

Research paper on environmental science

[Environment](#), [Pollution](#)



Biology

Chart 1.

Historical impact of human activities on water pollution (estimated)

(European Commission, 2010; British Geological Survey, 2013)

Purpose Statement

The purpose of this research is evaluation of various anthropogenic activities and their impact on water pollution and contamination throughout the recent centuries, as well as estimation of the possible future trends within this process.

Introduction

It is scientifically proved throughout numerous researches that agricultural and industrial activities have a negative impact on condition of groundwater all around the world. Current trends demonstrate that, although the paradigm of global development and technologies may change over time, the issue is still present and is growing increasingly significant.

Hypothesis

The hypothesis which is to be tested within this research is that the negative tendency of groundwater pollution throughout anthropogenic activities exists and may cause harm to sustainability of groundwater in the future.

Methodology

The methodology of the research includes both quantitative and qualitative analysis of various sources of data available from national and global organizations.

Results

Although a certain decrease of negative impact of groundwater sustainability has been reached in the past decades due to technological advancement and legal incentives, the tendency, in general, is still present. The distribution of pollution among countries is now in favor of the developing ones, and the developed countries tend to stabilize or even decrease the amount of respective pollution.

Discussion

The outcome generally fits the hypothesis, although it does not provide comprehensive data on the future development of the situation due to a considerable amount of external factors involved (demographical, technological etc.).

Chart 2.

Allopatric Speciation (My Geology Page, 2002)

Purpose Statement

The purpose of this research is to determine the outcome of a split within a single population of species as a result of a sudden and impenetrable isolation.

Introduction

There are four primary methods of speciation, or formation of new species – sympatric, which emerges within a population due to genetic morphism, parapatric, which is caused by an adjacent niche available for a part of a population, peripatric, emerging from an available, yet separated niche, and finally – allopatric – a sudden, irreversible and impenetrable division of a

population due to various reasons, e. g. volcano eruption or earthquake (My Geology Page, 2002).

Hypothesis

The main hypothesis is that under conditions of allopatric division the split population may develop various forms of adaptation, which may ultimately lead to creation of new species.

Methodology

The method used within this research is abstract generalization based on the theoretical findings of evolutionists.

Result

Discussion

The result of the research generally fits the hypothesis and reflects one of the existing evolutionary mechanisms.

Chart 3.

Global carbon emissions, 1970-2010 (Andrei, 2012).

Purpose Statement

The purpose of the research is to evaluate the tendency of global carbon emissions within the past four decades and assess the possible reasons of it.

Introduction

Carbon dioxide is the main contributor to the greenhouse effect, and its increased emission may be a reason of various unfavorable ecological phenomena, including but not limited to global warming. Increase of such emissions has various reasons and reflects the extent of development of the energy sector of the world economy, fossil consumption as well as

willingness (or unwillingness) of various nations and regions to limit the extent of air pollution.

Hypothesis

The degree of carbon emissions at a global scale is a logical consequence of national and international economic, industrial and demographic tendencies.

Methodology

The method used within this research is based on general multi-disciplinary analysis of statistic data from various official and private sources.

Results

The increase of carbon emissions over the past 40 years is directly linked to the increase of consumption of various kinds of fossil fuels. This tendency derives from the general growth of population, increase of the general demand and sequential extraction of fuel deposits – mainly oil, gas and coal. Unwillingness of certain nations to join international framework agreements, such as Kyoto Protocol, and also the possibility of trading of emission quotas make this problem difficult to resolve.

Discussion

Results of the research fit the initial hypothesis and determine a knot of issues which need to be solved in order to limit carbon dioxide emissions and achieve positive impact on the climate change.

Chart 4.

Projected consumption of coal by various regions of the world (International Energy Agency, 2010)

Purpose Statement

The purpose of this research is to determine, which of the two power

generation types – coal-based power generation or nuclear power generation – are more potentially dangerous for sustainable development of the humankind.

Introduction

When speaking of these two types of fuel for power generation – coal and nuclear – researchers speak of the lesser of the two evils. Both kinds of fuel and respective power generation techniques undoubtedly have their own advantages and limitations. Coal can be relatively easily extracted and burned in order to provide energy. Nuclear fuel has to undergo complex processing, followed by consequent careful utilization. Both fuels are capable of causing serious damage to the environment and, as a result, to sustainable development.

Hypothesis

Although nuclear power has been recently labeled as unsafe and dangerous, it has a far smaller impact on the global ecological balance than coal-based power generation.

Methodology

In order to assess this problem, the method of quantitative analysis has been used.

Outcome

Despite all the dangers associated with nuclear power, it contributes to environmental pollution only to a very limited extent. Coal burning, on the other hand, is responsible for around 40% of the global carbon emissions and over 55% of the sulfur emissions (The Energy Lab, 2012). Coal-based energy is therefore a greater of the two evils.

Discussion

While analyzing the potential danger of the two sources of energy, it should be kept in mind that other, alternative sources of energy are being currently developed, and they happen to be safer of any of these two.

Chart 5.

Stages of population changes among invasive species in unregulated ecosystem (Sakai, 2001; p. 315).

Purpose Statement

The purpose of this research is to determine the impact the newly invaded ecosystem has on the fluctuation of the invasive species, as well as the reciprocal impact.

Introduction

Invasive species (from viruses and bacteria to mammals) may have a strong, if not catastrophic, impact on the ecosystem they are entering. In the lack of internal measures of self-regulation and external control, invasive species may contribute to complete eradication of their food (or prey), therefore shifting the ecological balance irreparably.

Hypothesis

Invasive species and the affected ecosystem are experiencing a reciprocal impact which is aimed at restoring the ecological balance.

Methodology

The main methods within this research include field observations and qualitative analysis.

Results

Results of the research show two major possibilities of the outcome. The first one happens if the food for the invasive species is crucial for the survival of the ecosystem. In this case complete elimination of the prey may lead to eradication of both the ecosystem and the population of the invasive species. In the second case, if food is abundant and is not the cornerstone of the ecosystem, the populations of the invasive species and prey change inversely and may consequently form a new type of ecological balance.

Discussion

The results of the research reflect the concept of ecological equilibrium and its formation in case if the impact of the invasive species is not too strong.

References

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