

OIL EXPLOITATION AND HEALTH IN THE AMAZON BASIN OF ECUADOR^a

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Oil is a major source of income for Ecuador and since the 1970s has been the engine of the economy. The 1970s oil price boom lifted Ecuador’s economy - formerly one of the poorest in Latin America- by an average of 7% annually, with per capita income rising from 290 USD in 1972 to 1,200 USD in 2000. Today, oil continues to account for 40% of the nation export earnings and government budget. Most of this oil comes from the northeastern part of the country, the Amazon basin.

The Amazon basin of Ecuador, known as the “Oriente”, consists of more than 100,000 km² of tropical rainforest lying at the headwaters of the Amazon river network. The “Oriente” is also home of some 500,000 people, including eight groups of indigenous people, as well as peasants from Ecuador’s coastal and highland regions.

In 1967, a Texaco-Gulf consortium discovered a rich field of oil beneath the rainforest, leading to an oil boom that has permanently reshaped the region. The Amazon of Ecuador now houses a vast network of roads, pipelines and oil facilities. While the state

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has retained dominion over all mineral rights, several private foreign companies have built and operated most of the oil infrastructure.

Current oil production activities span nearly 1 million hectares in the "Oriente", and include over 300 producing wells and 29 production camps. The country has 4.6 billion barrels of proven oil reserves, with crude production of around 390,000 barrels per day (bbl/d). Of this production, Petroecuador –the government owned company- accounts for about 55% of Ecuador's total output, with private companies accounting for the remaining 45%. At the moment, 16 companies are operating in the country; Petroecuador, 3 private national, and 12 foreign companies.

Since the beginning of oil exploitation, foreign oil companies and Petroecuador have extracted more than two billion barrels of crude oil from the Ecuadorian Amazon. However, in this development process, billions of gallons of untreated wastes, gas and crude oil have been released into the environment.

This case study examines the environmental and health impacts brought out by the oil development process in the Amazon region of Ecuador.

THE ENVIRONMENTAL EXPOSURE

Source and extent of pollution

Oil development activities include several contaminating processes. The extent of these polluting processes depend mainly from environmental practice and technologies used by oil companies. In Ecuador, these practices have been repeatedly questioned.

In the Amazon basin of Ecuador, each exploratory well that is drilled produces an average of 4,000 cubic meters of drilling wastes (drilling muds, petroleum, natural gas

and formation water) from deep below the earth's surface. These wastes are frequently deposited into open, unlined pits called separation ponds, from which they are either directly discharged into the environment or leach out as the pits degrade or overflow from rainwater.

If commercial quantities of oil are detected, the production stage starts. During production, oil is extracted in a mixture with formation water and gas and separated in a central facility. At each facility, over 4.3 million gallons of liquid wastes are generated every day and discharged without treatment into pits. Roughly 53 million cubic feet of "waste" gas from the separation process are burned daily without temperature or emissions controls.

Routine maintenance activities at over 300 producing wells discharge an estimated 5 million gallons of untreated toxic wastes into the environment every year. Leaks from wells and spills from tanks have been common. According to a study conducted by the government in 1989, spills from flow lines alone were dumping an estimated 20,000 gallons of oil every 2 weeks.

Spills from the main and secondary pipelines are also common. In 1992, the Ecuadorian government recorded approximately 30 major spills with an estimated loss of 16.8 million gallons of crude oil. For instance, in 1989 at least 294,000 gallons and in 1992, about 275,000 gallons of crude oil caused the Napo river (1 kilometre wide) to run black during one week. Currently, it has been estimated two big spills occurs per week from the main oil fields in the region.

Overall, more than 30 billion gallons of toxic wastes and crude oil had been discharged into the land and waterways of the "Oriente". This compares to the 10.8 million gallons

spilled in the Exxon Valdez disaster in 1989 in Alaska, one of the major sea oil spills ever occurred.

Environmental analysis

Numerous reports have indicated that the contamination has occurred since the beginning of the oil exploration despite longitudinal data on the levels of exposure over time do not exist.

A study in 1987 by the Ecuadorian government found elevated levels of oil and grease in all of 36 samples taken from rivers and streams near production sites. In 1989, another Ecuadorian government study of 187 wells found that crude oil was regularly dumped into the woods and bodies of water.

In 1994, a study carried out by the Ecuadorian environmental and human rights organisation *Centro de Derechos Económicos y Sociales* (the Center for Economic and Social Rights, CDES) also found highly elevated levels of oil pollutants in the streams and rivers of the area, evidence also supporting a long term exposure of the residents to these toxics. Concentrations of polynuclear aromatic hydrocarbons were 10 to 10,000 times greater than the US-Environmental Protection Agency's recommendations.

In 1998, an independent local laboratory, frequently used by the oil companies, surveyed 46 streams in the region showing contamination by total petroleum hydrocarbons (TPH) in those located in areas of oil activities while no water contamination was found in areas without such activities.

