is some stock farming and crop farming, but on a smaller scale than in the sierra.

Chimbote is the most important fishing port in the world; 28 per cent of the fish caught in Peruvian waters is unloaded here. Forty per cent of Peru's total production of anchoveta, the chief species, comes from Chimbote. The entire tuna catch passes through this port.

Recently, there were forty-seven fish-processing plants operating in the Department of Ancash, representing 30.5 per cent of all Peru's fish-processing facilities. The fishing fleet consisted of 400 vessels and employed 4,300 fishermen. Fishing activities in this area provide employment

/for about

for about 7,600 persons, the difference between this and the previous figure representing the workers in industrial plants. Thirty-seven per cent of Peru's total output of fish meal and 50 per cent of its fish oil are produced in Ancash.

Most of the plants are in Chimbote, although there are some in Casma and Huarmey. A sample of the plants indicates average fixed assets of about one million dollars per plant.

Previously, the steel industry used Tysland-Hole electric furnaces for reducing the ore, but these have now been replaced by a blast furnace fired with imported coke.

Total steel making capacity is about 350,000 tons of ingots a year, but the actual output of steel and pig iron is less than 90,000 and 120,000 tons, respectively. This is partly due to the temporary problem of an imbalance between steel making capacity and that of the plants producing semi-finished and finished products.

The bulk of the production is non-flat products, but a rolling mill with an annual capacity of 130,000 tons of flat products is being installed.

The following figures provide a yardstick for estimating the loss of production due to forced idleness as a result of the earthquake: the daily output of the forty-five registered steel plants employing more than ten workers amounts to 10.4 million soles, or 270,000 dollars.

Steelmaking provides employment for about 1,600 persons. Allied activities include the manufacture of refractory products and chemicals.

Other important activities in this area include repairs to boats and to motor vehicles.

Although the manufacturing industry (establishments with five or more workers) of Ancash provided employment for some 8,000 persons, it is estimated that in 1966 about 21,000 workers were employed in industry in the Department, if artisan-type activities are included.

Ancash is an area where both industry and population have grown at a rapid pace, and a high proportion of the goods it produces are sent elsewhere; its own consumer market and labour force are in full development. Given the conditions under which such expansion is taking place in Peru's coastal region and its great momentum, this partly explains the flimsiness of many dwellings in the coastal area and the inadequacy of the urban infrastructure and other public services.

(ii) <u>The</u>

(ii) The economy of the Ancash sierra. Owing to the difficulty of obtaining regional data, it is impossible to give anything more than a very rough description of the economy of the Ancash sierra and its importance in the economy of Peru. A further obstacle to an objective analysis is the apparent universal tendency to treat the area as if did not differ basically from other parts of the Peruvian Andes, despite its tremendous advantages in having fairly easy access to coastal markets and in a combination of a favourable climate with a relatively abundant supply of land, and rivers which never run dry and provide enough water all the year round. The Ancash sierra also benefits from the presence of numerous smallholders, who although their individual incomes are low, produce marketable surpluses.

This goes to explain both why there are great many small villages and towns and why this is a monetary economy and the barter system prevalent throughout most of the Peruvian Andes is uncommon. The presence of these villages and towns is in turn responsible for a network of services, which means that the proportion of the active population engaged in trade in the Ancash sierra provinces is far larger than the average for the Peruvian Andes and that, from the point of view of services, it is comparable to the northern coastal provinces of Peru, except for the oil-producing areas.

Consequently, the farmers possess a local market to which they send whatever part of their produce they could not dispose of in the coastal markets because of distance, and competition from other areas. The result of this has been a high degree of diversification in agricultural production, despite the fact that the ecology of the region is relatively uniform. They have thus been able to avoid the kind of single-crop agriculture to be found in other parts of the Andes where, regardless of its capacity or fertility, the land is devoted to the sole product that can be transported to the coastal area.

This diversification has made it possible for the sierra's agricultural production to supply the coastal markets with foodstuffs and raw materials which Peru is short of. Thus, for example, although the

/area accounts

area accounts for less than 8 per cent of the agricultural land under cultivation, it produces 15 per cent of the country's potatoes, 16 per cent of its unmilled maize, 18 per cent of its barley and 21 per cent of its wheat, which is Peru's main import commodity. While its beef output is comparatively low (7 per cent of the total for Peru), it provides over 12 per cent of the country's milk products thanks to its production of alfalfa, which represents 13 per cent of the national output.

The available data indicate therefore that this is an open economy with a well-balanced structure. The agricultural and services sectors support each other and also quite a large artisan-type industry. The areas's economic growth is based on the saving of its inhabitants, most of which is invested locally with the remainder invested abroad through the trade banks.

In recent years, a certain number of manufacturing industries have sprung up and investment in tourist facilities has increased. For the most part, however, the area has been getting its manufactures from the coastal region, and, as one of the few mountains areas that has been incorporated into the monetary economy, it is an important market for industries (such as textiles and footwear) that have exhausted the possibilities of import substitution.

(c) The economy of the Department of La Libertad

The Department of La Libertad provides a significant share of Peru's domestic product and of its foreign exchange earnings as it possesses the country's largest agro-industrial complexes, which employ 40,000 people and account for some 50 million United States dollars of the country's income in foreign exchange. Though sugar production increased relatively slow during the 1960s, investment in the manufacturing sector was substantial, and steady enough to make the Department's capital,

/Trujillo, a

Trujillo, a large industrial centre. Moreover, investment in roads penetrating into the Amazon valleys has contributed towards the apparently rapid economic growth of the mountain area, which sends its surplus production to Trujillo and other coastal markets in the Department.

Trujillo is the centre of Peru's main sugar-growing region and a city which is in the process of industrialization. It is also the home of a great many artistic and archaeological treasures. The centre of the city, which was founded in 1534, boasts number of ancient mansions and churches which attract an increasing number of tourists, from home and abroad. On the outskirts can be found the huge ruins built during the Chimú period, including the imposing town of Chan Chan, which covers seven square kilometres. The mansions, churches and ruins have all been severely damaged by the earthquake of 31 May, but no estimate of the cost of rehabilitation has yet been made. The same applies to the University of Trujillo, whose biological and industrial research laboratories were built with credits from the Inter-American Development Bank and with technical advisory assistance from UNESCO.

The economy of the sierra area of La Libertad somewhat resembles that of the same area in the Department of Ancash, described above. It has numerous towns with from 5,000 to 25,000 inhabitants, and a diversified agriculture (though devoted mainly to cereals, potatoes, and fruit), and a substantial section of its population is employed in the services sector. Unlike the Ancash area, on the other hand, land ownership follows the old patterns of large estates in a few hands, but this is offset by the large number of tenant farmers. Another difference is that is is not far away from the market centres of Trujillo and other coastal towns. For the rest, the foregoing description of the Ancash sierra is also valid for that of La Libertad.

/(d) <u>The</u>

(d) The economy of the Department of Huánuco

Huánuco, being linked to Lima by the main means of communication with the Amazon plains, is one of Peru's in-migration departments. Migration is encouraged by the fact that it is mostly Amazon valleys more than 1,000 metres above sea-level.

The parts of Huánuco that were affected by the earthquake, however, are the provinces bordering on Ancash. The Central Cordillera of the Andes, in which vast plateaus and numerous valleys formed by tributaries of the Amazon are to be found, traverses this area. Apparently heavy in-migration from the neighbouring departments has been going on in this area, too, so that available population statistics may not accurately reflect its growth. Suffice it to say that a large number of towns with from 5,000 to 8,000 inhabitants have sprung up in the area, and that part of its agricultural produce is sent to the rest of the Department of Huánuco and, via Ancash, to Lima.

