

# Dammed or damned?

Large dams have already become a global concern for their negative impact on people and the ecosystem. Back in the 1960s, when the Kaptai dam was commissioned, 54,000 acres of cultivable land and 18,000 homes went under water, triggering off a massive human exodus to India. A proposed plan to raise water level of the Kaptai Lake, the Hill people fear, could engulf nearly 30,000 acres more and leave a few thousand families homeless. The authorities should try to contemplate the consequences before getting on with implementation of the plan, write **Ainun Nishat and Mahfuz Ullah**

IT is the Kaptai dam again. Debates are brewing about the proposed plan to raise the water level of the reservoir or lake in a bid to increase electricity production by 120 megawatts and the issues raised against the proposal demands serious considerations. The 670 metres long and about 46 metres high dam was completed in six years and was inaugurated on March 30, 1962. The Hill people, according to newspaper reports, are claiming that with a rise of five feet in water level about 30,000 acres of cultivable land would go under water. This has brought back the memories of the 1960s, when the dam was commissioned submerging 54,000 acres or about 40 per cent of the total cultivable land in the region. The original Rangamati town, including the palace of the Raja, went into the lake created by the dam. It swallowed the homes of 18,000 families rendering about 100,000 people homeless, who were about 25 per cent of the total population of the locality. And the biggest human exodus of the area, called *Bara Parang* (meaning exodus) in Chakma language, still haunts. Turned into developmental refugees, the Hill people migrated to India and the subsequent story of dissension, armed uprising and negotiated settlement are all known to everyone.

Large dams were constructed as one of the most important tools for water resources management during the 20th century. From the 1930s to the 1970s, construction of large dams was synonymous with development, progress and modernisation. The situation reached a point when in the 1970s on average two or three large dams were commissioned each day somewhere in the world. The immediate benefits of large dams, like production of electricity, food security, job creation, expansion of infrastructures, warranted their construction. Global investment in large dams is estimated at more than two trillion US dollars.

About 45,000 large dams across the globe have played a significant role in harnessing water resources for food production, energy generation, navigation, recreational purpose, flood control, and industrial and domestic water supply. Present estimates suggest that some 30-40 per cent of world's irrigated land now relies on dams and that dams generate 19 per cent of world electricity.

But the benefits soon turned into curse and construction of large dams became a matter of public concern because of their impacts on people, and ecosystem. The local adverse impacts of large dams soon turned into a global debate. Estimates show that dams have displaced some 40-80 million people while diversions of courses have affected 60 per cent of the world's rivers.

A number of global reports have documented the dramatic impact of human-induced water withdrawals from the lakes, rivers and ground aquifers. Total annual freshwater withdrawals today are estimated at 3,800 cubic kilometres -- twice as much as just 50 years ago. Besides, there are questions of impacts on communities and environment. Incidentally, social, environmental, governance and compliance aspects have been

ignored in decision-making about the construction of a dam in the past.

Against this backdrop, in April 1997, a meeting of representatives of diverse interests was organised by IUCN-the World Conservation Union and the World Bank to discuss controversial issues related to high dams. The meeting resulted in formation of the 12-member World Commission on Dams (WCD) in February 1998 under the chairmanship of Professor Kader Asmal, then South Africa's Minister of Water Affairs and Forestry and later the Minister of Education. Lakshmi Chand Jain of India was the vice chair of the WCD. The commission had two objectives: review of development effectiveness of large dams and assessment of alternatives for water resources and energy development; and

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The WCD has also observed that, "efforts to date to counter the ecosystem impacts of large dams have met with limited success. Pervasive and systematic failure to assess the range of potential negative impacts and implement adequate mitigation, resettlement and development programmes for the displaced, and the failure to account for the consequences of large dams for downstream livelihoods have led to the impoverishment and suffering of millions. Since the environmental and social costs of large dams have been poorly

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-- Large hydropower dams tend to perform closer to, but still below, targets for power generation, generally meet their financial targets but demonstrate variable economic performance relative to targets, with a number of notable under- and over-performers.

