Environ Monit Assess (2012) 184:4855–4859
DOI 10.1007/s10661-011-2307-0

Environmental accident and its treatment in a developing country: a case study on China

Yu Hou

Received: 19 December 2010 / Accepted: 24 August 2011 / Published online: 10 September 2011

Abstract Along with their rapid progress, developing countries have had to deal with more environmental problems, which have been a cause for concern among policy makers and the public in general. This study cites two accidents that happened in China in 2006 that caused serious environmental problems in nearby communities and discusses the problems these accidents created and the resulting disputes among the concerned people. Pollution-causing accidents not only pose threats to the health of the victims but also give rise to environmental disputes that jeopardise national security and social stability. Conflicts normally ensue following a pollution-causing accident, which are more likely to happen within a development zone or industrial park. Few environmental conflicts in the past decades were resolved through litigation. Nevertheless, there are lapses in the regulatory system, which have to be addressed to ensure that the public's rights and interests are protected. Currently, reports on pollution-causing accidents are difficult to obtain and are often released very late. A majority of industrial firms operate without environmental clearance, thus highlighting the government's inefficiency in environmental management. It is about time that the Chinese government takes seriously the use of the Environmental Impact Assessment.

Keywords Developing country · Environmental accident · Environmental conflicts · Case study

Y. Hou (✉)
Research Academy of Economics and Social Development,
Dongbei University of Finance and Economics,
No. 217, Jianshan Street, Shahekou District,
Dalian City, Liaoning Province, China 116025
e-mail: houyuxyz@163.com

Y. Hou
e-mail: houyu@dufe.edu.cn

Introduction

The rapid economic advancement of developing countries has undoubtedly enhanced the quality of people's lives. However, the downside is that developing nations have had to deal with more environmental problems and disputes arising from these problems. In some cases, environmental conflicts—which are described in this paper as mass protests over environmental issues—in developing countries were linked to social inequality issues (Sachihiko 1995). For instance, clashes in rural areas between opposing parties are triggered by seizures of natural resources (land, water, or forests) that adversely affect the interests of indigenous people and poor families living in the concerned areas. In urban areas, conflicts are prompted by land takeovers by the government for purposes of implementing infrastructure projects. The two environmental accidents discussed in this paper highlight the problems that come along with development.

Case study

Over the recent years, China has keenly demonstrated its involvement in environmental protection as environmental awareness is being promoted. Advocacy on environmental protection has become popular amid the rising number of environmental disputes. Statistics gathered by the Ministry of Environmental Protection of the People's Republic of China (MEP) in 2006 suggests that from the mid-1980s to 1997, environmental disputes remained steady at about 100,000 cases a year. However, the figure soared to more than 180,000 in 1998, to 250,000 in 1999, and to more than 300,000 in 2000. Since 1997, environmental disputes have risen annually by 25% (Wang et al. 2002). MEP statistics also shows that mass protests due to environmental problems have increased annually by an average of 29%. Using the two pollution-causing accidents in China in 2006, this paper discusses how such accidents have resulted in serious health risks and caused the growing number of environmental disputes. By citing causes of these accidents, ways on how to reduce the frequency of pollution-causing accidents may be determined.

Accident 1

On March 22, 2006, a short circuit occurred at the premises of an electrochemical company located at the Ningbo Daxie Development Zone, which is within the Yangtze River Delta area. This caused the leakage of liquid chlorine out of a pipeline. The leakage ran for about 10 min. The company did not inform residents in nearby areas about the accident. Instead, the company considered the accident as a regular accident that may happen during production. Work in the company thus resumed in the afternoon of the same day.

Unexpectedly, the pollution caused by the accident damaged food crops in the area and caused health problems to villagers. The affected residents complained of dizziness, chest pains, cough, and skin irritations, among others. Concerned about their health, 678 people visited the hospital on March 28. Of those who underwent medical checkups, 51 were kept under observation, while two were diagnosed with mild chlorine poisoning. The health problems of some of the residents caused panic in the entire village. More than 100 people held a protest in front of the premises of the electrochemical company, which they criticised for failing to inform them of the accident.

On March 23, the day after the accident happened, the Environmental Protection Bureau of Ningbo City already received a report on the liquid chlorine leakage at the premises of the electrochemical company. However, it took until March 26 for the Ningbo Daxie Development Zone to officially order the company to cease production. On the morning of March 28, Ningbo City officials held a special meeting where they decided to create an inspection group that would conduct an investigation of the accident. The group was headed by the deputy mayor. On the same morning, the Office of the State Council of Information informed MEP about the accident. That was the only time when an official investigation started. According to experts, approximately 100–120 kg of liquid chlorine had leaked. Traces of chlorine gas were initially detected within 1.2 km from the area of the accident. A plantation of broad bean crops was damaged. Further investigation later on revealed that the chlorine leakage-affected areas were within 1,000 m long and 500 m wide from the area of the accident.