Proper means of transport are lacking and the social infrastructure is very inadequate, because in-migration is such a new phenomenon. To a certain extent, therefore, this is a developing regional economy, the earthquake damage which could not be evaluated satisfactorily, even on a preliminary basis, as in this report, since, as will be shown below, the effects of the catastrophe on the eastern slope of the Cordillera Blanca are still unknown.

(e) Problems facing the national economy as a result of the earthquake

The tremendous damage caused by the earthquake coincides with the programme of economic recovery being implemented by the Government. In 1969, the economic growth rate was less than 2 per cent, under the effect of the stabilization plan introduced in 1968. In the second half of 1969, however, there were definite signs of an up-turn in the economy.

The decline experienced in 1968-1969 led to more widespread unemployment and, undoubtedly, under-employment as well. In 1969, private investment failed to respond to the various incentives which the country's economic policy provided; and, whereas public investment rose by 11 per cent, private investment actually dropped by over 10 per cent. All in all,

/domestic investment

domestic investment fell 7 per cent. In accordance with the Operational Budget for 1970, the Peruvian Government was attempting to arrest this downward trend. To do this, it planned an increase of 46 per cent in domestic investment, at current prices, which was designed to bring about a 7 per cent rise in the growth rate of the gross domestic product. The driving force behind this new investment rate was to be public investment, which was supposed to climb by 50 per cent at current prices.

Since unemployment had been on the way up in 1968-1969, the above investment programme was intended specifically to combat that trend. In view of the importance of construction work from the point of view both of economic recovery and of employment opportunities, the Government project involved giving it a powerful impetus through public investment in infrastructure and increased investment in housing. According to this plan, the construction sector is expected to attain a growth rate of 25 per cent, thus offsetting the decline of the two previous years. It should also be pointed out that, whereas it was planned to concentrate public investment to some extent in the Department of Lima, the investment resources of the public sector will now have to be spread over nearly all the departments in the country.

The first and most tentative estimates of the absolute minimum of resources needed to prevent an immediate out-migration from Ancash to other parts of the country and to revive Chimbote's manufacturing industry and restore the balance of the economy of the Department's mountain area are roughly the same as the figure for the 1970 public investment programme. In other words, the Government is faced with a serious dilemma. If the process of economic recovery initiated towards the end of 1969 is to continue, then it must maintain its investment programme. At the same time, it must forthwith allocate financial resources for the rehabilitation of the devasted areas. Hence the pressing need for outside financial assistance that would enable the country to maintain a reasonable balance in its national activities.

In recent years, taxation has risen sharply and the tax system is currently being formed so as to remove the inflexibilities and inconsistencies of the existing system. Until this reform produces results, the financing of the rehabilitation programme for Ancash without causing inflation will largely depend on the sources of outside savings to which reference has been made.

/3. Preliminary

3. Preliminary appraisal of the earthquake damage

As stated above, it is impossible to make a human and social, technical and economic appraisal of the earthquake damage and effects so soon. The main task of all the personnel that has been mobilized is to deal, first and foremost, with the human problems resulting from the disaster and, secondly, to restore transport and communications, and power, water and sewerage services, and to provide temporary shelter for the homeless.

Moreover, there are large areas which are still inaccessible, on which the fragmentary information that has been collected is completely inadequate in quality and in quantity. For example, many buildings which appear to be intact or only slightly damaged from an aerial survey are really a total loss because of structural damage to their main walls. It is not yet known even whether the walls of important industrial plants are out of plumb or there have been subsidences of their foundations which will make major repairs necessary; neither is it known whether small instruments or equipment, which may take months to replace, have been damaged also.

On this flimsy basis the Mission has endeavoured to interpret the data thus far available and to arrive at a very rough preliminary assessment of the human and material effects of the disaster in the light of its own observations in the area.

(a) Casualties

Although the official number of casualties is still far from being accurately determined (and will probably never be really known), the following estimated figures were announced on 13 June: 20,000 dead, 30,000 injured and 40,000 missing. In Yungay and Ranrahirca alone some 18,000 people were buried under the landslide; in fact, of the 20,700 inhabitants of these two population centres, barely 2,500 were registered during the rescue operations. The number of dead plus the number of missing does not necessarily represent the total death toll, however, since it is quite possible that once this phase of understandable confusion is over, the final figure will be somewhat lower.

/Up to

Up to that date, the National Emergency had recorded 2,920 dead and 13,021 injured; while 21,069 persons, relatives or friends, had been reported missing, and 402 persons had been evacuated from the danger areas - apart from the injured that had been taken to towns and hospitals for treatment. Transport was almost entirely by plane and helicopter, in view of the difficult access to the population centres affected, except in the case of coastal towns situated along the Pan American Highway. The Committee also considers that it is imperative to transfer about 50,000 people from the most devastated areas to other parts of the country.

(b) Houses and other buildings

The destruction of houses and other buildings in urban centres would seem to represent the biggest loss in terms of capital goods.

The magnitude of the earthquake was compounded by poor construction, as is apparent to anyone observing the ruins in the most severely affected towns. Apart from the poor quality of some of the materials used some of the practices in the use and disposition of the materials are very unsatisfactory (even for the prevailing type of one-storey building), and clearly shows the lack of, or failure to comply with, technical building standards.

In the loose and sandy soil of the coast, where the underground water-level is very high, many buildings collapsed because the foundations were not deep enough. There is a general lack of structural binding or tie-ins in buildings in both the coastal region and the sierra. In contrast, the few buildings which have reinforced concrete pillars at the angles of the main walls with reinforced concrete ties overhead and are properly designed and constructed on sound foundations, stood up well to the earthquake shock, even some two- and three- storey houses.

Dwellings in the sierra region have heavy roofs with mud tiles and roof joists, resting on walls without any lateral binding and often they have no sleeper joists that will withstand the horizontal stress.

/The information

The information available is still too scanty to determine with any degree of accuracy how many houses have been destroyed. Considering the percentage of destruction estimated by the National Emergency Committee for some localities (on the basis of aerial photographs), the population data obtained from the Statistics and Census Office, and the number of inhabitants per dwelling according to the 1961 Census, it may be estimated, as first approximation, that 90,000 to 100,000 urban and rural dwellings were destroyed in the Department of Ancash alone. This number includes a wide variety of dwellings in terms of type of housing, area and value, including those called chozas (hovels). If the destruction in the adjacent departments is taken into account the number may well be as high as 110 000. The number of homeless is probably, therefore, more than half a million.

The homeless in the sierra area require special attention, since because of the altitude, it is very cold, and the rainy season starts in September.

The construction of new dwellings similar to those destroyed but better designed to withstand earthquake shocks would cost at least 5 000 to 6 000 million soles (125 to 150 million dollars).

The expenditure on dwellings will be even higher because of the repairs that will be necessary in the case of those which are still structurally sound, although strictly speaking the losses due to the earthquake may have been less because they were old and crumbling before the disaster occurred.

In addition to dwellings, a great many buildings have been destroyed or made unusable, such as public administration buildings, hospitals, clinics, schools, churches, banks, sports pavilions, etc. Even before the earthquake there already a shortage of hospitals, clinics, health centres and first-aid posts in the Department of Ancash; altogether they were thirty-six medical centres with about 1,000 beds. Many of these with no doubt have been destroyed. It is already known that the Barranca hospital and the recently constructed hospital at Casma were destroyed, and the Workers' Hospital in Chimbote was seriously damaged.

/There has

There has also been widespread damage to educational institutions, but it cannot be evaluated because the information available is insufficient in quantity and coverage. This is what the Mission was told in Chimbote, where it saw two schools that had been completely destroyed. In 1966 there were 1,641 schools attended by 150,000 children in the Department of Ancash, after there had been increases of 7.2 and 19.9 per cent annually in the preceding four years in the number of primary and secondary schools, respectively. In the neighbouring Department of La Libertad, half the Universidad de Trujillo is in ruins and the other half is seriously damaged.