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the development of internationally acceptable criteria, guidelines and standards, appropriate for the planning, design appraisal, construction, operation, monitoring and decommissioning of dams. The commission started functioning in May 1998 and public consultation and access to the commission was a key component of its procedure. The WCD organised a number of hearings to obtain comments and views of professionals, experts, activist and stakeholders. The Bangladesh was well represented in such process.

Assessing the benefits and impacts of large dams the WCD, in its report published in November 2000, has observed that:

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accounted for in economic terms, the true profitability of these schemes remains elusive." The commission's observations are based on the emerging principle that the traditional concept of a balance sheet, that is calculating costs and benefits, is no more acceptable.

The WCD grouped the core values, which provided the basis of its understanding of issues related to large dams, under five principal headings: equity, efficiency, participatory decision-making, sustainability and accountability. In deciding on the fate of a dam, the WCD has recommended certain strategic priorities. These include: gaining public acceptance of key decisions, comprehensive options/alternatives assessment, addressing problems of existing dams, sustaining rivers and livelihoods, recognising entitlements and sharing benefits, ensuring compliance, and sharing rivers for peace, development and security.

Experts argue that the debate about large dams is both complex and simple. It is complex because the issues are not only technical but also contain the range of social, environmental and political choices, which are linked to human aspiration for development. It is simple because behind the array of facts and figures, of economic statistics and engineering calculations, lie a number of basic and easily understood principles.

Based on the findings of the WCD Report let us examine the recent proposal to raise the water level of the Kaptai Lake. The proposal to construct Kaptai dam, like many others, initially envisaged five types of benefits. These

were hydropower generation, irrigation and drainage, flood control, enhancement of navigability of the river and boosting forestry of resources harvesting. Later, fish culture in the lake was added to the list of benefits. And recreational benefits could be added to the list. These benefits have been achieved to a significant level but the benefits from irrigation and drainage has not been realised. But adverse affects of the Kaptai Lake have not been taken seriously by the planners as is manifested by the proposal to raise the water level of the artificial lake.

Following the construction of the Kaptai dam and filling up of the reservoir into a man-made lake there was an acute shortage of cultivable land in the region. As part of the original rehabilitation plan, the government allotted land to the displaced families in the low-lying areas of Langdu, Barkal and Baghachari thanas for resettlement. The Kaptai Lake took about two years (1960-61) to take its final shape. In the second year when the low-lying areas of the thanas mentioned were inundated the rehabilitated people became homeless for a second time in a year and they decided to migrate to India. The government tried to resist the exodus and carefully monitored their movements. In a bid to outwit the government, the affected people resorted to various tactics. Some of them left their houses at night keeping the lanterns burning so it was assumed the residents were still in their houses. These people first

its storage continues for power generation. So, the fringe land gradually emerges above water with recession of water line and cultivation on such lands becomes possible. Availability of land largely depends on the fall of the water level in the lake. According to an estimate, a total of 36,000 acres of fringe land around the lake are cultivated in dry months when as water level drops from full reservoir level of 33.2 metres above MSL to 25. Of them, 2,000 acres stretch from 27 to 30 metres, 6,000 acres from 30 to 32 metres, 22,000 acres from 32 to 35 metres and the remaining 6,000 acres from 35 to 38 metres from the lake's dry season waterline.

It is not clear what changes have been envisaged in design as well as in operational pattern of the Kaptai project in the recent proposal. It is known that the dry season water level will be raised. Will the height of the dam be raised? Possibly the answer is no. Then, will the maximum reservoir level be increased? Again the answer may be no. Otherwise the stability of the dam may be questioned. Then how the water level during the dry season will be raised needs to be understood. Then one will be able to quantify the area of land that presently comes under cultivation in pre-monsoon season will be lost due to submergence.

Apart from uprooting thousands of people, the Kaptai project has also created other adverse impacts. These include: changes in the occupational structure, loss of forest

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migrated to the Mizoram, Tripura and Assam States of India. Later, they were transferred to Arunachal Pradesh.

