



## **A study on the technology and the environment**

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### **Abstract**

The paper gives a top level view of the innovation effects of beyond environmental regulations. There's a great deal communicate about environmental policies being faulty. Beyond regulations are being criticised for failing to fulfil environmental goals (the environmentalist grievance), for being overly steeply-priced (the industrialist criticism) and for failing to encourage innovation and dynamic performance. This paper appears at the innovation and technology adoption outcomes of past environmental regulations. It reveals certainly few examples of environmental policies that inspired innovation. The not unusual compliance reaction is the usage of luxurious quit-of-pipe answers and incremental procedure adjustments presenting restricted environmental gains. This paper offers a 2d explanation—based totally on insights from innovation studies. It says that in an effort to promote innovation, policy devices have to be high-quality-tuned to the occasions wherein sociotechnical exchange procedures arise and tip the balance. The paper gives a modulation view on coverage, which complements an instrument view. The paper appraises policy contraptions for selling surroundings-enhancing technical alternate and offers tips for the layout and use of policy instruments. It argues for using guidelines which might be explicitly worried with technical alternate (instead of implicitly thru a alternate in the economic and prison body situations) and to be involved with institutional arrangements beyond the info of coverage gadgets. This calls for different roles for policy makers: that of a sponsor, planner, regulator, matchmaker, alignment actor and 'creative game regulator'. Those guidelines aimed at learning and alignment aren't an alternative to policies that alternate the frame conditions however an addendum. Both types of policies are wanted for accomplishing an ecological modernisation.

**Keywords:** dynamic performance, sociotechnical, ecological modernisation, quick-sighted farming practices, ecological stability, profound incursions

### **Introduction**

Throughout time, humanity has grappled with questions of the way to survive and, in so doing, to fulfil the desires for fundamentals such as meals and refuge. Traditionally, humankind has used era to assist within the pursuit of those survival basics. Researchers analysing society from a comparative and historic attitude note that as subsistence technology has evolved—for example, from the digging stick with the plow to the steam engine—so have there been profound changes inside the approaches societies themselves are organised (e.g., Len ski 1966; Len ski and Nolan 1984).

With the development in generation, societies are able to collect and convey more food and to build up surpluses. This ends in some of profound adjustments in social and ecological processes, along with changes in the numbers of people residing in a society, and, greater commonly, on earth, and in the styles of accumulation and distribution of assets amongst the ones humans. Furthermore, as era permits for deeper incursions into the earth, the potential for environmental effect increases dramatically (Ponting 1991; McNeill 2000).

Due to the profound implications for the properly-being, and perhaps even the long-time period survival, of humanity, questions about interactions of social preparations amongst human beings, the technologies they produce, and their impacts on the natural environment are vitally crucial to sociologists. But by means of their very nature, those questions involve a number of elements, and as such, their

have a look at normally has been interdisciplinary. The observe of social-technological-environmental interactions, by means of its very nature, attracts on some of subfields. We now turn to a number of the attempts to deliver social scientific analysis to these questions.

### **Early work linking technology and the surroundings with human social organisation**

Some of the early attempts to look at those interrelationships were undertaken via sociologists, however with a heavy affect of other disciplines, most extensively biology. Those came to be recognised beneath a broad rubric of human ecology (e.g., Duncan 1964; Commoner 1971, 1992; Canton 1980, 1994; Canton and Dunlap 1978; Hawley 1981).

Human ecologists advanced a framework that came to be known as the POET model, so named because of the acronym formed via the 4 major variables: populace (human social), company, environment, and era. Whilst this version served as a useful way to awareness discussions approximately human-environmental interactions, it changed into not particularly influential in guiding empirical research. one of the chief criticisms spoke to the ecological nature of the version itself, in that it did not specify an outcome and did no longer make particular predictions (for an in-intensity discussion, see Dietz and Rosa 1994).

