

The Economic Impact of the Cholera Epidemic, Peru, 1991

A summary is presented of some of the results of a study designed to determine the economic impact of the cholera epidemic in Peru. The study was carried out by economists Margarita Petrera, principal investigator, and Maibí Montoya, assistant investigator, sponsored by PAHO/WHO upon request of the Peruvian Multisectoral Commission for the Campaign Against Cholera.

Background

In the epidemiological history of cholera, Peru is the country that presents the highest incidence during the current pandemic, and holds second place after Chad, African nation of extreme poverty, in reference to the world's cholera mortality rates. The high incidence and mortality makes one wonder about the Peruvian context that received cholera. The economic, social, and political crisis being faced by Peru is the longest and most serious of this century. The evaluation of the following indicators is used to illustrate this situation: per capita gross domestic product, family income, public spending on health, urban land use, housing conditions, and the incidence of acute diarrheal disease.

Peru's per capita gross domestic product (GDP) declined by 28% in the period from 1987 to 1990. This took place in the context of an acute inflationary process that culminated in hyperinflation on the order of a cumulative 7,650% in 1990. During this same period, the income distribution deteriorated: the percentage of minimum wage earners increased (from 23 to 54%) and the purchasing power of their income was drastically reduced. Whereas in 1986 a family of six required the work of two family members to cover its minimum food requirements, by 1990 the work of four members was required in order to satisfy the same needs.

At the same time, during the period from 1985 to 1989 public spending on health decreased in real terms by 52%, which implied a curtailment of services and a reduction in the development of infrastructure. During the same period, the population of 6.5 million in the metropolitan region of Lima who live in shantytowns, known in Peru as *pueblos jóvenes*, increased by 50%. With regard to sanitary conditions, it is estimated that 55% of the population of the country received water from public municipal systems and that the sewerage system covered 45% of the population. Water quality has been compromised by deficiencies in the distribution systems and the intermittent service provided. Under such circumstances it has been almost impossible to maintain acceptable quality, particularly with regard to disinfection.

Directly related to the situation described above is an indicator that links the health situation to these conditions--the incidence of acute diarrheal disease. In Peru, acute diarrhea has been the second-ranking cause

of morbidity in recent years, showing a distinctly rising trend from 919.8 to 1,320 per 100,000 population in the period from 1984 to 1989.

Methodology

The study was carried out taking into account two complementary levels of analysis: sectoral and macroeconomic.

Sectoral analysis studied the dynamics within the sectors linked to cholera and was focused on the response of the agents (families, exporters, national producers and marketers, producers of health and sanitation services) to different types of costs, benefits, and changes in the structure of sectoral production that could have arisen as a result of the epidemic. The macroeconomic analysis showed the aggregate effect of the losses and possible benefits of the epidemic on present and future national production.

The methodology distinguished between direct cost--patient care costs--and indirect cost. The latter consisted of losses resulting from different restrictions on demand (external and internal) for Peruvian products supposedly contaminated by cholera; from the effect of these restrictions on the other sectors not directly linked to the epidemic, but which maintain economic interrelationships with those sectors; and from working days lost due to disease or death.

In addition to costs, the emergence of possible beneficiaries as a result of demand for certain drugs which was generated by the epidemic was also studied. The processes of sectoral regrouping stimulated by the epidemic were covered as well.

Results

Fisheries, Vegetable and Fruit Exports

The international fear of cholera in the early months of the epidemic was manifested by import bans on practically all Peruvian products of marine and plant origin. Some countries included fishmeal and preserves among the prohibitions. Microbiological quality control and the fumigation of ships and aircraft from Peru were required.

Exports affected were fisheries and agricultural products. Fisheries exports accounted for 15% (US\$503.2 million) of the total value of exports in 1990.

Furthermore, although export of vegetables and fruits represented only 4% of the total value of all exports, this activity was on the increase and its future prospects were good.

Total export losses amounted to US\$27.97 million. They included losses due to: 1) sale agreements not carried out (lost shipments); 2) the lower prices at which Peruvian products were sold on the international market; 3) higher export costs deriving from prolonged storage in foreign ports, due to delays in acceptance on the part of purchasing countries; 4) higher export costs deriving from more rigorous controls to ensure the absence of *V. cholerae*; 5) technical studies on the prevention of cholera and its dissemination, carried out by exporters in order to ensure safety and improve their image in the international community; 6) the impact on the remaining economic sectors associated with fisheries and agricultural exports. This estimate was made by applying the input-product table.