Presently, the water level of the lake is maintained at 25 metres above Mean Sea Level (MSL) up to June 1. The water is stored during the monsoon when heavy rainfall and onrush of water from the upstream reaches of the Karnaphuli take place and the lake is filled up to designed high water level. The maximum reservoir level is 33.5 metres above MSL. The water is released from the reservoir during the wet season through a 227-metre long spillway only when there is excess of rushing water into the lake that can damage the stability of the dam. Some water is discharged into the Karnaphuli River round the year as electricity is produced using the head of water. At the end of monsoon season, the supply of water from the upper catchment dwindles down to trickles and the level of water in the reservoir drops as discharge from

resources (a staggering 75 square kilometres of reserve forest area and another 600 square kilometres of unclassified forest areas went into the lake), decline in wildlife and cattle, scarcity of safe drinking water. According to the Chittagong Hill Tracts District Gazetteer 1975, the lake devoured a total of 54,000 acres under cultivation and 21,522 acres of cultivable land were reclaimed by clearing the forests. In the Kasalong Reserve Forest under Baghachari Thana alone, 100 square kilometres of forests were destroyed to reclaim 10,000 acres for farming.

The fish cultivation in the Kaptai Lake has also affected the local variety. According to statistics available, during 1965-66, the share of Ruhi, Katla, Mrigel and Kalibaus and other fishes in the total fish population of the lake was 78 per cent. In 1993, the share reduced to a meagre 2.36 per cent. On the other hand, in 1992-93, Tilapia's share went up to 19.55 percent. The wild beasts, which once freely

roamed the jungles of the area, included elephants, sambar, monkeys, wild boars, wild dogs, black leopards, gaur, etc. There were also many species of birds and reptiles. Most of these animals and beasts are now extinct.

Today, there exists a varied range of options for delivering water and electricity services. There is considerable scope for improving performance of the dam's hydropower generation units. The WCD report argues "as a development choice, the selection of large dams often served as a focal point for the interests and aspirations of politicians, centralised government agencies, international aid donors and the dam-building industry, and did not provide for a comprehensive evaluation of available alternatives. Involvement from civil society varied with the degree of debate and openness to political discourse in a country. However, the WCD Global Review documents a frequent failure to recognise affected people and empower them to participate in the process. In some cases, the opportunity for corruption provided by dams as large-scale infrastructure projects further distorted decision-making."

All these accusations are also valid in the case of Kaptai dam. A Chittagong University study shows 69 per cent of the Chakmas felt that the dam created food and financial problems for them. 69 per cent complained of inadequate government help for rehabilitation. 58 per cent were disheartened as it did not provide any meaningful job opportunities and 93 per cent felt that their economic condition had been better before the construction of the dam. The affected people had no role in the planning process nor were they consulted about the relocation or rehabilitation programme. And the engineering services and construction work were done by International Engineering Company (IECO) and Utah International Inc. respectively, both of the United States.

One may argue that in the 1950s, when the Kaptai project was taken up, the importance of local people's participation in planning process was not given due emphasis. One may claim that environmental impact assessments were not a known component of professional practice in those days. One may further argue that social impact assessment is a recent requirement in project planning process. One may point out that consideration for ecological and bio-diversity conservation is of recent origin. But such claims are not valid any more. These are essential requirements of planning process under the present policy as well as legal regimes in force in Bangladesh. Recently formulated Water Policy as well as the regulations under the Environmental Act of 1995 demand that these analyses are done properly. Time has come that Bangladesh introduces the practice of holding open and free public hearing for all major and controversial projects.

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# In dark about a dread called dioxin

by Md. Asadullah Khan

FACTORY owners as well as shoppers have a penchant for wrapping everything in plastic and then burning the rubbish indiscriminately. Prompted by a mistaken belief that such burning will ward off harmful effects, this practice in most part of the world goes unabated. Developed countries like the US and Japan are now suffering the growing pain of prosperity. Trading toxic waste without the permission of importing countries or disposing of it callously or dumping it in the backyard of another, which in turn passes it on to another and "another," is a criminal act. Reports have it that last year 3,000 tonnes of mercury tainted-industrial waste from Taiwan ended up in Cambodia, where it was linked to several deaths and sparked riots and a panicked exodus that resulted more fatalities. UN estimates that the world produces 400 million tonnes of hazardous waste including toxins and dioxins every year and about 40 million tonnes are traded internationally. Even if this trade is curbed, disposing of it most callously either in our own country or elsewhere that most often generates toxins invites disasters and diseases that prove to be fatal.