As sociologists and others came to understand the limitations of the POET model, it was changed by using a number of

researchers round several rising themes. a chain of arguments were superior that a hard and fast of fashions must be specified that would be expecting environmental influences, together with deforestation, greenhouse gasoline emissions, and air and water pollutants. As a completely standard manner of conceptualising the problem, environmental effect was visible as being a feature of populace, generation, and human consumption levels (which got here to be cited in the various fashions as “affluence” because of the high correlation in many societies among tiers of wealth and styles of intake). They supplied the IPAT version, wherein (Environmental)  $\text{impact} = \text{populace} * \text{Affluence} * \text{generation}$  (Ehrlich 1968; Commoner 1971, 1992; Ehrlich and Ehrlich 1981, 1990; Dietz and Rosa 1994).

Every of the 4 terms may be defined in a number of methods, and as such, the IPAT model need to be seen as a preferred framework as opposed to a specific predictor (Dietz and Rosa 1994). For example, even as some of the identical social factors which are linked with an environmental effect, consisting of greenhouse gasoline emissions, can also be used to predict deforestation, there are important variations as nicely. Whilst populace dynamics are vital to recollect in predicting environmental effect, specifics approximately population distributions are often more informative than typical levels of population. Studies, for example, show that rural populace growth is a whole lot greater carefully related to deforestation, whilst city population boom is extra closely related to greenhouse gasoline emissions and levels of aid intake (Burns, Kick, and Davis 1997, 2003).

Furthermore, the social factors maximum closely associated with what predicts one greenhouse gas (carbon dioxide) range in important approaches from those predicting every other greenhouse gas (methane) (Burns *et al.* 1994; Burns, Kick, and Davis 1997; Jorgensen 2006). a good deal of the work has accompanied on this vein, and in a wonderful variant, researchers have reformulated the IPAT method into the STRIPED version, an acronym for Stochastic affects by way of Regression on populace, Affluence, and generation (e.g., York, Rosa, and Dietz 2003). while all of the specifics of these processes are beyond the purview of this access, it's miles although essential to realise that such differences as to the scope of specific reasons of unique environmental impacts are critical for researchers and policymakers to consider. Attention to such detail can regularly lead to insight about why there are findings that can be characterised as “conflicting” in the popular press. It's miles hence essential to give unique interest to each of the respective regions of the general framework, as well as to the overall photo.

## **Impact: Considering humanity’s consequences on the environment**

### **A. Water Pollutants**

In developing international locations, about ninety percentage of human sewage is truly dumped with none attempt at treatment by any means (world assets Institute 1996: seventy one). These discharges frequently cross directly into water; yet even if the dumping is not direct, it regularly leaches into underground aquifers. Both way, this causes critical pollution troubles and the public fitness risks related to them. While ok elements of safe drinking water end up extra imperilled

worldwide, it's far an especially acute problem in parts of the developing world where population growth is outstripping the local sources. by way of the most dependable estimates, for instance, by means of the year 2025, at the least one billion human beings in northern Africa and the centre East will lack water for simple necessities like ingesting and maintaining their plants (Postal 1993).

Runoff of water contaminated by way of quick-sighted farming practices, along with indiscriminate use of artificial fertilisers, insecticides, and herbicides, as well as from concentrations of farm animals animal waste from massive feed plenty results in a number of ecological and fitness troubles, in particular for those living downstream from them (Steingraber 1998; Burns, Kent-or, and Jorgensen 2003).

### **B. Soil Erosion, Depletion, and Unsustainable Agriculture**

On common, farmland within the u.s.a. now has best about - thirds as a whole lot topsoil as it did at the beginning of the 19th century (Pimentel *et al.* 1995). That is without delay as a consequence of terrible land management practices, which includes raising one crop over huge stretches of land (mono crop agriculture) and the big use of tractor plows and artificial fertilisers and insecticides. Usually, this results in a scenario wherein soil is both blown away by using wind or washed away by way of rain or with the aid of irrigation. Only on about 10 percent of U.S. farmland is soil being replaced as rapid as it's miles being eroded, normally through the slow but rich system of evidently breaking down natural be counted (Pimentel *et al.* 1995).