Other public buildings are known to have been damaged and in some cases completely destroyed.

It seems appropriate to estimate the total loss at somewhere between 600 and 800 million soles (15 to 20 million dollars), depending largely on the amount of equipment that has been destroyed in hospitals and the university. As in the previous case, this estimate represents the invesment required to replace the ruined buildings by new ones of a similar type but which are better structurally and more functional

(c) Urban centres and health services

In urban centres, there has also been widespread damage to roads and to drinking water supplies and sewerage services. In the main towns of the most severely affected region, the sewers are not operating at all, while the coastal towns are faced also with drainage problems. The most seriously damaged drinking water supplies (Chimbote, Casma, Huarmey, Huaraz, Recuay, Chiquián, Aija, Caraz, Yungay, Ranrahirca, Carhuaz and Marcara) used to provide water for 152,000 people through 10,500 branches to houses and an unknown number of public fountains. The supply systems cover more than seventy kilometres. The sewerage systems (Chimbote, Casma, Huarmey, Huaraz and Yungay) totalled about forty-six kilometres in length and comprised more than 5,000 branch connexions to houses.[1/]

Chimbote, with an estimated population of 290 000 inhabitants after the earthquake (some 80,000 are thought to have flooded into the town in the ten days following the disaster), previously had connexions to around 40 per cent

1/ Information supplied by PASB/WHO.

/of its

of its houses. The remainder get their water from public fountains, water carts and private wells. The town is normally supplied by four wells connected to a network consisting of iron and asbestos cement pipes which burst during the earthquake. The pumping system broke down when the electricity supply failed, and the water-towers have yet to be checked for structural damage.

The sewerage service 2/ comprises three independent systems discharging into the sea which serve the sections of the town which have a drinking water supply. The rest of the population throws its dirty water into open drains. Although the exact state of the sewerage system is still unknown owing to the breakdown in the water supply, there is every reason to suppose that it has suffered severe damage.

The town also uses ten drains to reduce the underground water-level which is very high and empty the water into the sea. Since even under normal conditions it does not operate satisfactorily, there are some 300 hectares of waterlogged ground which are a potential source of pollution. As a result of the earthquake the situation has deteriorated owing to the blockage or bursting of the drains and to the fact that, with the drinking water and industrial wells out of commission, the water-level has risen further, bringing with it the additional risk of pollution and threatening the foundations of certain buildings.

In the towns situated in the Callejón de Huaylas, the drinking water and sewerage systems apparently catered to a smaller proportion of the urban population. Instead, there are a great many private wells serving various purposes and sewage disposal systems that empty directly into the Santa river.

Considering the characteristics of the existing services, the need to rebuild certain towns on new sites and the necessity of equipping the new dwellings with adequate services, the investment required for the above-mentioned urban public services is estimated at no less than 600 million soles (15 million dollars).

2/ Ibid.

/(d) Transport

(d) Transport infrastructure

(i) Damage to the road network. According to information supplied by the Ministry of Transport and Communications, the road network of the entire area affected by the earthquake is some 4 320 km, in length i.e., 8.7 per cent of the country's entire highway network.

LENGTH OF ROAD NETWORK IN THE EARTHQUAKE AREA AND PERCENTAGE OF THE NATIONAL TOTAL

Paved a/	443 km	9.1 %
Improved b/	119 km	1.4 %
Earth c/	2,498 km	17.9 %
Negotiable paths d/	1,260 km	5.6 %

a/ Asphalt surface.

b/ Surface of graded materials.

c/ Surface of non-graded gravel materials.

d/ Running in random directions.

The most severely damaged stretches of paved road are the Panamerican Highway, running along the coast, the partially paved Huaraz-Sihuas highway in the Department of Ancash (Callejón de Huaylas), and a few roads in the Department of Lima. On the remaining roads, most of the damage was in the Department of Ancash, and about 30 per cent of its improved roads, 80 per cent of its earth roads and over 60 per cent of its negotiable paths were affected. Official statistics for 1968 indicate that most of the Ancash network was made up of earth roads and negotiable paths.

The damage to various stretches of paved roads, including the Panamerican Highway, took the form of collapses of the roadbed, cracks in the roadbed and in the asphalt surfacing, slipping of the road-filling and shoulders, minor landslides and collapses and, as regards the bridges, subsidence of the infrastructure pulling the superstructure out of alignment.

The effects of the earthquake were more serious in other roads. There are massive falls of rock and other materials which have covered the whole road, on many stretches, slipping and collapses of the roadbed repeated minor earthfalls and subsidences, total or partial destruction of many bridges, and severe damage to the entire drainage system.

/Despite the

Despite the interruption of traffic along many roads, immediately after the earthquake as the Mission was able to appreciate, the competent bodies of the Ministry of Transport and Communications made a tremendous effort and succeeded in reopening the roads to traffic within a few days, - though often on a makeshift and provisional basis - along a large section of the main arteries.

The Mission was also able to co-operate with officials of the Ministry in considering a preliminary assessment of the damage sustained by the public road network. A conservative estimate sets the damage at around 549 million soles (13.7 million dollars), of which 541 million for the repair of the roads themselves, and the remainder for equipment, material and buildings belonging to the highways department.

(ii) Railways. The only railway line affected by the earthquake runs between Chimbote and Huallanca and is operated by the Corporación del Santa. No information has been forthcoming on possible damage to the railway line between Trujillo and the port of Salaverry, or to the railways in the Department of Lima, but this is not thought to have been extensive.

The Santa railway line between Chimbote and Huallanca is 168 km long, including branch lines, and has a 0.914 metre gauge. The rolling stock consists of 10 old steam locomotives, 8 passenger coaches and 124 freight cars. The freight traffic (35,000 tons a year) represents less than 1 per cent of the country's total railways traffic. In recent years, it has also been running at a heavy loss owing to the limited traffic and the old age of the permanent works and the rolling stock.

Judging from information obtained by the Mission, much of the Santa railway track has been destroyed, mainly by the wave that swept down the Santa river as a result of the "huayco" which buried Yungay and filled at least a fifteen-kilometre stretch of the river bed with mud. In view of the present situation and the dim prospects for railway transport in the area served by this line, it would be advisable to take advantage of the earthquake to abandon it altogether and replace it with a road built along the railway track. This proposal is being considered by officials of the Ministry and the management of the Corporación del Santa.

/(iii) Ports.

(iii) Ports. The earthquake area includes a number of seaports, of which Chimbote and Salaverry are of particular importance. Of the rest, Huarmey, Supe and Huacho are not very important, and Casma is just a small fishing port. Chimbote ships about 15 per cent of Peru's exports, not counting its iron ore, and Salaverry 6 per cent; the remainder together handle about 4 per cent. Coastal traffic accounts for 18 per cent.

Initial estimates of the Water Transport Department set the damage to the ports mentioned at 7.6 million soles (190,000 dollars), 5.7 million of which for Chimbote.

The damage to the port of Chimbote consists mostly of the destruction of port terminal, cracks in the main dock, a difference in level between the part of the wharf built on piles and the part built on filling, and damage to the electricity supply installations.

As for the Port of Salaverry, the most serious factor is that to operate the loading machinery for bulk sugar, the principal commodity handled by the port, electric power has to come from the hydroelectric power station of the Cañón del Pato, the condition of which is dealt with elsewhere in this report.

Most of Peru's exports of fish meal go through Chimbote. The coastal trade is mainly in SOGESA iron ore.

