

HUMAN BEHAVIOR EFFECTS ON THE WATER, SOIL AND AIR OF THE COASTAL AREA NW-LIBYA– CASE STUDY

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ABSTRACT

Peoples living on the coast nowadays facing several hazardous effects (natural and man- made) and heavily depends on the presence of goods and services. This paper deals with human hazardous made during his everyday living practices. The study considers the environmental damage occurred on the coastal area as a consequence of human behavior. The case study taken as an example, located on the area between Juddaim and Mutrad NW-Libya, resemble a case of landscape turn to dumps. The study showed different types of effects and that the polluted environment is expected to influence the human life on the coast.

Psychology of people living on the coast is also studied as a cause of human behavior, which leads to environmental damage.

KEYWORDS: Environment, Coastal Area, Pollution, Human Behavior, Coastal Management, Human Psychology

INTRODUCTION

“Humankind has not woven the web of life.

We are but one thread within it.

Whatever we do to the web, we do to ourselves.

All things are bound together...all things connect.”

Khalil Gibran

With these words of Khalil Gibran, I would like to say that the objective of all human activities are the attainment of happiness and welfare but this is only possible if we save another thread of the woven web and that is Environment.

However, quantity and quality of environmental resources keep steadily decreasing as human populations continue to grow, material consumption intensifies and production technology quickly expands. Following the view of the United Nations Environment Program (UNEP, 2002) and the European Environment Agency (EEA, 2003, 2005) there is continuing concern about nature fragmentation and loss of biodiversity, shortages in freshwater availability, global warming, urban air pollution extreme weather events. The recent atlas of UNEP (2005): “One planet, many people” shows hopeful pictures of the way in which human settlements and road infrastructure are flourishing in rapidly urbanizing areas throughout the world.

SUSTAINABLE ENVIRONMENT AS A PROBLEM FOR HUMAN SOCIETY

With reference to environmental sustainability, Vlek and Steg (2007) stated that social and behavioral researchers

need to understand the state of affairs regarding various physical problems and expected developments in environmental resource use. Even if many readers may be acquainted with the responses of environmental damage and risks, a look at the current picture may be useful and not all of the update is bad.

Depressing environmental picture characterize the less industrialized regions of the world. For example, many communities in Africa, Southern Asia, and South America are strongly dependent on natural ecosystem services such as arable land, water resources, and various forest products. Their day-to-day survival needs to consider long-term environmental values explicitly. UNEP (2006) reports that in quite a few African countries poverty has increased and life prospects have gone down, while the environment has depreciated (see also UNDP, 2005). Poverty is not only cheapening people (Narayan, Patel, Schafft, Rademacher, & Koch-Schulte, 2000), it is also damaging local environments.

Human Behavior

Human behavior everywhere are closely linked to their natural surroundings, and their impact that different patterns of human behavior imposed on the state of the environment form degradation, because problems have accelerated in recent decades. Aimen (2010) observed that the effects in a social perspective where system of society attitude towards work and philosophy of life governs the behavior of a person.

For example in today context of developing urbanization and industrialization, the amount s and kind of wastewater are continuously increasing and all our natural resources of water (surface waters as well as sub surface waters) are getting despoiled. As a result, the water quality of surface water (river, lakes etc) and underground water are getting degraded to levels that prevent their direct use for some of human needs (Bhargava, 2009). Among the numerous beneficial use of water is for drinking, recreation, agriculture, industrial, fish–culture, ... etc.

When we think about the effect of human on environmental degradation we visualize the threats arising by three factors: first, lack of knowledge or the every process of development. Increasing poverty, which is the foremost issue before the nation. Poverty is related with the unemployment and underemployment which is due to high population growth (and consequent demand for food and work) and lack of successful implemented projects conjugate with lack of work culture.

Population of poverty and literacy has a direct cause and effect relationship with the level of education. It is directly related with squalor and disease, which again is due to lack of knowledge (literacy) and income. Such type of vicious circle cannot be broken only by economic factors and certainly it- will have to encompass social, political, psychological and institutional parameters as well.

As it is mentioned above the quality of water suffers from the disposal of large quantities of untreated human wastes, and the forests get denude by being indiscriminately cut down to provide essential fuel and construction materials. The demands made on such resources –termed renewable –are more or less proportional to the size of the total population. On the other hand, the lack of financial capital and the urgency of the problem often make it a difficult to protect these resources. It is in the poor countries that such a deterioration of resources most significantly jeopardizes the future health to the environment.