Despite being the most developed country in the world, this practice has turned Japan into the dioxin centre of the world. Dioxins, a highly toxic group of chemicals that are known to cause birth defects, skin disease and cancer, are produced when polyvinyl chloride (PVC) and other plastic waste is burned at temperatures below 700 degrees Celsius. So toxic is dioxin that a dose no bigger than a single grain of salt can kill a man. In 1982, the Mayor of Times Beach, Missouri, evacuated about 801 families because it was contaminated with dioxin. Despite fantastic development and innovation in scientific testing, uncertainties still exist in the US in judgements about alar, PCB (polychlorinated biphenyl), asbestos and radon. Citing government studies, environmentalists in the US sounded alarm about toxicity and cancer. If it is true that sometimes the risks have been exaggerated, even then the risk assessment and the method of evaluating how dangerous a substance is to humans has hardly been perfect. In the US, officials have been quick to ban chemical that according to lab tests are carcinogenic. But sceptics contend the system is so sensitive that if standard tests were applied to all natural and synthetic chemicals, fully half of them would appear to cause cancer.

But there must be a way out to prove that a chemical causes cancer since the disease may not strike until years after exposure. Unable to wait that long, scientists have tried to speed up the process by feeding huge amounts of suspect chemicals to laboratory animals such as mice. Typically they are given what is known as the maximum tolerated dose, and amount just below the lethal level. In the case of the artificial sweetener saccharin, mice were given the equivalent of hundreds of cans of diet soda a day. Similarly, a person would have to eat thousands of apples a day to get the maximum tolerated dose of alar, a fruit ripening chemical used by growers until it was withdrawn from the market because of cancer scare. If as few as five mice out of 200 given these megadoses develop tumours over two years the substance is usually labelled as carcinogenic. Such a conclusion is based on a host of conservative assumptions, including that the effect on mice is generally the same as on humans and that it makes no difference whether the chemical is swallowed, inhaled or

rubbed on the skin. Another questionable premise is that there is no safe dose of a carcinogen. In fact, the body may have evolved methods of coping with small amounts of such chemicals. But when lab mice are given a megadose of a chemical, it could overwhelm their natural repair system. Such a dose may also stimulate cells to divide rapidly, which magnifies normal genetic errors and produce cancer.

If traces of chemicals can cause cancer, then the peril is inescapable. Most fruits and vegetables contain natural pesticides -- chemicals that plants themselves have manufactured to ward off bugs and blights -- and about half those compounds have tested positive as carcinogens.

Japan, the most developed country in the world is grappling with dioxin scare on many fronts. "As pure as mother's milk" is not a phrase one is likely to hear these days in Japan. The revealing findings came from a leading Japanese scientist Miyata Hideaki who suspected that the milk from mother's breasts might be contaminated with the controversial chemical pollutant dioxin -- something confirmed by tests, he subsequently carried out. Miyata says, "I can't help but believe it is safer to keep our babies away from mother's milk."

In recent years, dioxin pollution has become a national obsession in Japan. One reason: it is closely linked to the burning of trash. Dioxin is often released when plastics and other wastes containing chlorine-based chemicals are burned. More than three-quarters of Japan's garbage are consumed at about 3,840 government incinerators. Until recently, few if any controls on dioxin release existed. Miyata learned first about dioxin in 1970 in a US government research paper and till then the chemical dangers were not well known. Most Japanese and others would remain ignorant until the adverse effect of Agent Orange, a herbicide that the Americans used in the Vietnam War to defoliate forests, became more widely known. It was only about four or five years ago that Japanese and the world around Japan really awakened to the dioxin pollution surrounding them. Miyata was conducting research on another toxic chemical polychlorinated biphenyl (PCB) at the Osaka Prefecture Institute of Public Health. Working on worst cases of PCB poisoning, the Kanemi Rice oil case that killed 126 people in 1968, he and his team isolated two additional toxins in the PCB-tainted oil, both of which the World Health Organisation (WHO) included in the list of carcinogens in 1998.