The demand by importers for a modernization of the production process took place in a context marked by a lack of incentives to export and a growing decline in the exchange rate that was harmful to export activities. Accordingly, it was to be expected that small producers could not face the higher costs of export and consequently had to abandon the market, which originated sectoral restructuring in the direction of centralization and concentration.

Tourism

Tourism losses were estimated at US\$147.12 million, and the indirect cost was estimated at US\$62.32 million. The income in foreign exchange produced by tourism represented 12% of national exports in 1989. In estimating the losses caused by cholera, no account was taken of the descending trend in tourism in recent years that resulted from insecurity and from cost of living increases.

Domestic Fisheries and Street Food-Vending

Losses from fishing for human consumption were estimated at US\$32.57 million. Between January and December 1991, consumption of fresh or frozen marine products had registered a decline of 33.65% compared with the same period in 1990.

According to a household survey conducted by the Ministry of Labor (1986), 5% of all informal workers were engaged in street food-vending. Taking into account the lack of data on the weight of the informal sector of the economy, the percentage share of 1989 GDP (16.45%) of the income of self-employed nonfarm workers was taken as an indicator. The direct cost to national production, of the fewer sales made by street food-vendors, was estimated at US\$15.85 million.

Pharmaceuticals and Cleaning Supplies

These industries were considered possible beneficiaries of the cholera epidemic, and indeed, some companies in the pharmaceutical industry became major beneficiaries, particularly those that produced intravenous fluids. However, this benefit could not be generalized for the entire industry. Benefits on the order of US\$5.53 million were estimated in this regard. On the other hand, increased sales, and consequently increased profits, were not confirmed for companies producing cleaning supplies.

Health and Sanitation

An important consequence for the health sector was the restructuring of service delivery. Inasmuch as public spending on health was shrinking, the provision of care for cholera patients during the peak of the epidemic (February-April 1991) curtailed the supply of other basic health care, which then had to be provided at home.

Considering the unit cost per consultation, the total cost to the health sector for cholera treatment in 1991 was US\$29.05 million. This figure also indicated the cost of public health services that had to be sacrificed and that the population had to provide for at its own expense. For this item--services not provided--estimates were based on a case study in La Caleta Hospital in the Department of Ancash.

The aggregate loss to the economy from all the workers affected by the disease, either from days not worked or death, was estimated at US\$17.59 and US\$242.05 million, respectively.

Direct benefit refers to the technical and financial cooperation that Peru received as a result of the epidemic. This benefit was estimated at approximately US\$12 million, although it was not possible to determine a truly comprehensive figure in this regard.

Sanitation activities refer to studies on water quality control and chlorination, with the corresponding inputs and equipment, and repair and maintenance activities. Expenditures on sanitation could not be considered a loss because they covered maintenance and other activities performed on a regular basis. One argument for including them in the economic impact was that these activities were carried out because of the presence of cholera and would not have been performed without the occurrence of the disease. The data for the city of Lima amounted to US\$767.74 for these expenditures.

Analysis of Family Cost

In studying the costs incurred by families in dealing with the disease, a survey was made of a sample of families in urban and urban marginal areas in the cities of Lima and Chimbote. In summary, the families affected assumed part of the cost of the disease. A third

Table 1. Loss and benefit caused by the cholera epidemic, Peru, 1991.

Loss	Total loss (US\$ million)
External market	175,325
Exports	27,972
Imports	233
Tourism	147,120
Internal market	337,112
Internal fisheries	32,568
Street food vendors	15,850
Cholera patients care	29,053
Absence from work due to illness	17,586
Absence from work due to death 1991	8,292
Future absence from work due to death	233,764
Benefits	Total benefit (US\$ million)
Manufacture (Pharmacy-chemical human use)	5,534
International technical cooperation (Donations)	11,602
Total benefits	17,136
Total Loss	495,302

of the families surveyed made some expenditures on drugs. The study also suggested that medical care in health establishments of high complexity, self-medication or use of informal health services, and delay in seeking treatment in institutional health establishments had the effect of raising the costs to families. Two-thirds of the families surveyed made substitutions in their normal consumption habits and sacrificed basic expenditures, such as on food and children's education, in order to face the costs

associated with the disease and to consume more water and fuel in combating it.

Macroeconomic Analysis

In aggregate terms, the total of direct and indirect benefits and losses amounted to a net loss of US\$495.30 million. The net loss in relation to the GDP for 1991 was US\$232.49 million, close to 1% of the GDP for that year, which did not take into account the loss of US\$233.76 million to affect production in future years.