At low levels of industrializations pollution arises primarily from the disposal of human wastes which have a high organic and bacterial content, and often leads to disease and ill-health second type of pollution, which is addition to

threatening the resources base as described above, can lead to problems of toxicity, come from the residues of chemical used in agriculture, which again a cause for concern.

Another human factor that effect the environment degradation is “pollution of affluence” causal–by technological factors and excess of growth industry, modern agriculture, urbanization and means of transportation all produce a vast array of wastes, which when dumped indiscriminately into air, water bodies or soil, present hazards, not only to health but sometime to life itself. Toxic gages and smoke in the atmosphere, pesticides residues and dangerous chemicals in water sources, excess salinity in the soil are just a few examples of the pollution problems faced today in the industrialized countries like Japan, the USA and Western Europe.

They are also present in newly industrializing developing countries like India. The largest body of literature on the trade-off between economics and ecology has emanated in recent years from these countries. According to an estimate USA’s 210 million people and their highly productive system use more resources and do more damage to the environment than 2.5 billion inhabitants of the less developed countries.

Human Behavior and Environmental Sustainability

Thirty year later of environmental policy making many cases of hazardous pollution have been resolved. Lead has been banned from car fuels, DDT from pesticides, and asbestos from building materials. Toxic wastes are treated with superior care, industrial safety has significantly increased, electric power plants have become cleaner, and energy and materials are used more professionally. The world has generally become more sensitive to the need for renewable energy sources (Vlek and Steg, 2007).

Major environmental problems as deforestation, lack of clean drinking water, coastal flooding and air pollution were existing in the poorer parts of the world. Considering the increase in “bush meat” hunting, Du Toit (2002) concludes that in rural Africa wildlife resources will predictably be exterminated from undefended areas.

Environmental highlights, negative as well as positive, in the course of 2003–2005 had been compiled by the Worldwatch Institute (WWI, 2004 and 2005). Table 1 displays numerous examples. Clearly, here, as in WWI’s full “year in review”—the negative items are more numerous than the positive items. Going over and interpretation of the items in table 1 reveal that many environmental problems basically are social and behavioral problems. For example, the oil pollution of Northern Spain was a failure of human decision making both about technical safety and about a timely harboring of the “Prestige” instead of sending it back to sea. Climate change is a long-term and common effect of various human activities involving burning of fossil fuels. Biodiversity is decreasing because of extreme livestock farming, agriculture, and logging.

Over the past 50 year, following the *Millennium Ecosystem Assessment* (MEA, 2005), critical ecosystem services have changed by human activities more rapidly and comprehensively than in any comparable period of history. Out of 24, fifteen ecosystem services examined are being violated or used unsustainably such that they now entail risks of nonlinear changes that will have important consequences for human well-being. Future growing demand for water, food, and fuel is expected to intensify current problems. So far the load of environmental degradation is particularly borne by population of sensitive areas in the Middle East, sub-Saharan Africa, and southern Asia. MEA Synthesis Report (2005, p. 17) showed that “An effective set of responses to ensure sustainability management of ecosystems requires significant changes in institutions and governance, economic policies and incentives, social and behavioral factors, technology, and knowledge”.

Environment Degradation and Human Behavior

Aiman (2010) stated that as per the ECK hypothesis is named after Simon Kuznets (1195) who proposed a hypothesis that there is an inverted U-Shaped relation between quality of environment as measured by some of the indication of environmental degradation and per capita income but I want to express this curve in the more broader concept of human behavior and environmental degradation. This means that environmental degradation is depend upon the human behavior in terms of improvement because environmental degradation is low firstly, then it increases with the growing improvement which effects the human behavior example air pollution, water pollution, loss of biodiversity etc. This relation represented in the curve shown in figure 1, which is based on Kuznets Curve.