Accident 2

On April 5, 2006, more than 40 people blocked the main thoroughfares through the village of Nanshan in Taizhou City (situated in Zhejiang Province, Eastern China) to protest the irresponsibility of the concerned officials that led to the rupture of a sewage pipeline. The sewage had spilled over to a body of water and nearby wells. Environmental protection departments confirmed that water in the wells in a nearby village had become acidic and polluted with organic elements. Two companies that were suspected to be responsible for the pollution were ordered to stop production.

On April 9, 4 days after the incident, villagers went to a hospital for a medical examination. Nine of them produced urine samples that tested ‘positive’ for exposure to pollution. The results of the medical examinations prompted villagers to stage another protest. On April 10, some villagers attacked one of the suspect factories and assaulted the owner. On the afternoon of April 14, more than 60 villagers approached the local government offices, demanding

that they close down the factories. The villagers likewise demanded the local governments to provide investigation reports on the accident and pay the medical expenses of all those affected by the pollution. By April 15, a total of 190 villagers had already been examined by the hospital, and 59 people (including the 9 referred to above) had tested positive for contamination. Ironically, the team investigating the incident concluded that none of these test results were linked with the rupture of the sewage pipeline.

The field surveys conducted by the joint investigation team—composed of representatives from public health and environmental protection departments of both the municipal and provincial governments—arrived at the following conclusions: (1) there was no obvious correlation between the results of the urine tests and the contaminants, (2) the results of the urine tests conducted on the residents of Nanshan Village were similar to those of tests conducted on the residents of villages not affected by the pollution, (3) there was evidence that a number of businesses adjacent to Nanshan Village had been, to varying degrees (the report was vague in this respect), responsible for polluting the environment. Investigations also revealed that only 1 out of 13 manufacturers in the affected areas had a licence to operate; the remaining 12 companies had all been illegally operating for 2 years. These 12 companies had been manufacturing, albeit on a small-scale basis, obsolete equipment without the approval of the environmental protection departments. The wastes being generated from this illegal production were being left untreated. On April 25, local government officials had a dialogue with the villagers. Compensation for health damage was offered (although the amount of compensation was not specified), and the villagers were granted access to relevant environmental monitoring data. In order to facilitate the clean-up operation—which entailed complete removal of the pollutants and treatment of the contaminated water and soil—MEP issued the following orders: all companies that did not comply with Environmental Impact Assessment (EIA) procedures should immediately halt production; environmental monitoring in the area would be strengthened; prompt release of monitoring reports must be observed, and widespread investigation of all businesses in the area would take place to weed out any hidden environmental dangers and violations of environmental protection procedures.

Findings

Although the two accidents cited in this paper are distinct from each other, they have similarities. Both were caused by a facility failure—the first one by an electrical short circuit, the second by a pipeline rupture. Evidence and experience suggest that facility failures usually occur as a result of one of the following: improper operation, poor maintenance of facilities, and use of either old or faulty equipment. Nonetheless, the investigation reports on the two accidents did not mention any of these causes. The two groups of people exposed to the accidents had similar descriptions. Both were living in rural areas in close proximity to the industrial areas where the accidents happened. If not for the protests staged by the two groups of villagers, no information about the accidents would have been made public. It took 6 days before MEP was informed about the incident at the Ningbo Daxie Development Zone. Similarly, it took half a month before the Environmental Protection Administration of Zhejiang Province reported the sewage-rupture accident to MEP. We opine that the results of the surveys and the investigations on the accidents should have been made available much earlier.

In the first incident, the exposed individuals reported dizziness, chest pains, cough, skin irritations, and other acute symptoms. Two people were officially diagnosed with mild chlorine poisoning following chest x-rays. In the second incident, 59 people produced a urine test positive for contaminants, but the results of the investigations said there was no obvious correlation between the results of the urine test and the contaminants. Damage to crops and fears over the ill effects of the accidents on the people's health prompted disputes between villagers and the companies at fault. Pollution-prevention practices were implemented by local governments to appease the angry villagers.