(iv) Civil Aviation. Nearly all the damage was in the airport of Caraz, in the Callejón de Huaylas. Three-quarters of the airport is covered to a depth of several metres by material brought down by the avalanche. To facilitate the resumption of air traffic, a landing strip has been put into operation at Anta, and it is probable that the destroyed airport will be rebuilt there. The airports of Chimbote, Trujillo and Lima suffered only minor damage.

The total damage suffered by civil aviation has been estimated by the Ministry of Transport and Communications at 12.2 million soles (3 million dollars), 7 million of which are accounted for by the devastation of the airport at Caraz and 5 million by the temporary operation of the airport at Anta.

/(v) Summary

(v) Summary of the estimates of damage to the transport infrastructure

The following table shows the cost of the damage to the transport infrastructure.

		Millions of soles
Highway infrastructure		549.3
(a) Roads	541.0	
(b) Equipment and other installations	8.3	
Railways		200.0
Ports		7.6
Civil Aviation		12.2
Total		769.1

(e) Communications

The earthquake cut off nearly all lines of communication within the earthquake area and between that area and other areas of the country.

In the zones that were not seriously affected and along the coast itself it has already been possible to re-establish a good part of the communications, but the process will be much slower in the interior, where, particularly in the Department of Ancash, post offices, telephone exchanges, telegraph and wireless stations suffered the same fate as the houses.

Preliminary estimates of damage amount to 18 million soles, of which 7 million would go to the telegraph offices and telephone exchanges and the cable network, and 10.8 million to post offices.

In addition to the above, mention should be made of the damage suffered by the Compañía Nacional de Teléfonos del Perú, estimated at 11.3 million soles, most of this figure corresponding to damage to cables and private lines in the coastal zone between Trujillo and Lima and in the Callejón de Huaylas. In weighing the importance of this damage, account should be taken of the fact that many installations were very out of date.

/(f) Electric

(f) Electric energy

At the time of the earthquake, 41 villages in the Department of Ancash were supplied with electrical energy, 21 of them by the Cañón del Pato (Huallanca) hydroelectric power station. The rest were supplied by 20 small independent stations, half of which were hydroelectric. There were, in addition, more than 50 small private generating plants.

According to the Electricity Board (MEM) the electricity supply of eight other villages outside the Department of Ancash failed, particularly the Trujillo area and neighbouring villages (Moche and Salaverry) served by the Cañón del Pato station. The extent of the damage to installations in other villages and to industries with their own electricity supply is not yet known.

The total installed capacity of the Department of Ancash is 137 000 kW, three-quarters of which corresponds to public services. The Cañón del Pato station, with a capacity of 100 000 kW, is much more important than the other supplies electricity through a network transmission line to the towns of Chimbote and Trujillo on the coast, and all the villages in the Callejón de Huaylas, down as far as Huaraz and Monterrey.[3/]

The power station derives its energy from the normal flow of the untrained river Santa and has its inlet works in a steep-sided cañón of the river valley. After passing through the straining grid for gravel and silt, the water goes through the inlet pipe (more than 8 km long) with a capacity of 48 m^3 per second. A vertical iron-sheathed shaft in the rock leads the water to the underground power house (a cavern in the rock) with four groups of generators (each with a capacity of 25,000 kW) powered by pelton turbines. Between the inlet pipe and the shaft there is a surge chamber, also cut out of the rock. The station generates 300 million kW annually, but, before the disaster, an output of 400 million kW was forecast for this year.

3/ Huallanca-Chimbote: 2x66 MW; 138 kV; 95 km.
Chimbote-Trujillo: 36 MW; 138 kV; 123 km.
Huallanca-Huaraz: 10 MW; 66 kV; 92 km.
Huaraz-Monterrey: 2 MW; 13.8 kV; 5 km.

/At the

At the time of the earthquake, the station stopped operating, apparently through the normal working of its security system, and subsequently the intake works were closed by the staff, who then abandoned the station for reasons beyond their control.

When the mission was in Peru, no inspection had been made of the damage, but according to the account of the staff operating the plant at the time of the earthquake, and from the nature of the design of the plant, it is hoped that the problems are not very big and are limited to: blockage of the intake and outlet works by fallen debris and material swept down by the river and by the wave that followed the avalanche that buried Yungay and Ranrahirca and destruction of part of a high cable transmission line to Chimbote, which has already been mentioned. Less probable but possible are: damage to the surge chamber, the shaft (or penstock), the high-tension switch-gear and the mobile equipment being forced out of alignment.

A very rough estimate of damage which was supplied by the Electricity Board, but can only be considered as guess work in so far as it relates to the Cañón del Pato station, amounts to 280 million soles (7 million dollars), about half of which would be for repairs to distribution networks.

The lack of electric energy, principally in Chimbote and Trujillo, where local thermal plants are providing emergency supplies of light and pumping, appears to be the principal obstacle to the resumption of many activities. The SOGESA steel plant which, according to preliminary estimates, could be in operation again in two months, will subsequently depend on the Cañón del Pato station being put back into operation

/(g) Agriculture

(g) Agriculture and irrigation

As was seen earlier, intensive agriculture is carried on in the Department of Ancash along the coast in the Santa, Sechín, Huarmey, Nepeña and Casma valleys, and is basically dependent on irrigation (20 per cent of the total area under cultivation), while in the sierra, dry, seasonal and irrigated crops are grown in the longitudinal valleys of the Huaylas and Conchucos (80 per cent of the total area under cultivation).

The May earthquake made the zonal economy unbalanced and cut it off from the national economy. Its effect on the rural areas has not been such as to prevent farmers from returning to their land, but the large-scale destruction of towns and the loss of tools and stocks of merchandise are a serious obstacle to the return to work of persons employed in trade and public services. An unchecked exodus of the population to other areas might, therefore, mean that the mountain area of Ancash would become another depressed area of the Peruvian sierra, with the consequent loss of part of the market for manufactures.

When the Mission was in the country, the competent authorities had not yet been able to assess the damage to agriculture. An unofficial source (Sociedad Nacional Agraria) reported that 50,000 hectares of farmland on the coast, throughout the area ravaged by the earthquake had been damaged by the destruction of wells, pumping equipment and irrigation channels, which would take some months to repair. Government sources feared that 38,000 hectares in the same coastal zone would not receive additional irrigation at the right time before the harvesting season, such irrigation being essential if yields were not to be substantially reduced. The reasons were the same as those previously mentioned: damage to different parts of the irrigation system.

In the ground and air trip which the Mission made to part of the Callejón de Huaylas, it estimated that about 1,000 hectares of farmland in that zone (0.7 per cent) were destroyed by the "huayco" and landslides. It was also noted that, as a result of above-average rainfall, the land under cultivation was in good condition. On the other hand, as in the irrigated zones the water is taken at relatively high levels from the

/tributaries of

tributaries of the Santa, and flows by gravity down channels which take full advantage of the slope of the land, so that the channels do not need to be so long or the space between them so great, the damage may not be very extensive. The channels that have been destroyed will probably affect only small areas. In the Callejón de Huaylas, the damage to the transport network might set a ceiling on agricultural production.

A rough estimate of the losses in this sector on the basis of the above information might be about 280 million soles (7 million dollars) including the investment needed for the reconstruction of some irrigation works, the decrease in agricultural production if additional irrigation cannot be carried out on the coast before the harvest, and the cultivable land destroyed by the "huayco".

(h) Industry and fishing

Up to the time of the earthquake there were 87 industrial enterprises registered in the Department of Ancash, 45 of which employed more than 10 workers, thus provi ing employment for approximately 6,000 persons. The 45 enterprises comprise the Sociedad Siderúrgica de Chimbote, S.A. (SOGESA), which alone employed 1,600 workers; about 40 fish meal plants, 30 of which were in Chimbote; one sugar mill; and some small boatyards for the building and repair of fishing vessels. Most of the remaining enterprises, which employ fewer than 10 but more than 4 workers, produce consumer goods for local or regional consumption, particularly essential goods. The rest are artisan-type activities in which quite a high proportion of the population is employed.