Table 1: Highlights of Environmental Developments 2004–2005 (from WWI, 2004, 2005), As Documented by Scientific Research or Government Reports

| | |
|---|---|
| Pollution: Oil tanker <i>Prestige</i> carrying 77,000 tons of oil splits apart, contaminating Spain’s Galicia coastline and unleashing public anger worldwide. | Energy: More than 150 countries attend Renewable 2004, the largest-ever meeting of government and private-sector leaders focused on achievable renewable energy goals. |
| Population: By 2050 world population will be 8.9 billion, down from earlier forecast 9.3 billion. | Biodiversity: If global temperature rises 2-6 degrees as now predicted, 18-35 percent of the world’s species could be gone by 2050. |
| Climate: Concentration of carbon dioxide, the main global warming gas in Earth’s atmosphere, posts largest two-year increase ever record. | Marine Systems: The number of oceans and bays with “dead zones” of water, so devoid of oxygen that little life survives, has doubled to 146 since 1990. |
| Fisheries: Industrial fishing has killed off 90% of the world’s biggest and most economically important fish species. | Energy: World energy demand will grow 54 percent by 2025, with oil use rising from 81 million to 121 million barrels a day. |
| Food: AIDS is fueling famine in southern Africa, where 7 million farmers have died from the epidemic. | Water: World bank is boosting its funding of large dam projects to the detriment of the environment and local peoples. |
| Transportation: Traffic delays cost U.S. motorist about \$8 billion a year in wasted fuel and 3.5 billion hours in lost time. | Toxics: The Stockholm Convention on Persistent Organic Pollutants enters into force to rid the world of 12 hazardous chemicals, including PCBs, dioxins and DDT. |
| Climate: Atmospheric concentrations of methane, the second most potent greenhouse gas, have leveled off after two centuries of growth. | Urbanization: The world will soon become predominantly urban, with 60 percent of people living in cities by 2030. |
| Wildlife: A surge in demand for skins of tigers, leopards, and other endangered wildlife as the fashion industry once again embraces fur. | Forests: Rising international for Brazilian is encouraging high rate of Amazon deforestation. |

In this context we could say that this curve holds particularly in the sense that environmental degradation is increasing, we (Human) are developing conjunction with growing commercialization of agriculture, urbanization and industrialisation.

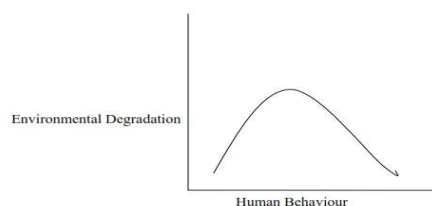


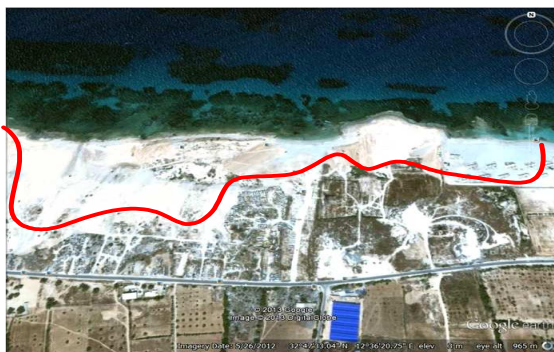
Figure 1: Kuznets Curve

Many people in developed world, having reached high levels of material well being, are beginning to ask question like this one; what good is material wealth if it comes at a cost of large –scale disruptions of the ecosystem by which we are nourished. Further essential perhaps is the facts that with present-day economic, demographic and technological developments around the world, the associated environmental outcome are becoming much more prevalent and poisonous. What were formerly restricted environmental impact easily rectified, have now become widespread effects that may well turn out to be irreversible.

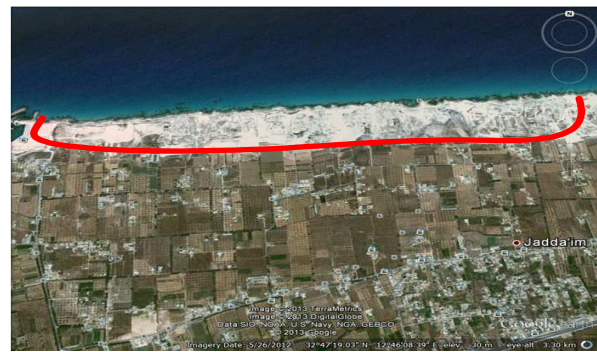
THE CASE STUDY

According to the explanation given between environment and human behavior, the environmental degradation caused by quarries distributed in the coastal area between Juddaim (30 km west of Tripoli) and Mutrad (50 km west of Tripoli) were studied Figure 2.