Traditionally, societies elevated their meals production by growing the amount of land dedicated to farming and grazing. This worked properly so long as there was fertile soil that might be delivered under cultivation. But, these will increase are always sure by the amount of general land to be had to a society, and ultimately by way of the size of the planet. Over time, most effective less fertile land became available, and people more and more started out to try cultivating land that wished something beyond what turned into to be had thru the natural environment to provide meals.

### **C. Declining Biodiversity**

The earth and its subregions are in a delicate ecological stability. Loss of a species ends in some of issues, no longer the least of that is that the fragile stability regularly receives disillusioned, now and again main to catastrophic results (Ryan 1992). For instance, within the Twenties the human beings in Kern County, California, determined to cast off threats to their crops and cattle. They killed each such hazard they may discover—skunks, coyotes, snakes, foxes, and beavers. For his or her efforts, they had been repaid by means of being overrun with the aid of hundreds of thousands upon thousands and thousands of mice, in what was (at least to this point) the worst rodent infestation in U.S. history (Maize 1977, noted in Eisenberg 1998).

By using a few estimates, anywhere from 15 to seventy five species in tropical rainforests go extinct on a median day (Ehrlich and Ehrlich 1981; Wilson 1990, 1992). Yet the various “miracle drug” remedies come from flora (lots of them teetering on the threshold of extinction) in the ones very rainforests (Soejarto and Farnsworth 1989).

#### D. Deforestation

The primary social reasons of deforestation involve population dynamics, the level and growth of economic development, and the structure of international alternate (e.g., Rudely 1989; Kick *et al.* 1996; Lofdahl 2002; Burns, Kick, *et al.* 2003). however, converting technologies significantly have an effect on all three of those important reasons in special methods, that means that technology influences deforestation in a roundabout way and has carried out so all through human history (e.g., bite 2001; Diamond 2005).

The consequences of population are often addressed in the context of city populace increase and rural population boom. as an example, rural population boom increases the chance that forested areas may be converted, reduce, or burned to be used in commercial activities, extractive methods, or agricultural manufacturing, and associated technological tendencies handiest exacerbate the environmental affects of these sports (Rudely 1989; Burns *et al.* 1994; Rudely and Roper 1997).

#### E. Global Warming

The human dimensions of climate change and global warming are possibly the most extensively addressed human-environment relationships in the social sciences and policy venues. There may be well known consensus in the medical community that international warming is indeed a fact and that human societies do make contributions to the warming of the earth's environment thru activities that lead to the emission of noxious greenhouse gases (country wide research Council 1999). Atmospheric greenhouse gases take in and reradiate infrared energy and warmth back to the earth's surface, which increases water, land, and air temperatures inside the biosphere (Christiansen 1999).

Two of the most critical greenhouse causing gases emitted into the ecosystem as a derivative of human hobby are carbon dioxide and methane. In terms of scale, carbon dioxide accounts for the largest quantity of greenhouse gasoline caused by human beings; molecule for molecule, methane is an order of magnitude greater powerful at soaking up and reradiating infrared electricity and warmth lower back to the earth's surface. The number one human activity contributing to carbon dioxide emissions is using fossil fuels. Methane emissions are expanded via the refining of fossil fuels as well as through extended livestock production and huge-scale agriculture sports, in particular the growing of rice (Jorgensen 2006).

#### Considering the primary human reasons of environmental effect

##### A. Technology

With technological development comes the potential to dig deeper, to go farther into the earth, oceans, and area. While this lets in humans to provide more meals, apparel, safe haven, and luxury objects, it additionally makes extra demands on the arena's resources and dramatically will increase the buildup of waste products.

