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Title:

Industrialization: For Welfare and Wealth Generation

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Abstract:

Industrialization has long been considered a central driver of economic development, welfare, and wealth generation. However, its expansion has also generated complex challenges related to environmental degradation and human well-being. This paper examines the relationship between industrialization, environmental quality, and human welfare by exploring how industrial growth contributes both to economic prosperity and ecological stress. While industrialization increases production, employment, and income thereby raising the standard of living it simultaneously exerts pressure on natural resources such as forests, water bodies, and air quality. The study discusses the conflict between economic growth and environmental sustainability within the framework of welfare economics, highlighting how environmental goods such as clean air, water, and ecological balance play a vital role in human welfare despite often remaining outside market valuation. Drawing on theoretical insights, including transaction cost analysis and environmental economics, the paper emphasizes the external costs of industrial activity borne by society. Empirical observations and case examples from industrial regions illustrate the impacts of pollution, groundwater contamination, and deforestation on public health, productivity, and ecological stability. The study argues that unchecked industrialization may undermine long-term welfare by degrading environmental resources essential for life and development. Therefore, sustainable industrial practices, technological innovation, regulatory frameworks, and government intervention are essential to balance economic growth with environmental protection. Ultimately, the paper advocates a model of sustainable development in which industrial progress supports both wealth creation and the preservation of environmental quality for present and future generations.

Keywords:

Industrialization; Human Welfare; Environmental Quality; Sustainable Development; Environmental Pollution; Natural Resources; Economic Development; Public Goods.

Introduction

Industrialization has broad meaning that productions and enhancement of utilities for human consumption, through goods. The human quest for more is infinite but the means to satisfy them are finite. The environment provides the basis for production. Intensified production takes tool of the raw material stock and production. The disparities between progressively increasing production of utilities and the limited means of environment lead to changes in environment.

Environment as a Concept of Welfare

The welfare of the individuals does not come from the goods marketed alone. It depends on the goods that stay out of the ambit of market also. They are not manufactured but they are necessary for the welfare of humanity. We call them social goods. Good air, water and earth are examples of these. The earth is responsible for the purity and the taste of the water which we drink and cook with.

It is widely acknowledged that welfare increases with increase in the GDP. GDP is the money value of the market-based goods. But there is a question following this evaluation. Some products of industrialization promote welfare but also erode it. This forces the choice between standard of living and quality of living. Environment provides the quality of life. Industrialization provides the standard of life.

Quality of Environment due to Industrialization

Industrialization is a part of economic development. It can be quantified. But human welfare cannot be quantified. Its Connection with economic development is illusive. But traditionally, right from the time of J.S. Mill, economic development has been considered a part of human welfare. But Boulder was unique because he cared for preservation of environment quality because he cared for development which could take care of future development also.

The British economist *Professor E.S. Missan* points out that modern production process involves noise, confusion and excitement. He suggests some means of moderation. For example, he suggests that when smoking is found to be a pollution which at least a part of the population wants to avoid, then the Railways have to think-of a Smokers' or Non-smokers' Compartment. Similarly, if an industry pollutes the atmosphere with its effluents, then take measures to reduce or to remove the pollution. But then it is not always possible to care for the quality of the environment at the expense of production and consumption. So, Pareto makes the unpalatable but inevitable observation that nobody can be better unless somebody is made worse off. That is the unfortunate basis of the conflict between a true Welfare Economics and the Economics of Industrialization.

Industrialization and Environment

All economists agree on one idea: that environment is a natural commodity which contributes to the promotion of welfare. But in the process, environment is depleted in its basic components. Sometimes, the depletion is irremediable (as in the case of fossil and mineral resources) and in other cases, often, the necessary time is not allowed for the recouping of the depleted components. What are the pressures that economic growth will exert on our environment in the coming years? A higher rate of industrialization can result in an irreversible negative impact on human welfare. A report from the World Bank brings out the following facts.

The Report predicts long term trends of productivity and population. It says that between 1990 and 2030 the productivity in developing countries will increase between 4 and 5 per cent per annum. It takes into account the increase in population also. It expects production to increase five-fold-in industrialized economies the production will go up three-fold but with the rise in output, there will be a corresponding rise in environmental pollution. This will take innocent young lives through chronic illness, water shortage and decline in the area of tropical forests and other natural habitats. The earth's self- protective capacity can withstand only a certain amount of pollution. Industrialization can spare human suffering if it takes measures for controlling pollution-

in other words, if it controls itself. Substitution, technical changes and structural changes are the directions that industries will have to take if they are not dedicated to selfishness. For example, in paper making, every tone of paper takes wood of 20 tones. Technical changes, use of wood substitutes, recycling of waste paper and the discovery of other raw material-like paddy straw or wheat straw-can all steps in the right direction. Technical changes may also lead to enhanced production. Such technical changes have led to the outstripping of demand by production in the case of metals like zinc and aluminium.

The demand for water will far outstrip supply. Water is a natural resource and a public good. Water scarcity is already rife in China, Jawa and some arid belts in India. Groundwater resources are irreversibly exploited in residential and industrial areas with scant regard for the requirements of the future. Unless that is checked, India may become another Somalia! Impact of Industrialization on Health, Productivity and Environment following facts are relevant to all developing countries. They have equated development with industrialization and that is bound to have a great effect on the welfare of their peoples.