In the 1980s while Miyata was in the Setsuun University in Kyoto, his team turned its attention to dioxin contamination from garbage incinerators. Small wonder, excessive amounts of dioxin were found in the ashes of all three municipal incinerators in Osaka. More disturbingly, he found the chemical, to be present in mother's milk, an indication that the carcinogen was being passed on to the next generation. But the issue didn't really hit home until 1990s when the plight of Tokorozawa, a city north of Tokyo, became news. Trees were blackened and moss was dying there. What's more, people there suffered from persistent cough and sore eyes. And all these happened because of the presence of numerous industrial waste incinerators, some operating illegally. Miyata's team analysed the soil and found high doses of dioxin. His detailed and widely publicised report awakened the city fathers and drove

them into action. In 1997, Tokorozawa became the first Japanese city with its own code for regulating dioxin release.

Japan, a vast industrial city dealing in plastics, polythene and other chemicals, spew out dioxin in a large dose. But somehow it went unnoticed until people complained of severe health problems. A recent study by Nicholas Smith, from the Tokyo office of Jardine Fleming, a stock-broking firm, found that more than 100 of the 1,500 incinerators in Japan failed to meet the century's already lax dioxin emission criterion. Japanese law allows 80 billionths of a gram of dioxin per cubic metre of air -- 800 times greater than typical standards in Western Europe and North America. Curiously enough, despite such a phenomenal progress in all areas, only eight incinerators in Japan meet international norm. And one, in Hyogo, continues to spew out dioxin at 10,000 times the concentration allowed elsewhere.

All that poison floating around either here in our country or in Japan in the air may pass unnoticed. But when it falls to earth and contaminates the soil and groundwater, it becomes harder to ignore. A wake-up call for Japanese industry -- on the scale of Love Canal in America in 1980 -- came in April 1998 when the soil surrounding an incinerator in Nosecho, a residential suburb north of Osaka, was found to contain a staggering 8500 picograms of dioxin per gram of soil. With this finding, Nosecho has earned the unpleasant distinction of highest recorded dioxin concentration in the world.

Unfortunately, because of lack awareness and absence of testing methods, our country is inching towards disaster. Recently, studies by ITC (Intronics Technology Centre) in Dhaka, just established with the financial support of a Bangladeshi scientist working in the US, have revealed dangerous levels of several volatile organic compounds like toluene, benzene, ethyl benzene, isocyanates methoxybenzene, propyl benzene and trimethyl benzene responsible for causing cancer in humans. The maximum tolerance limit of toluene in air, they say, is 2000 microgram per cubic metre, but shockingly, the level found in Dhaka's air shoots up to 200,000 microgram per cubic metre.

Incidentally, the outcry about toxic waste in Love Canal in New York state prodded the American Congress into establishing a trust fund called super fund financed by levy on the oil and chemical industries to clean up such sites. With the publication of ugly details about the frightening condition of some of the sites in Osaka and Tokyo, Toshiba, an electrical goods manufacturing company, moved into action. In early June in 1998, the electrical group found illegally dumped high levels of a carcinogen, trichloro ethylene -- an industrial cleaning agent that is believed to cause kidney and liver damage as well as cancer -- in the groundwater beneath four of its domestic factories. The company carried out onsite inspections of all of its 25 plants in Japan after detecting trichloro ethylene levels at 15,600 times the permitted level at a factory in Nagoya in October 1997.

Next a consumer-electronics giant, Matsushita, reported harmful carcinogen levels in the groundwater beneath four of its factories in the Osaka area. The level of the cancer agent tetrachlorethylene -- used for cleaning semiconductors -- at one of the plants was 9,400 times the permissible limit. At another plant, in Hokkaido, the groundwater contamination was 5,200 times the maxi-

mum. The company suspects that the groundwater beneath 80 of its 112 plants in Japan may be contaminated with harmful compounds. Such findings have come to light more than a year after Japan's amended Water Pollution Prevention Act came into effect. But the recent rush to reveal all has been prompted as much by the "Nosecho effect" as by the retroactive nature of the legislation, which forces the original polluter to clean up an affected site.