Some analysts argue that the earth is powerful enough to cope with waste products and could regenerate itself (e.g., Simon 1983, 1990; Simon and Kahn 1984; for counterarguments, see Ehrlich and Ehrlich 1981, 1990). At the same time as almost

anything may be damaged down and recycled by the natural surroundings, the question of how long this may take is essential. For instance, a unmarried glass bottle may be damaged down, however the method takes approximately 10,000 years. the usage of generation in permitting people to extract sources after which to apply them in an increasing number of distinct mixtures has the capacity to lead society to the factor wherein the earth will no longer be capable of regenerate itself in time for the human race to stay and use era within the way it does (Ehrlich and Ehrlich 1981).

Era is most without difficulty available in centre societies, however it's also becoming increasingly more substantial in the course of the world, in particular in unexpectedly developing nations. It's miles actual, but, that if environmental regulation is promulgated in any respect, it has a tendency to be achieved in the main within the excessive-ingesting, evolved societies. As a consequence, the growing societies often have an aggregate of generation with a lack of concomitant law. The result is that the developing societies are regularly locations with some of the worst ecological degradation.

##### B. Population

An essential idea in ecology is that of wearing capacity of the herbal surroundings. Although it became at the beginning conceptualised in terms of animal and plant species, with some critical caveats, it applies to people as properly (Canton 1980, 1994; Cohen 1995). Carrying capacity of an area refers back to the variety of individuals of a species which could stay in that vicinity. For animals, the vicinity poses herbal limits through distinctive feature of the food and safe haven available and in terms of the threats to a species' livelihood via publicity to ailment and competition from predators.

With a few essential caveats, some of the theories that have been developed to describe nonhuman populations can apply to human populations as properly. The usage of language and other complicated image structures makes the human case quite distinct, but. Technology is made feasible thru those complicated symbol structures and the buildup of expertise that accompanies them. This, in flip, makes it viable to modify the herbal surroundings profoundly. Even as it is authentic that every species has an impact on its environment, humans have, by using a long way, had the most profound effect of all (Len ski 1966; Schnaiberg and Gould 1994).

Humans can use technology to increase the sporting capacity of a place briefly. The use of fossil gasoline which includes gasoline is a great example. Through techniques along with drilling into the earth and refining the crude oil discovered there, we are capable of use energy that changed into fixed millennia ago. In so doing, we increase the wearing potential, however we accomplish that best briefly. The oil itself takes a great deal longer for nature to supply than for us to apply it. Ecologists see the brief extension of carrying ability via era as a high case of overshoot (Canton 1980). However, it is also a precept of ecology that overshoot tends to be observed through a few disaster that reasons severe hassle and dying. This circumstance is regularly referred to within the literature with the apocalyptic moniker of "crash"; traditionally, the extra the overshoot, the more the severity of the eventual crash (Canton 1980; see additionally Diamond 2005).

### **C. Affluence, Inequality, and consumption**

As we've got visible, population boom is associated with environmental effect in a number of complex methods (Burns *et al.* 1998). In the end, every character requires a positive quantity of electricity to continue to exist. However, the level of affluence must be very carefully taken into consideration as nicely. There is a high-quality deal of inequality, each within and among countries, in terms of the level of affluence.

In 1960, the richest 20 percent of the arena's population had a profits about 30 times that of the sector's poorest 20 percentage. Inside one generation—by way of 1990—that share had doubled to 60—the richest fifth of the sector's population had incomes 60 instances that of the poorest 5th (United countries development Programme 1994). With growing affluence comes the increasing impact, or size of the “ecological footprint,” a person or a society makes (Jorgensen 2003; York, Rosa, and Dietz 2003).

Carefully associated with the query of typical affluence is the query of how unevenly that affluence is sent. In fact, one of the best critics of Thomas Malthus, and his thoughts on overpopulation, was Karl Marx. Marx believed that the important human problem was distribution of resources, with some humans residing in luxurious, even as many lived in poor, and increasingly more desperate, conditions. Even as Marx had little to say approximately the effect of this on the surroundings (for an attempt to hyperlink Marx's work with environmental concerns, see Foster 1999), the consequences of his critique of Malthus are broad.