According to information supplied by the Ministry of Industry and Trade, it was impossible for the moment to hazard even an approximate estimate of the damage which these industries have sustained as a result of the earthquake.

Operations in the SOGESA steel plant had been stopped so that it could be overhauled and the damage evaluated; the damage to the plant and equipment was probably considerable. Most of the damage, however, is thought to consist of fallen masonry and the minor destruction this may have caused. It may well be that some of the instruments and minor equipment will have to be imported. Levels and alignments are being checked. It is

/certain that

certain that some fire-proof facing was destroyed; the exact state of the blast furnace is not known. It is considered likely that this damage will prevent the plant from resuming operations for a period which has not yet been determined but would be about three months, unless the overhaul reveals further damage. The loss of profits may well be substantial.

The information obtained on fish meal plants indicates that they have not sustained any major damage to their machinery - mainly settlement of the bases and equipment out of alignment - or their buildings. The Coishoa plant, however, sustained some damage as the result of a big landslide on a nearby hill which may be fairly serious.

Presumably the remaining industries, including small enterprises employing fewer than 10 workers, and artisan-type activities, have been seriously affected and many of them are at a standstill owing to collapsed buildings and the consequent destruction of their equipment.

Total losses in buildings and equipment are estimated at about 200 million soles (5 million dollars).

From available data on the value of industrial production, the effects of the earthquake in terms of production losses may be estimated, as an order of magnitude. The value added in the annual production of the forty-five enterprises mentioned above was 1,725 million soles in 1968. Assuming that the value of the production of the remaining enterprises and of artisan-type activities amounts to a similar figure, the total loss of industrial production per working day would be about 15 million soles.

As regards the fishing industry proper, neither the boats nor the unloading facilities were damaged, so that operations can be resumed as soon as the fish meal plants are in a position to resume operations (the Mission was informed that this is the closed season). In other types of fishing activies, the most critical point is the state of the refrigerating chambers and equipment, which has not yet been properly checked.

(i) Mining

Mining is another sector which plays a not unimportant part in the economy of the Department of Ancash. In 1967 it provided employment for 3,128 persons, 2,715 of whom were manual workers. Mining output comprises a wide range of metallic and non-metallic minerals, which in 1965 amounted

/to a

to a total gross value of 137 million soles, or 1.5 per cent of the total gross value of Peru's mining production. The most important metalliferous ores and silver, copper, lead, zinc and tungsten, and the non-metallic minerals include guano and limestone.

There were six ore-smelting plants in the Department of Ancash, with a total capacity of nearly 1,000 tons a day. According to a report of the Banco Industrial del Perú, the area has appreciable reserves of various metalliferous ores, but there were only a few mining companies in operation for want of roads for transporting the ore at reasonable freight rates.

The Mission was unable to obtain information regarding the earthquake damage sustained by the mining sector, but since the mines are located in heavily devastated parts of the Department, it must be assumed to have been considerable.

(j) Commerce and tourism

In view of the complex and varied nature of this sector, it is obviously difficult to evaluate the extent of the damage it has sustained. Before the earthquake, the Department of Ancash had about 200 commercial establishments, 40 per cent of which were of fair size. In addition there were several thousand retail establishment enterprises making sales direct to the consumer.

The bulk of the losses suffered by this sector were due to the destruction of stocks, and more particularly the destruction of and damage to commercial buildings and premises. For the purposes of the present report, therefore, it may be considered that the losses sustained are largely included in the preliminary estimates of the damage and destruction of dwellings and other buildings.

There will naturally be a loss in profits in these activities during the emergency period in which essential consumer goods are being supplied to the population in the disaster area.

According to information gathered by the Mission, tourism warrants special attention as one of the most important factors in the reactivation and economic development of the earthquake area, particularly the Callejón de Huaylas. In fact, the scenery in this area is considered by international experts to be among the most beautiful in the world, and there is the

/additional attraction

additional attraction of the remains of pre-Colombian civilizations and a wealth of folklore. The art treasures of the Chimú civilization in the Department of La Libertad are also very valuable.

Up to the time of the earthquake, however, there were only four hotels in the whole area - at Huaraz, Monterrey, Chavin and Huallanca with a total of 130 rooms for the accommodation of tourists. This very modest capacity shows that tourism is still in its infancy. The hotels have sustained a medium amount of damage, estimated at 2.7 million soles, although some 15 million soles must be added to cover losses represented by the destruction of tourist attractions: museums, archaeological sites and mineral springs.

To give tourism more value as a factor in the region's future development, it would be advisable, not only to improving the hotel facilities and increase the amount of accommodation available, but to improve access and other roads for vehicles touring the zone, and to build a new airport that would meet tourist requirements; according to a project already in existence, this airport would be located at Anta, and would be able to take medium-range jets.

(k) Summary of the preliminary assessment of earthquake damage

As stated above, the Mission has, for obvious reasons, been unable to obtain an official estimate of the damage caused by the earthquake. To arrive at a figure which would be acceptable to the authorities would be a long and difficult task, and the results would not be known until after several months's work had been done.

During the Mission's stay in Peru, the press estimated the damage at 230 million dollars, without furnishing any details or explaining how this figure had been arrived at.

The Mission considers that the material losses can be broken down into at least three large groups of figures: the cost of the emergency, independently of the donations of food, medicines and services of all kinds which Peru has received; the actual material destruction; and the economic and social losses sustained, i.e., the loss in profits in every imaginable form.

In the light of all these factors, the Mission considers that the above figure falls short of the truth, and that a closer estimate of the earthquake damage would be some 300 million dollars.

/4. Organization

4. Organization of emergency operations and the Reconstruction and Rehabilitation Committee

The Government has immediately begun to tackle the problems arising out of the disaster at two separate levels:

(a) Urgent action needed to deal with emergency situations in the earthquake areas; and

(b) Reconstruction and rehabilitation.

The responsibility for the first category of tasks lies with the National Emergency Committee which operates under the Ministry of Health and acts as a staff headquarters for the control and co-ordination of all operations for the various emergency committees in the different areas. The National Emergency Committee records all verified data on the number of persons dead, injured, missing and evacuated, and makes supplementary guess estimates of the numbers of dead, etc., as yet unknown. The Committee evaluates material damage on the basis of aerial photographs and information obtained on the ground, supplied by the country's different technical services. At the same time, it acts as a centre for the reception of all kinds of material aid from whatever source, keeps a record of it and dispatches it to the emergency zones in accordance with the needs notified by the Committee's own sources of information or at the request of the local emergency committees; these operations are carried out with a very careful control of the movements of ships, aircraft and vehicle convoys.

The earthquake area can be divided into four broad zones: the coast; the Callejón de Huaylas; the intermediate zone stretching from the Cordillera Negra to the coast; and, lastly, the area to the east of the Cordillera Blanca; assistance has been sent to these zones in the order indicated, the coast and the Callejón de Huaylas being the most badly affected.

The zonal emergency committees are responsible for everything that has to be done in their zones: clearing debris, burying the dead, caring for the wounded, providing food and shelter, re-establishing essential services, maintaining health control and starting up economic activities once more. The people are co-operating very well. The Mission was able to

/observe permanent

observe permanent repairs and total reconstruction being carried out side by side with the construction of light emergency dwellings, suited to present weather conditions, which may be considered as partially adequate for the time being. However, the cold nights in the mountain zones and the Callejón de Huaylas may lead to sickness and death from exposure, and the influx of rural population into the already overcrowded town of Chimbote makes health control difficult and brings with it all the problems of a devastated city.

The tasks of rehabilitation and reconstruction were started immediately.