Natural vegetation

Forests are the first casualty in industrialization. The increasing population is one factor in the reduction of the area under forest cover. The forest areas are the source of fuel in rural areas, and 80 per cent of this rural energy is spent on cooking. Population increases steps up the pressure on forest land, and forest products like wood. Urbanization, a concomitant of industrialization, brings in new needs for wood. Housing, paper industry, all needs wood. Consequently, forest cover is reduced at the rate of one per cent a year. In India, forest cover has gone down to 12 per cent from 30 per cent. That results in ecological, economic and social pressure proportions. Loss of soil, watershed production loss, climate change, destruction of wildlife habitats are part of these changes. Certain Himalayan plant roots are used in the production of perfumes, but these plants are the staple diet of the musk deer. The deer population, thus deprived, is now shifting to other areas. Wild animals like tigers which used to feed on deer now stray into human habitats! In 2018, at least 1500 people died in landslides and flash floods. The Indian woman depending on natural fuel has now to spend at least six hours a day to collect her firewood. Less forest land less of rainfall, and more of soil erosion. Deserts advance into living lands. In countries like Costa Rica, Malawi, Mali and Mexico, the productivity has come down by 10 to 15 per cent of their G.D.P.

Water Bodies

Data regarding water is available only with effect from the 1980's. One billion people do not have access to clean water. 18 million have inadequate sanitation facilities. Many do not have proper water supply in developed urban areas. Its impact on health and hygiene is evident. Millions die due to water-borne diseases: about a million children fall a victim to diseases generated by absence of or inadequate or improper water supply in developing countries alone. At any given moment, 500 million are suffering from stomach disorders,

and worm-borne diseases are rampant. Precious man days are lost and productivity suffers heavily. Water pollution affects the productivity of land, and tells upon the fisheries. Municipal water supply charges escalate.

Air

Air is polluted by the use of energy (coal, fossil oil), through emissions of vehicles and industrial units. Twelve million people breathe contaminated air according to WHO standards. Dust and smoke lead to respiratory diseases. In India and China alone 7 lakh people die early due to air pollution. Air and noise pollution following industrialization leads to hyper tension, blood pressure and neurological troubles. Noise pollution affects IQ and a study may be usefully conducted to determine the relationship between noise and educational efficiency.

Industries and Atmosphere Change in Industrial Areas

The zone of ozone that shields the earth from the ultra-violet rays of the sun is depleted by the use of air-conditioners and such equipment and by emissions from fossil-oil exploiting machinery. The ultra-violet rays cause cataract, cancer, etc. and affect marine organisms. Eventually they affect the productivity of humanity. The emission of greenhouse gases increases the earth's temperature. At the turn of the century, the earth's temperature may be higher by 1.5 to 4.5 degrees Celsius. The ice caps of the poles may melt sending up the sea level submerging coastal cities and islands. Rains in polluted areas may be in the form of acidic water which may affect steel structures, forests and water bodies. The effect on the soil will be felt on the quantity of food available, its quality and health. Industrial disposals may affect human health, block drains and may become a source of diseases. Nuclear disposals can create serious radiation problems.

Transaction Cost Analysis

The Transaction Cost Analysis theory of Roger Coase shows that a transaction between two parties affects a third party not involved in the deal at all. Goods are produced by one set of people, and they are consumed by another set of people. But a third set of people is affected, and they lose in terms of public goods. Nature's generous bounty is thus depleted, and the need of the hour is Sustained Development and not Reckless Development. Government must directly intervene. A government, if it is worth its salt, is for the present and for the future. It must make stringent laws and enforce them-to compel industries to be careful. They must be made to avoid polluting technologies and to find methods that eliminate the possibility of pollution. When anti-pollution measures prove too costly, the government must subsidize the cost.

Case Studies

On 14 March 1993, the Indian Express produced a news item saying that a divisional consumers' forum has launched an agitation against the pollution caused by the State Government. The Government-run Ariyalur Cement Works, criticised for its polluting smoke and effluents, pleads that its pollution control mechanism is

unable to work nonstop because of certain process problems. Respiratory disorders, water-carried disorders, eye diseases have affected the cattle and people of the locality. On 28 November 1992, Usha Rai reported in the Indian Express that alarming levels of groundwater pollution exist in small, industrial towns like Faridabad, Ludhiana, Kanpur, Lucknow, Pali and Varanasi. Untreated effluents have leaked into acquihires making the water unfit for human consumption. In Faridabad area, there are more than 1000 units manufacturing tractors and agricultural implements. Electrical plastic and rubber goods are also manufactured here.

Underground water in that area shows chromium levels between 15.5 and 114 mg. per litre of water. In some places it is several times this, while the tolerance level is 50 mgs. Copper and nickel contents have also crossed the tolerance level. In Kanpur and Ludhiana, the situation is far worse. In Kanpur, untreated effluents have injected groundwater with chromium concentration of 2700, 18000, 5650 and 1100 micromilligram. The cycle industry, foundries, alloys, gas burner manufacturing units. use a chromium plating process and let out their effluents which have a high level of chromium and cyanide. They cause skin, nasal membrane problems, and can cause lung carcinoma. The diesel engine locomotive works discharge effluents with calcium and make water unfit for drinking. The carpet industry in Mirzapur lets the toxic dye effluents into the stream, contaminating groundwater, causing major health problems for the people.

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