#### **Looking ahead as society movements thru the twenty first century**

As we are able to see from the above discussion, there are numerous ways wherein populace procedures, technology, and intake styles are intertwined. As a end result, their influences on the surroundings alone and in mixture are complicated. But it's miles important for social and natural scientists to continue to grapple with understanding these complexities. There's little doubt that many of the issues discussed on this research paper will worsen before they enhance. Any progress that is to be made is likely to contain taking environmental problems significantly while at the identical time moving the focal point beyond anybody unmarried causative issue.

The specific contributory mechanisms most carefully associated with environmental consequences generally tend to vary by level of improvement of a rustic or area. Populace approaches are actually connected with environmental effects, but the level of resource intake of a populace, itself largely a function of affluence and the methods in which technology are used, is a massive aspect in environmental effect as nicely. Consider, for instance, that according to capita strength usage inside the USA is over 50 instances as an awful lot as in a few third world locales. For this reason, even though it is real that population increases have environmental consequences, it is shortsighted to forestall at that observation. The methods in which populations use assets are profoundly essential as properly, and it is critical to keep in mind these elements together with one another if we're to achieve something past the most simplistic of perspectives.

That said, by honestly all projections, population will multiply drastically through as a minimum the primary half of of the

twenty-first century, with the maximum large will increase taking place in growing countries. Because the human population will increase, social scientists look at some of related phenomena, including consistent with capita aid intake and concentrations of populace in city areas. better degrees of electricity utilisation, in turn, imply greater impact on the surroundings, including greater extraction of fossil fuels and the degradation associated with them or more reliance on nuclear fission and, thereby, the advent of its toxic by means of-products.

Increases in populace and urbanisation regularly tend to be followed with the aid of technological innovation, that may potentially be exact for the environment (Simon 1990). Yet if history is any indicator, as new technology are advanced, they're frequently used to make deeper and more lasting incursions into the environment (Freudenburg and Freckle 1995). Technological innovation, hence, frequently has a net negative effect at the surroundings. As society develops inside the twenty-first century, it's going to remain important that citizens stay vigilant about the approaches in which technology is conceptualised and used.

Also of importance is the query of technological diffusion. With increasing global patterns of trade, verbal exchange, and transportation, much less developed international locations are exposed to technologies heretofore normally confined to the evolved global. Closely related to technological diffusion are dramatically rising intake styles (e.g., Gruber 1991, 1997). Bear in mind that with America presently having approximately four–5 percent of the arena's population, it currently consumes about 25 percent of its strength. If each society fed on sources at the charge of advanced countries, as the ones in North the us and Western Europe do presently, the sector's sources, effective capability, and sinks might be taxed far greater than they already are, past sustainable tiers.

Yet consumption styles are catching up internationally. Bear in mind that China, the most populous USA within the global, has very currently become the sector's largest customer of a diffusion of commodities, from soybeans to lead and copper (Commodity research Bureau 2005). As rapidly growing international locations continue to transport closer to the same old of living of the maximum developed international locations, the overall ecological impact on this planet will probably growth to heretofore unheard of ranges.

#### **Conclusion**

With society moving into the twenty-first century, the challenges associated with the environment and the interrelated elements of technology, populace, and patterns of intake hold to offer themselves. Whilst societies have continually confronted such troubles, the value of environmental and technological demanding situations confronted with the aid of the people inside the twenty-first century is unheard of in human records. There are greater humans than ever earlier than with the technological wherewithal to make extra profound incursions into the planet and its biosphere, ingesting sources at more prices than at another time in human history. These factors promise to make questions concerning the surroundings and generation possibly the most important faced through society within the twenty-first century and past.

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