On 9 June, the Government promulgated Decree Nº 18306, establishing a Reconstruction and Rehabilitation Committee composed of highly-qualified experts in the numerous tasks coming within its terms of reference. It is presided over by a Minister of State.

The Committee is responsible for the over-all planning, all the reconstruction and rehabilitation work, and it is clearly understood that this involves restoring normal conditions in the area and setting it on the path to future development. Apart from the work of reconstruction, this includes solving the problems typical of the earthquake area, such as the surplus agricultural population in the Callejón de Huaylas, and the possibility of creating other labour-intensive economic activities or of promoting a certain amount of migration to suitable areas, that have been prepared to receive them, establishing an infrastructure that is better suited to the needs of the area, making certain essential productive investment which have been under consideration for some time, etc. In particular, towns and villages will be rebuilt carefully selected sites which offer the best chance of preventing the recurrence of the all-too frequent disasters that have occurred in the Callejón de Huaylas or where the soil is most favourable for building, drainage and permanent health facilities.

/Apart from

Apart from its planning and co-ordinating powers, the Committee also has an executive branch, financed from its own resources: "All the national and foreign resources intended for the reconstruction and rehabilitation of the earthquake area shall be administered by the Committee" (Art. 6). A "pliego", i.e., a budget item under the exclusive control of the Committee, was opened immediately, with an initial allocation of over 700 million soles thanks to cuts in other items of the National Budget.

In the execution of its tasks "the national agencies of the public sector shall provide any support requested of them by the Committee" (Art. 5). This provision means that if certain roads must be built for the purpose of rehabilitation, the Ministry of Transport will supply the engineers, technicians and teams of workmen needed to plan and carry out the work, as far as they are able, without prejudice to the Ministry's responsibility to the rest of the country. If sufficient staff are not available on loan, the Committee will recruit the additional staff needed.

The Mission considers that the fact of having a single body to plan and carry out emergency tasks is a very good solution; it will prevent the reconstruction and rehabilitation work from being swamped by every-day activities as time goes on and from losing the necessary unity and the greater speediness which are required precisely because it is needed to make good the losses caused by the disaster.

/5. Some

5. Some prospects for rehabilitation

A rough preliminary figure was given in the third section of the present document, representing the damage wrought by the earthquake; this figure does not necessarily cover all the required expenditure on repairs and reconstruction, which would be, on the whole, much higher, since the construction to be done will have to be of higher quality than that which existed previously.

However, the Government is well aware that it is necessary not only to reconstruct but also to rehabilitate and develop. If the disaster has a good side, it lies in the possibility of organizing the economy and life in the earthquake area and the neighbouring areas along more rational lines, better suited to present-day conditions. In addition, at both the local and national levels people are anxious to set about the work of reconstruction with the support of the nation and a desire for progress which should get the response it deserves in the form of international technical and financial co-operation.

This effort should be made on the basis of suitable regional planning within the framework of national development.

Naturally, the Mission could not expect to obtain any precise opinions on this point. As a very rough provisional estimate, the Reconstruction and Rehabilitation Committee considers that, to carry out the tasks mentioned above, it will need about 520 million dollars.

As no plan has yet been drawn up, only an outline can be given of the prospects for the rehabilitation of the earthquake area.

In respect of fixed assets, a distinction must be made between the manufacturing capacity in the Chimbote and Trujillo zone and all the dwellings, community services and communications that have been damaged throughout the earthquake area.

The rehabilitation of industrial equipment in Chimbote, including the electric power stations which are vital to it, and the prospects for the speedy rehabilitation of the town, depend on technical factors and, to a lesser extent, on financing. In one way or another, the firms which supply the industrial equipment could contribute a certain amount of technical advice and suggest specific plans for financing.

/In Trujillo,

In Trujillo, the manufacturing capacity does not appear to have suffered any major damage. However, the cutting off of the electricity supply from the Cañon del Pato power station will paralyse many enterprises for several weeks.

Continuing with the fixed assets of the coastal area, it may be pointed out that the rehabilitation of the agricultural areas would not raise any problems either. Most of the irrigation channels are still in operation, as are the irrigation systems using underground water.

The same is true of dwellings and other community buildings in the coastal area. In Trujillo, it would be necessary to rehabilitate the University and restore a large number of mansions, temples and pre-Colombian ruins, which are the city's tourist attraction. For lack of information on the cost of restoring these buildings, but on the assumption that the amount needed is relatively small, it may be expected that the city could be rehabilitated in a relatively short time.

The dwellings and community services destroyed by the earthquake in Chimbote raise a rehabilitation problem which also applies to other towns of the disaster area. Most of the town was built on sandy, loose soil, with the result that the foundations were not deep enough. The rehabilitation of this town may involve moving part of the town to a more favourable site, which would mean abandoning existing water and drainage networks, even though they could be repaired effectively, given the size of the town (which has an estimated population of 212,000). Foreign credit will probably be required for its rehabilitation, matched by a substantial contribution from Peru in counterpart funds.

Obviously, the same soil problem as in Trujillo arises in several large towns in the Callejón de Huaylas, and is even more serious because there, the towns must be moved because of the danger of avalanches and, in some cases, because of the poor quality of the foundations. In all these cases, therefore, the estimated value of the damage is considerably lower than the amount required to provide a satisfactory solution to the housing problem.

/The most

The most essential fixed asset in much of the earthquake area is the communications. Although most of the main arterial roads were opened to traffic during the emergency phase, secondary roads and the negotiable paths, which served to transport the agricultural produce of the zone and fed traffic on the the main roads, have not yet been examined. The re-opening of these secondary roads is vital to the economic activity of the mountain areas of La Libertad, Ancash and Lima.

Compared with the damage to housing and the urban services infrastructure, the preliminary estimate of the damage to the transport and communications infrastructure appears to be relatively moderate. However, account should be taken of the comparatively low level of the previously existing infrastructure and the bad conditions it was in, and of the needs for rehabilitation, reconstruction and modernization.

According to preliminary estimates made by the Ministry of Transport and Communications, these needs would amount to more than 4,000 million soles for the disaster area alone. These estimates are based on plans for modernizing the national infrastructure, which were scheduled for execution in the next few years. It would now seem necessary to modify those plans so as to bring forward the execution of the projects and programmes in the disaster area, allocating additional resources for the purpose, so as to avoid delays in execution of projects and programmes in other parts of the country, which would have unfavourable effects on economic development.

Generally speaking, the efforts at rehabilitation should, in the first instance, be directed towards preventing large-scale migration from the towns to other parts of the country. To this end, funds would be required not only for building houses, but also for replacing equipment in artisan-type industries, retail trade, the hotel services used by national traffic, and the transport sector.

These are what can be considered the most pressing needs. Whether or not they can be properly and rapidly satisfied largely depends upon the availability of financial resources from the rest of the national economy and from abroad. The volume of investment required for rehabilitation in the immediate future is at least equal to, if not more than, the savings

/capacity of

capacity of the country's entire public sector. The Peruvian Government has therefore applied to the Inter-American Development Bank for a loan of 35 million dollars and to the International Bank of Reconstruction and Development for a further 150 million dollars.

The financing from these sources, along with the funds that the Peruvian Government has already budgeted for and its transfers of allocations to the earthquake area, could probably meet most of the investment requirements for the kind of immediate rehabilitation outlined above.

In the opinion of the Mission and of many persons consulted during its visit, however, this rehabilitation would not be adequate in scope. In addition, a number of features of the region's future development also have to be taken into account. First among these come the development of the coastal manufacturing sector, population pressure and possible solutions for it, and the need, as has already been said, to adapt the area's transport system to the new pattern of development.