In 1999, the *Instituto de Epidemiología y Salud Comunitaria "Manuel Amunárriz"* (IESCMA), a local health Non Governmental Organisation, undertook water analysis for TPH in communities in the proximity of oil fields and communities far away from them.

Water analyses showed high levels of TPH concentrations in rivers used by communities near oil fields. In some streams hydrocarbons concentration reached 144 and 288 times the limit permitted by the European Community regulation.

The oil companies are by law required to monitor the level of pollution in the environment regularly and to send the reports to the government. This information is closed to the public scrutiny. However, when one of these reports was presented to a community after several environmental complaints, concentrations of TPH over 500 times the limit permitted were found in the streams of this community while company and government insisted these were acceptable levels.

There is a lack of data on soil pollution and its potential impact. No study has been conducted in fishes either. However, studies from the Amazon basin of Peru showed how after an oil spill in the Marañón river, high concentrations of TPH were found in the stomach and muscles of the fishes.

THE HEALTH EFFECTS

Although several studies have focused on residents exposed to major oil spillages, epidemiological studies of communities exposed to oil pollutants near oil fields are scarce.

In the “Oriente”, concern over oil development related pollution was raised a long time ago by residents of oil producing areas. Both peasants and indigenous people have reported that many local streams and rivers, once rich in fish, now support little or no aquatic life; cattle are reported to be dying from drinking from contaminated streams and rivers. These are typically the same waters people use for drinking, cooking, and bathing.

Residents have also reported that bathing in the river waters causes skin rashes, especially after heavy rains, which accelerate the flow of wastes from nearby pits into the streams.

In 1993, a local community health worker's association conducted a descriptive study in their communities. The study suggested that exposed communities had elevated morbidity - higher occurrence of abortion, dermatitis, skin mycosis, malnutrition - and mortality rates.

In 1994, the organization CDES released a study reporting skin problems (dermatosis) among the local population, apparently related to petrol contamination.

In the last few years, the IESCMA has been involved in a research process to assess the potential health impact of oil pollution in communities living near oil fields. In the first of these studies, women living in exposed communities reported higher rates of physical symptoms than women in control areas. The study suggested a higher risk of adverse effects such as skin mycosis, tiredness, itchy nose, sore throat, headache, red eyes, ear pain, diarrhoea and gastritis among women living near oil fields. A risk of spontaneous abortions 2.5 higher was also found in women living in the proximity of oil fields.

Recently, an excess of cancers was observed among males in a village located in an oil producing area in the region. A later study found significantly higher incidence of all cancer sites combined in both men and women in counties where oil exploitation had been on going for at least 20 years. Significantly elevated levels were observed for cancers of stomach, rectum, skin melanoma, soft tissue and kidney in men and for cancers of the cervix and lymph nodes in women. An increase in haematopoietic cancers were also observed in children.

THE GOVERNMENTS' ANSWER

Peasants and indigenous people from the Amazon have presented their complaints to the different governments. The demands ask for better quality of life, presence of basic needs, technical assistance and above all, cleaning of the oil pollution. Local populations, through their organisations, and supported by national environmental groups have demanded that the companies clean-up the environmental pollution and compensate them for damages caused by oil related contamination. But the measures adopted by oil companies and governments have been described as “patches” (to cover some waste pits, to build some schools, to open a path) without facing the root of the problem.

Governments have declared the essential importance of oil to the country's development. However, despite oil revenues, accomplishments in improving socio-economic conditions in the country have fallen short of expectations. Currently Ecuador has the highest per capita debt of any country in South America at nearly \$1100 per person. The unemployment rate has not decreased and the percentage of people living in poverty almost doubled (47%-70%) in the period between 1970 and 1990. The ratio of the income between the poorest 5% of the population and the richest 5% has changed from 1:109 in 1988 to 1:206 in 1999. Locally, the Amazon region has the worst infrastructure and the lowest socio-economic and health indicators of the country.

One of the main strategies of the economic plan of the government and the International Monetary Fund in response to the nearly \$16 billion external debt, has been to expand the oil exploitation in the country. The government proposal consists, among other things, to open 2 million hectares of pristine rainforest in the south of the Amazon to oil

exploitation and the construction of a new heavy crude oil pipeline which means further exploitation in the north of the “Oriente”.

In summary, oil exploitation in the Amazon basin of Ecuador has resulted in a public health emergency because of its adverse impact on the environment and health. The Ecuadorian government has up to today not designed an adequate strategy to prevent further negative environmental and health impacts. The oil industry argues that it has a role to play in the development of the country but it should not be at the expense of contamination and poor health. Unfortunately Ecuador is not the only country to suffer the negative consequences of oil exploitation in Latin-America. The public health problem exists and has the potential to increase if oil exploitation expands virtually unregulated over the continent. Action is required on a local, national and international level.