Other forces are at work, too. Japanese manufacturers have been adopting the international ISO14000 standard of environmental good housekeeping faster than those of any other country. Since the danger from dioxin scare gripped them in 1998, in the meantime, some 730 industrial sites in Japan had become fully compliant, compared with 525 in Britain and a mere 110 in America. Half of the Japanese plants that have complied with the new ISO standard are in the electronics sector. Being top exporters, Japanese electronics firms have been understandably nervous about having their goods barred from countries that are signatories to the ISO14000 agreement. To be awarded the ISO seal of approval means making fundamental changes in the way a plant is managed, with strict planning, implementing, checking and reporting systems put in place. These, as much as anything, are encouraging Japanese firms to clean up their act.

Many suspect that the opportunities currently being exploited by the clean-up industry in Japan are merely the tip of an iceberg. Now that two of the country's most respected industrial names, Toshiba and Matsushita, have voluntarily surveyed their sites for toxic problems -- and gone public with their findings -- many more Japanese companies are expected to follow suit. The pressure for them to do so is increasing as they shut old smoke-stack factories and redevelop the land for other uses.

But the remedial work is not just required at big manufacturers. The Environment Agency of Japan points to the plethora of small plating shops as the country's worst offender in terms of toxic waste and quite surprisingly followed by dry-cleaners, hairdressers and public bathhouses. Big industries such as chemicals and electronics follow close behind. So far, only a fraction of the small back-street offenders have had their land surveyed. There is still a lot of nasty stuff out there in the Japanese soil. And an awful lot of work will be needed to clean it up.

Thanks to the encouraging and dedicated activists in the developed countries like Japan, US, Germany and UK governments, corporations and citizens in that region have woken up to the damage that has been done to the precarious balance between man and his surroundings. The damage and havoc caused in those countries have brought home the need for a more responsible way of doing business. It must give us sobering moments to pause and reflect on how the environment could have been better managed. Likewise, efforts must be underway to right some of the wrongs that go unnoticed and unabated in our country.

Shockingly, in our country regulators, corporate bodies, city corporations, water supply authorities are reluctant to invest in waste treatment with some arguments that the toxins will be diluted to safe levels in the vast expanse of the Bay of Bengal or other seas around Asia. But the cleaning power of ocean currents has its limits. Researchers are dis-

covering alarming levels of industrial poisons even in whales and dolphins caught in northern Asian waters. An international study found their meat to be highly contaminated with deadly chemicals. It can give us hardly any satisfaction to think that we are safe just because whale and dolphin don't feature on our menu. Experts are now concerned that our drinking water just piped from underground and other seafood -- even fished from the ocean depth -- may present similar perils.

Just like other pollution, airborne or waterborne, polythene bags and plastics in recent years have become a major source of health hazards in our country. Reports have it that on an average about 60 lakh pieces of polythene bags are being used in the Dhaka city alone. Sources close to Dhaka WASA indicate that about 100 crore polythene bags are lying abandoned in the capital city alone. Besides causing blockage to sewerage pipe blocking the smooth and regular flow of wastewater, which might result in the complete breakdown of the drainage system, it presents hazards in many ways. As polythene is a non-biodegradable element, it can remain in the environment for years causing enormous damage to our health and cultivable land. Polythene does not mix with soil and remains unchanged like a strong curtain through which nothing can pass. On the other hand, the fertility of the soil is weakened because of the fact that natural working of other elements in the soil is obstructed. Poly-