While, on the coast, the social problem is linked to the precariousness of a swift process of expansion, which raises social expectations and breeds shanty towns, the problem in the sierra is more one of stagnation and of the marked absence of any manufacturing activity of note, including a complete lack of industrial capacity for processing the agricultural produce of the zone itself.

The trans-Andean region is faced with the serious problem of limited communications with the rest of the country, but conditions there are very favourable, for it links the region with the somewhat warmer Marañon valley, provides access to the Huallaga land settlement area and to the valleys and the sierra between these two valleys in the sparsely populated Department of Huánuco. Quite apart from the resources deriving from the variety of climate, this region also boasts two mining projects of definite importance for the country's future, Antamina and Magistral.

This brief survey suggests a number of preliminary ideas for a rough outline of the regions's possible development along the following lines.

/Peru's development

Peru's development plans for the manufacturing industry should take into account the new form that the market for its manufactures may take as a result, among other things of the signing of the Andean Subregional Integration Agreement. According to the Peruvian development plans, the manufacturing industry (excluding the fishing industry) of the earthquake area would not be in a position to expand its markets by exporting to other countries; but this situation could now be corrected.

In both La Libertad and Ancash, there are mountain areas which are experiencing a steady and appreciable process of out-migration. The path of the migrations is usually towards the coast, particularly Lima, during the 1960s it also contributed to the taking over and frequently precarious settlement of the eastern areas belonging to the Amazon basin. The earthquake is likely to accelerate this movement, especially from the Callejón de Huaylas. The economic prospects of these groups of migrants would improve, and their social prospects also, if they were settled in new irrigated areas, some of which have already been studied, and in properly planned settlements in the Amazon valleys, particularly the Huallaga valley.

The irrigated areas are in the Chao and Viru valleys, the Chimbote pampas and in the northern part of the coastal area. These projects, some of which are already under way, could absorb a large number of families. As for the Huallaga valley, studies carried out by United Nations experts suggest that although settlements already exist as a result of spontaneous migration, there is still room for a larger population, once certain specific stages of the project have been completed. This will be made all the easier if an industrial, artisan-type and services sector can be developed so as to maintain an agricultural population not exceeding 50 per cent.

It has already been pointed out elsewhere in this report that great importance should be attached to the development possibilities of various regions in the eastern part of Peru, as these could absorb some of the surplus population from several areas in the Department of Ancash, particularly the Callejón de Huaylas. The restoration of the means of

/transport and

transport and communications in the earthquake area would entail a co-ordinated study of the development potential of both the most devastated region and certain neighbouring regions in the valleys of Marañon and Huallaga, and also of the regional and interregional infrastructure that would serve as the basis and framework for the co-ordinated economic development of the various regions involved.

Some form of collaboration in all these spheres between ECLA and ILPES and the Peruvian agencies responsible for the planning, reconstruction and economic and social development of the devastated area might be extremely fruitful.

/6. Recommendations

6. Recommendations of the ECLA/ILPES Mission

The ECLA/ILPES Mission, while fully aware that its terms of reference are confined to the preparation of a technical report for the information of the delegations attending the extraordinary session of the Committee of the Whole of the Commission, which was convened at the suggestion of ECLA's Executive Secretary in order to consider the situation resulting from the earthquake which devastated the north-central region of Peru, feels that it would not be out of place to present a few comments and recommendations.

For many years the international agencies have concerned themselves with the serious human and material losses occasioned by natural disasters such as floods, earthquakes, hurricanes, etc., which affect large areas in different parts of the world, year after year. In each decade, several thousands of millions of dollars' worth of property is destroyed and many hundreds of thousands of lives are lost. These tremendous losses occur more often in the developing countries, not only because these countries cover the largest area and are the most densely populated in the world, but also because, not having yet made much progress towards development, they have fewer technical media for forecasting these disasters than more developed countries, and because the material means they possess for protecting themselves from resulting devastation are much more limited and much less satisfactory. It can be said that, by and large, not enough emphasis has been given to the undeniable cause and effect relationship that exists between the occurrence of these disasters and the state of under-development, inasmuch as they entail the continual destruction of human and financial resources, which seriously impairs the effectiveness of the efforts towards progress and development made by countries which have not yet advanced beyond the initial stages of development.

The countries themselves and international agencies - both public and private - have set up increasingly efficient machinery for providing aid to disaster areas and helping to deal with emergencies. Even so, these efforts prove insufficient when disaster strikes simultaneously and suddenly and devastates extensive areas of a country, interrupting its normal activities

/so seriously

so seriously that the means which do remain available for aiding the stricken population are quite inadequate: this is, inter alia, the case of Peru.

The Mission considers that it is of the utmost importance that the Committee of the Whole should examine the problems and recommendations presented below, while recognizing from the outset that some of them may be outside the Committee's sphere of competence.

(a) Direct ECLA/ILPES action in the rehabilitation and development of the area affected by the earthquake

As may be gathered from the Mission's report, the Peruvian Government had gone a long way towards preparing a regional development plan for the north, covering eight departments, including two of the four directly affected by the earthquake (Ancash and La Libertad), which is undoubtedly where the destruction is greatest. At the same time, because of their manufacturing and fishing industries, these are the two most important departments in north Peru.

The new guidelines laid down by the Government for the medium-term policy for the country's economic development and reconditioning certainly reflect a different approach from that of national and regional planning. But there can be no doubt that the establishment of a Committee headed by a Minister of State to deal with the reconstruction and rehabilitation of the earthquake area which will have sole responsibility for planning and carrying out all the tasks required in the sphere of economic and social activities, and for administering all the national and foreign resources earmarked for these purposes, is a clear indication of the manner in which the Government proposes to carry out these functions. The earthquake area has close links with the rest of the Peruvian economy, but particularly with the adjacent departments, whose development projects and possibilities are directly related to the measures being taken in Ancash, La Libertad and Huánuco.

There is therefore a huge job to be done in connexion with economic and social planning for this region, pre-investment activities and the identification of projects, and the conception of multi-purpose development

/projects associated

projects associated with basin-wide river development or the utilization of other natural resources. Since both ECLA and ILPES have acquired a great deal of experience and special knowledge in these fields, it seems logical for them to offer the Government of Peru special co-operation in the rehabilitation of the area laid waste by the earthquake, quite apart from any human and financial assistance they may provide in the normal way. Although the number of experts, their field of activity and the period for which they would be required are matters for the Reconstruction and Rehabilitation Committee (CRR) to decide, the Mission wishes to say, merely in order to express its recommendation in quantitative terms, that, in its view, eight experts would be needed at the outset - two in general and regional planning, one in regional financial machinery, one in transport, one in energy, two in multi-purpose development projects, and one in natural resources.

Accordingly, it is thought that the Committee of the Whole may wish to adopt a recommendation embodying the following basic ideas:

(a) ECLA should provide emergency technical assistance, and encourage the Governing Council of ILPES to do the same with a view to obtaining its collaboration in the planning of the reconstruction and rehabilitation of the earthquake area and adjacent areas, independently of the co-operation which Peru normally receives.

(b) A request should be presented to the United Nations Development Programme for adequate immediate financing for any missions of experts that Peru may request in these fields, for at least one year.

(c) The General Assembly should be asked to approve an appropriate increase in the next annual budgets to cover this emergency assistance for as long as the Peruvian Government and ECLA think fit.

(d) ECLA should propose to the Peruvian Government and to the United Nations that it should act as co-ordinating agency for all technical assistance to be provided by United Nations agencies. ECLA would carry out its co-ordinating function through the Resident Representative.