Comments

The two accidents have similar circumstances. Both require an in-depth analysis of their causes. The operators of industrial firms must be trained in production safety and in handling emergency situations in order to prevent these from worsening and so

on. They must likewise be made to comply with regulations on proper operations—such as those that deal with the maintenance of equipment to reduce the risks of pollution-causing accidents.

Poor oversight on the part of concerned government agencies and the lack of an emergency plan contributed to the unnecessary damages caused by the two accidents. The fact that many manufacturers were operating without environmental clearances showed the weakness of environmental regulation and the lack of corporate social responsibility. There is no existing law that requires companies to promptly inform concerned authorities of pollution-causing accidents. It took so much time before reports on such accidents were given to authorities. Poor communication led to serious problems. Moving forward, firms must be encouraged to exercise honesty and business ethics.

In both accidents, the damage to crops and the risks to people's health provoked disputes between villagers and the polluting companies. China's 'Environmental Protection Law' clearly states that a citizen has the right to challenge a firm's actions regarding violations of environmental laws and, where damage has occurred, ask for compensation. Nonetheless, few environmental conflicts in the past, including the two accidents discussed by this paper, have been resolved with ease. Complexity of the law, the high cost of making legal action, and the difficulty in identifying the causal relations between a pollution-causing accident and the resulting health damages are major obstacles to easily resolving disputes. Fear appears to be a major factor that prompts disputes. Fear is not limited to the immediate environmental impact of an incident, but it includes uncertainties of what the long-term effect of a pollution-causing accident will be on a community. Debates between victims and companies that are liable for such an accident normally are on whether its effects are 'true', meaning if they are objectively measurable, or are simply 'perceived'. Debates also focus on the amount of compensation that must be given to the victims of pollution-causing accidents. The amount of compensation for possible health effects is difficult to determine because of the usual absence of sound epidemiological evidence that will determine their seriousness.

Recommendations

A downside of China's rapid development is the increase in environmental problems, including the frequency of pollution-causing accidents and the resulting environmental disputes. It was only after the ninth 5-year plan that Chinese officials began to promote environmental awareness and allowed environmental issues to influence domestic politics and the management of the economy. There appears to be a correlation between the growth of environmental awareness and the increase in disputes following pollution-causing accidents. Our study shows that an environmental conflict normally follows a pollution-causing accident, which usually happens in areas where development zones or industrial parks are situated. To avoid hampering economic development and at the same time prevent rowdy conflicts that jeopardise social stability, a dispute-settlement mechanism must be formally set up.

The usual key players in environmental disputes are contractors, local and national governments, and local residents. Disputes are often prompted by fear of possible serious health hazards of a pollution-causing accident. Winning the trust of local residents is critical in resolving disputes. However, the current practice is to leave public disputes to the arbitrary discretion of regulatory officials or the firms involved. According to China's Environmental Protection Law, a citizen has the right to challenge publicly or even sue a firm whose development plans or actions are in violation of environmental laws. Nonetheless, few environmental conflicts have been resolved via judicial means. Therefore, we suggest that a legal mechanism to resolve environmental disputes—that will help protect people's rights and interests—be formally set up.

On a final note, we stress the importance of addressing the apparent weakness of oversight as shown by the continued operation of companies without environmental licences. In this regard, EIA is an important tool in deliberating concerns raised against a proposed industrial activity (Celso and Magrini 2003), and so it must be extensively used. EIA requires developers to submit a report on their activities that may have an impact on the environment and that describe how they intend to prevent such an impact. The efficiency of EIA to mitigate the adverse

impact of any development plans has actually improved. EIA may now help in defining the types of activities that can or cannot be conducted in certain types of geographic areas; defining the conditions under which permitted activities may take place; and defining (based upon scientific findings) acceptable thresholds for certain activities, say the acceptable level of certain substances that may be exposed in the environment. Stricter observance and enforcement of the EIA in China are needed. The administrative and enforcement power of environmental laws and regulations also has to be strengthened. At the very minimum, regulatory officials should develop guidelines on corporate social responsibility that firms must strictly observe.

Acknowledgements The author gratefully acknowledges the support by the National Natural Sciences Foundation of China titled as Research on the System of Damage Assessment for Environmental Polluting Accidents.

References

Celso, S. B., & Magrini, A. (2003). Conflicts in developing countries: a case study from Rio de Janeiro. *Environmental Impact Assessment Review, 23*, 489–513.

Sachihiko, H. (1995). Environmental dispute resolution process and information exchange. *Environmental Impact Assessment Review, 15*, 69–80.

Wang, C., et al. (2002). Settlement of environmental disputes in China and environmental enforcement supervised by the public. Environmental Protection 5.