Vivien, et al. (1991) recognized some natural varying vulnerability of the US to future coastal hazards. Among these more active variables, which accelerate sea level rise: relief, erodible substrate, land level movement, erosion or accretion, and wave/tide energies?



Quarries at Juddaim Coast



Quarries at Mutrad Coast

Figure 2: Quarries along the Coast of the Two Studied Localities Juddaim and Mutrad

In our case relief was affected by man through opening the quarry and eroded the substrata in order to use the stones as a source for buildings constructions. Figure 2 shows the expansion of these quarries (White areas limited by red line), which reflect how severe the erosion occurred by man on the shoreline of the coastal area. This activity led to level the land to the level of the sea surface. The residence along the coast adjacent to the quarries starts to use the quarries as dumping areas for human mass wasting (Figure 3). These mass wasting then classified (Figure 4 and Table 2) for the sake of selling. From these behaviors we can see the subject of workers to different diseases as they become attached to the piles of mass wasting.



Figure 3: Mass Wasting Filling Rock Quarry



Figure 4: Mass Wasting Classified For The Sake of Selling

The degradation of the coastal environment in the studied area occurred through polluting air, soil and groundwater was clearly observed and approved by the people living nearby disposal areas. Some people claiming problems in their respiratory, digestive systems and skin problems. During the area survey, burning the waste was seen arising a very bad smell in the nearby areas (Figure 5).

Table 2: Classification of the Waste Dropped in the Quarries of the Studied Area. After Khalil and Naji (2013)

| Item No. | Wastes Type | Classification | Source |
|----------|-------------------------------------|----------------|---------------------------------|
| 1 | Food Wastes | Solids | Domestics, Restaurants |
| 2 | Papers and Furniture | Solids | Domestics, Offices, Markets |
| 3 | Building Materials | Solids | Domestics, Industrials, Streets |
| 4 | Electrical and Electronic Equipment | Electronics | Domestics, Markets |
| 5 | Plastics | Solids | Domestics, Markets |
| 6 | Trees | Solids | Farms, Streets |
| 7 | Glasses | Solids | Domestics, Markets |
| 8 | Dead Animal and Wastes | | Farms, Markets |
| 9 | Metal materials | Solids | Domestics, Markets |



Figure 5: Burning the Waste in the Quarries

Spoiling the soil and groundwater was expected and can be ascertained as pouring used oil was observed in the studied area (Figure 6) whereas groundwater contamination was expected by heavy metals which could be released from the wastes and leached by rain in all the studied open and filled quarries (Figure 7).



Figure 6: Disposing Used Oil in the Quarries



Figure 7: Damping the Waste and Leveling the Earth Surface

From the given phenomena observed in the studied area, it can be said the degradation occurred in the environment of the coastal area was related to human behavior. This behavior reflects that the people living in the area lack environmental preserved knowledge and behave unconsciously against urban growth.

UNDERSTANDING UNCONSCIOUS HUMAN BEHAVIORS

People often behave unconsciously as a result of external stimuli and affect environment without their own intention or knowledge. Unconscious behaviors can be explained as automatic process as being effortless, unconscious, and involuntary (Hasher and Zacks, 1979). A lot of researches looked into the mechanisms of unconsciousness. Although little is known about the types of these behaviors, Suri and Ideo (2005) present seven patterns with the examples of thoughtless acts in everyday life. This research identifies four attributes of unconscious behavior. This can be also represented in a map with two axes as follows, depending on whether it is individual or social, and whether users had an initial intention or not (Figure 8).

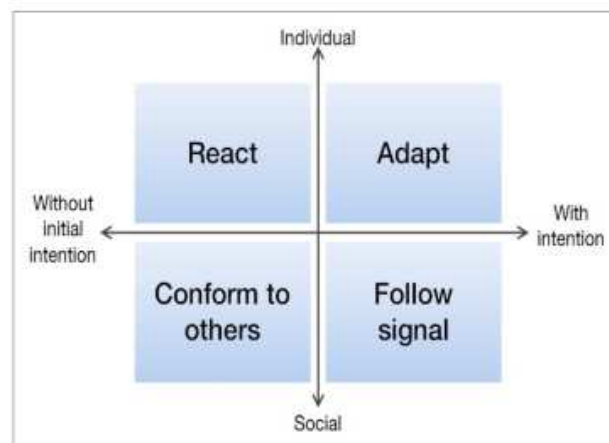


Figure 8: Design of the Four Attributes of Unconscious Behavior

React

People interact automatically with objects and spaces that they encounter, even without any purpose. Affordance of an object often triggers this attribute (Norman, 1998). People tend to walk on road lines, or to place a cup in the safe area of a table. This is triggered by the fact that people enjoy making their own orders and desire the orders to be met.