/(b) Technical

(b) Technical assistance from the United Nations specialized agencies and the UNDP emergency programme

It goes without saying that in their different spheres, the United Nations specialized agencies could make a very useful contribution to the work of the Reconstruction and Rehabilitation Committee in the preparation of pre-feasibility studies in connexion with investment and research projects, and in helping the administrative bodies to meet the new tasks with which they are faced. It is of course too early for the Government of Peru or for the Commission to be able to determine the precise nature of the problems or the degree of urgency with the collaboration of experts from FAO, UNESCO, UNIDO, WHO, etc., may be required in each case. On the other hand, it would obviously be advisable to set up special programmes for such matters as housing, earthquake research or the prevention of avalanches in the Cordillera Blanca, stabilization of lakes, etc. The last point, for example, has already been a subject of concern in the past and will be all the more so now; suffice it here to recall the work of the members of the Kinzl and Schneider mission in the 1930s, the Heim mission in 1946 and the studies of the Ranrahirca avalanche in 1962.

At the same time, full advantage should be taken of the fortunate circumstance that the Governing Council of UNDP is currently in session in Geneva, and is scheduled to close its meeting after the Committee of the Whole has examined the situation in Peru. It would therefore be extremely useful, given the circumstances of the disaster, for the Committee of the Whole to request UNDP to allocate a lump sum to help finance the technical assistance projects of the various agencies, even though they have not yet been formulated by the Reconstruction and Rehabilitation Committee, rather than wait for another regular meeting of the UNDP Governing Council.

It is no easy task to estimate the financing required for an operation of this type but, inasmuch as assistance projects normally last between eighteen and thirty months - some being rather shorter and other considerably longer - it should be possible to think in terms of an over-all authorization

/corresponding to

corresponding to sixty expert/years, which would include the sum required for the ECLA/ILPES programme suggested under paragraph (a) above. Final decisions would of course rest with the Administrator.

If adopted, this proposal could take the form of a recommendation by the Committee of the Whole to the Governing Council of UNDP.

(c) Recommendation to States making voluntary contributions to the United Nations Development Programme

Peru's reconstruction and rehabilitation programme is a long-term project. Therefore, in addition to immediate and emergency co-operation from UNDP in adopting the important short-term activities which the country will have to initiate long before the end of the emergency phase, Peru will undoubtedly have to receive continuing technical assistance from the various United Nations agencies for many years, and this assistance must not affect the country's normal programmes if undue delay is not to be caused in programmes for other areas which are also in need of aid. At the same time, this special programme for Peru cannot be allowed to diminish UNDP's technical assistance programmes for other developing countries.

In the circumstances, it is felt that the Committee of the Whole should request the States which make voluntary annual contributions to UNDP's funds to make a special additional contribution for a number of years, exclusively to meet Peru's emergency needs deriving from the disaster.

(d) Extending permanent authorization to the Administrator of UNDP to take action in the event of natural disasters

Peru's case illustrates the UNDP's capacity for immediate action merely because the disaster happened to coincide with a regular session of the Governing Council. Had this not been the case, it would have been months before this agency could have done anything to consider the situation, and its immediate action would have been confined to the limited authorization which the Administrator now has to initiate projects without waiting for the Council's approval.

/It seems

It seems desirable that the Committee of the Whole should request whatever body may be appropriate - the Governing Council or the Economic and Social Council - to accord far-reaching powers to the Administrator of UNDP so that he can act as expeditiously as possible in the event of a disaster.

This resolution of the Committee of the Whole might take the form of a recommendation or a request to its member countries which are also members of the Governing Council of UNDP or the Economic and Social Council, to take action along these lines.

(e) Assistance which the United Nations could provide in the event of disasters

In resolution 2435 (XXIII) and the subsequent amendments thereto, the General Assembly authorized the Secretary-General to provide up to 20,000 dollars in emergency aid in connexion with natural disasters. This sum is completely inadequate compared with the enormous emergency requirements that have arisen as a result of the few disasters for which the Secretary-General has been able to provide a contribution, given the ceiling set on the resources he can draw upon (150,000 dollars in any one year).

According to official statistics, a total amount such as that authorized would represent, for example, 0.6 per 10^4 of the financial cost of the fifty-eight great disasters that occurred in 1966. In the present case of Peru, where it is urgently necessary to provide provisional shelter for 100,000 families, the sum that the Secretary-General could donate would only be enough to purchase 200 tents of the type required.

It would seem logical to think that the countries represented in the Committee of the Whole might request the next General Assembly to consider placing larger funds at the disposal of the Secretary-General to enable him to take effective action.

(f) Request for appropriate action by the Economic and Social Council and the international financing agencies

The financing agencies directly associated with the United Nations are the International Monetary Fund (IMF) and the International Bank for Reconstruction and Development (IBRD); but another important financing agency operating in the Inter-American system is the Inter-American Development Bank (IDB).

/It would

It would be appropriate to present a request to the Fund and the Bank along the same lines as on previous occasions, for instance, in the case of the situation created in Chile as a result of the disaster of 21 and 22 May 1960 (see document E/3402 - E/CN.12/AC.46/4), of course, following prior consultation with the Government of Peru; this would be particularly necessary in the case of the International Monetary Fund.

The Government of Peru has lost no time in requesting funds from the International Bank for Reconstruction and Development and to the Inter-American Development Bank (150 and 35 million dollars, respectively). Both institutions have sent study missions, and in IDB at least - the only one on which the ECLA-ILPES Mission was able to obtain information before the preparation of the present report - there exists the greatest willingness to take rapid action.

It would seem advisable for the Committee of the Whole to support swift action by IBRD, at least to the degree that it has done on previous occasions, but a more positive move would be to obtain the support of the individual member countries which are represented on the Boards of both IBRD and IDB, and ask them to express the wish for favourable action on requests in connexion with disasters such as the one that has occurred in Peru.

Apart from this action, for which investment resources could initially be made available, it would be advisable to consider whether, in the face of a disaster situation affecting a large area of a country, it would not be possible to obtain unorthodox forms of financing from these institutions, such as approval of programme financing, the setting up of consortia, or any type of multinational action which could channel the funds made available and co-ordinate the action taken by the international financing agencies and those provided under bilateral financial co-operation agreements. In this way, the preparation of specific projects within the over-all programme could be speeded up and the conditions would be much more favourable than under the usual slow procedure of project-by-project approval.

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Since the second part of this recommentation is addressed to non-United-Nations agencies and countries acting outside the ambit of the United Nations, it could take the form of a wish or a suggestion expressed in connexion with the first part of the recommendation. The Mission does not know enough about the international machinery to specify the means of carrying out the above idea; but it considers this idea to be very important if Peru - or any country in similar circumstances - is to be able to act with speed.

(g) Co-operation of the International Development Association

As is well known, given IDA's special purpose, only the low-income countries can apply for funds from this affiliate of IBRD. Peru is not one of those countries. All IDA credits have been for terms of fifty years, free of interest - and with only a small service charge.

It would seem logical to suppose that, given the high cost of a great natural disaster, in social and financial terms, for any under-developed country, such a catastrophe should make it eligible to apply for an IDA loan for the reconstruction of the devastated area.

Consequently, the Mission would suggest that the Committee of the Whole should approve a recommendation that all countries urge the relevant body - in this case, probably the Board of Governors of IBRD - to request and approve an amendment of IDA's statutes to enable it to provide aid to under-developed countries which suffer a large-scale natural disaster, even if they are not normally entitled to request a loan. This decision might possibly be taken by the Bank's Board of Governors, the Committee's recommendation should therefore be addressed, in the first instance, to the Governors who represent the member countries of the Committee of the Whole, so that they may take steps immediately to secure the proposed amendment.

The ECLA-ILPES Mission has deemed it fit to confine itself to giving the arguments which justify each suggestion and the ultimate result it is hoped to achieve. The form of the resolution, decision or recommendation adopted by the Committee of the Whole, the organ or level to which it should be addressed, and the form in which it shall be presented are matters which do not lie within its competence.