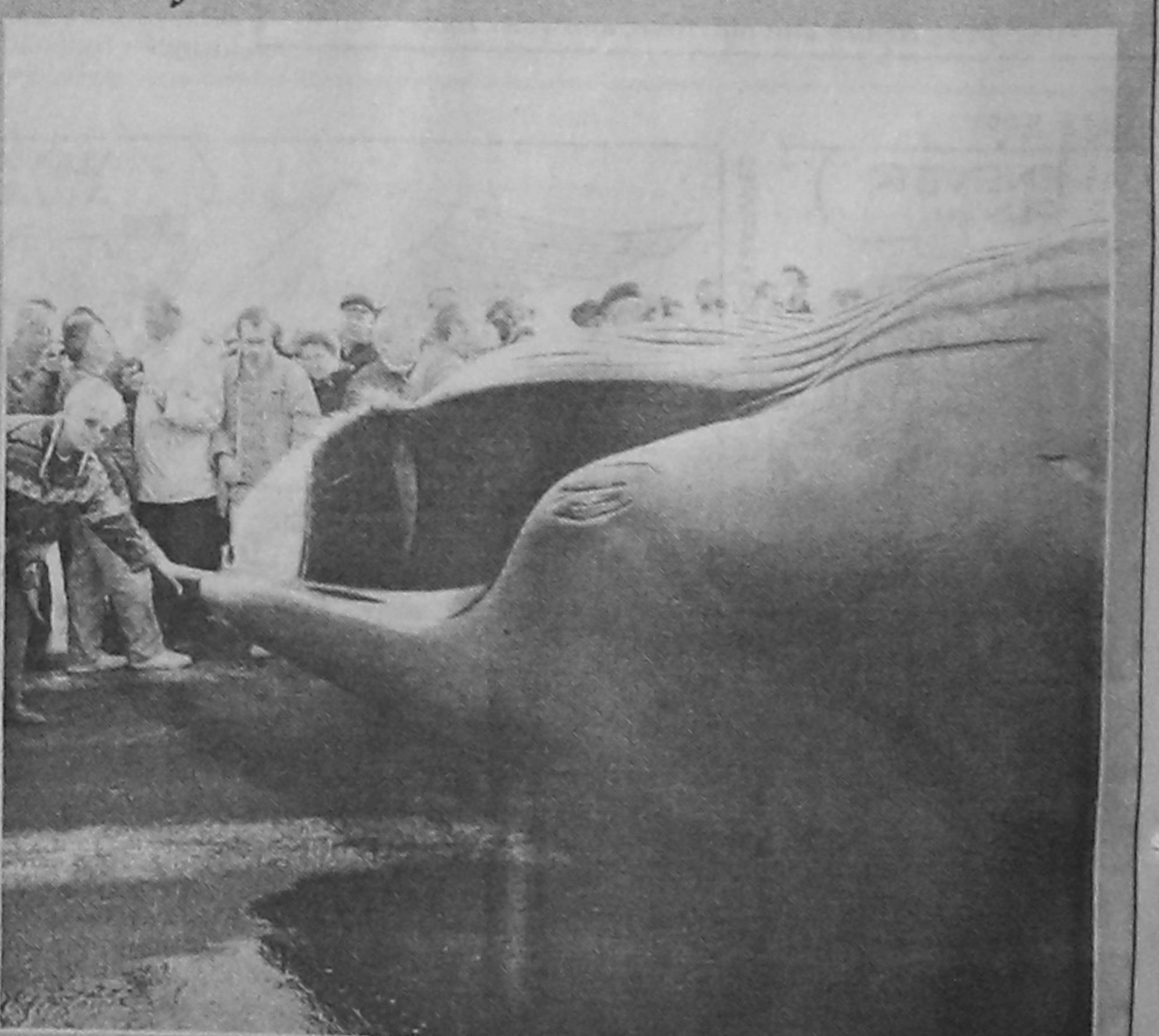
thene or polyethylene which is the name of this organic compound is usually manufactured by gas-phase polymerization and does not yield complete polymerisation but creates different kinds of vinyl chlorides. Heavy concentration of these substances is highly toxic and may cause cancer. Besides, this substance destroys the beneficial bacteria in the soil and obstructs sunlight from reaching the soil.

Disposing of polythene is a very difficult job. The only method used is by burning but burning polythene, especially the black ones, produces the most toxic gases such as dioxin and hydrogen cyanide and destroys the human immune system and is responsible for causing cancer. Polythene and plastic goods production in the country has gone up.

Unfortunately, the government or the manufacturing companies or the citizens in the country are not aware of the dangers, let alone acknowledging the dangers of dioxin. In line with the developed countries we have not yet been able to set standards for daily intake. "Dioxin is a symbol of our contemporary life of mass consumption based on mass production," says Researcher Miyata in Japan's Kyoto University. The mass culture exacts a price, and people are paid back what they do -- or don't do -- to the environment. If people in the country continue to live indifferently, it will be like "strangling" ourselves.

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## Wail for the Whale



People surround a 15-meter whale that ran ashore on a Pyla beach near Arcachon, southwestern France on Wednesday. The about 15-tonne animal was discovered lying high and dry there.

-- AFP photo