Adapt

Adaptation is related to people's intention. People tend to find opportunities from other objects for a desired condition. People take physical advantages from their surroundings, to achieve their objectives. For example, people usually put their coat on the back of a chair, or use their newspaper as a pot stand.

Conform to Others

In social psychology, conformity is the process by which an individual's attributes, beliefs and behaviors are influenced by other people. People unconsciously conform not only to what other people are doing, but also the results of others' behavior.

Follow Signal

People respond immediately for the messages that others made. This feature is similar to ‘react’ or ‘conform to others’ features, but it has an initial purpose. Users turn the volume up by following the signal of a round button and push up by following a sliding button, without thinking or learning. Connection.

ENVIRONMENTAL PSYCHOLOGY

Environmental psychology, which developed in the US in the 1960s, looks at the range of complex interactions between humans and the environment (Anja and Julian (2002)). It is therefore a very broad field with many divisions. The division that looks at the psychological roots of environmental degradation and the relations between environmental attitudes and pro-environmental behaviors are part of environmental psychology but does not have a separate name in English. In German this field is called *Umweltpsychologie*.

Anja and Julian (2002) also mentioned that over the last 30 years many psychologists and sociologists have explored the roots of direct and indirect environmental action. The answer to the questions: ‘Why do people act environmentally and what are the barriers to pro-environmental behavior?’ is exceptionally composite. By ‘pro-environmental behavior’ they simply describe behavior that consciously seeks to minimize the harmful impact of one’s actions on the nature (e.g. minimize resource and energy consumption, use of non-toxic substances and reducing waste production).

To explain the gap between the possession of environmental knowledge and environmental consciousness, numerous theoretical frameworks have been developed and displaying pro-environmental behavior (Figure 9). Although many hundreds of studies have been done, no definitive answers have been found. Anja and Julian (2002) in their study analyze the factors that have some control, positive or negative, on pro-environmental behavior such as demographic factors, external factors (e.g. economic social, institutional and cultural factors) and internal factors (e.g. motivation, environmental knowledge, awareness, values, attitudes, emotion, locus of control, responsibilities and priorities).

Anja and Julian (2002) present this relationship in order to give environmental educators a feel for some of the broader research which have informed current environmental education *theory and practice*. In doing so, they want to open up a discussion regarding the most efficient ways environmental educators might help build up pro-environmental behavior at all levels in society.

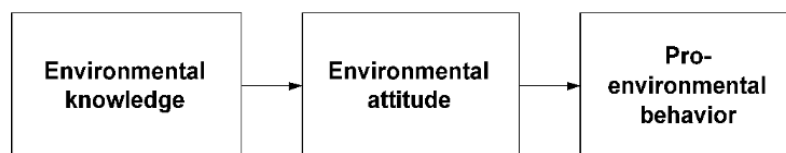


Figure 9: Early Models of Pro-Environmental Behavior (After Anja and Julian, 2002)

RESULTS AND RECOMMENDATIONS

The observed phenomena in the studied case indicated that human behaviors are acting strongly on the environment and aggressively within a short period of time. Leaving the conditions without treatment leading to a very worse and disaster problems. Therefore an urgent need to effective management program of coastal areas is the only possible step through informing decision making coupled with sound scientific data.

As populations increase in the coastal zone, the number of man-made resources that are potentially susceptible to the impacts of coastal hazards also rises. Natural resources in the coastal zone are stressed because they are competing for space with human population growth and are becoming increasingly affected by coastal hazards and probably by expected sea level rise. The decision maker must put a strategy adapting the recent bias human behavior to adopt pro-environmental behavior.

An example for some strategies set for managing coastal environment adopted in this work were those given by Fischman and St. Amand (1990) to preserve coastal resources: (1) prohibit development, (2) allow development under certain conditions and (3) prohibit hard structural devices.

CONCLUSIONS

More studies were needed including psychological analysis of the population living on the coast in order to decide and built an active management program leading to the strategy of creating pro-environmental society. Moreover, attention also should be paid to how humans and natural environments affect each other.

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