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"Zero Waste Strategy for Good Environmental Status-BSB257" Project

Ecosystem Education Program Trainers' Guide

Lead Beneficiary

Tekirdag Namik Kemal University-Turkey

Partners

Civitas Georgica-Georgia

Ukrainian Marine Environment Protection Association-Ukraine

Tourism Development Council in Nessebar Municipality-Bulgaria

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Ecosystem Education Materials were prepared within the scope of "**Integrated Land Use Management Model in the Black Sea Basin-ILMM-BSE**" Project.

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Civitas Georgica, Georgia

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EEP Trainers' Guide

This training material consists of five basic parts:

In the first chapter, general information about ecosystem, natural balance and the components that make up them are given.

The second part focuses on the target region's ecosystem (in case of Turkey it is Ergene Basin Ecosystem) and examines the physical, social and economic characteristics of the Ergene Basin.

The third section discusses the threats to the basin ecosystem and their causes and consequences.

The topic of the fourth chapter is what individuals and institutions should do and what kind of behavioural changes are necessary against environmental problems that arise in the basin.

In the fifth and final section, detailed information is given about the current practices, national and international projects to protect ecosystems in general and particular in the Ergene Basin.

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Dear Trainer,

This is a slidewhow/video enriched by visual content to raise students' awareness on Ecosystem and Ergene Basin. The visual content designed specifically on issues include tables, graphics and images.

The visual presentations within the slideshow/video are also dubbed. There may be intended pauses during the video streaming to make you explain the information included in this guide as well as allowing your students to keep questioning that section.

The main purpose of our campaign is to inform our students about ecosystem and to aid to create a perception of responsibility for preserving Ergene Basin in a sustainable way. Within this scope, a campaign model entitled ¨seven gates for social change¨ has been initialized.

The seven gates proposed by the model are summarized as follows:

Gate 1 - Gate to know: You are going to help your students perceive the problem.

Gate 2- Gate to wish: You are going to create an opportunity for your students to imagine a different future for themselves.

Gate 3 - Gate to get skilled: You are going to offer thinking opportunities about what to do for the future they have imagined.

Gate 4- Gate to believe / Gate to trust: You are going to provide your students with the belief in as well as trust to the actions taken by both themselves and others to achieve their dream for the future.

Gate 5 - Gate to get equipped for the change / Gate to take external aid: You are going to make your students understand that they can be in need of some help for the actions they believe in and that external aid is important.

Gate 6 - Gate to stimulate: You are going to have a chance to express your students that the events and situations they have experienced may time to time stimulate themselves though taking action and sustaining the progress is also important.

Gate 7 - Gate to reinforce: You are going to find an opportunity to make your students use positive reinforcers since utilizing positive reinforcers for effective social change increases the awareness.

The section entitled ¨Clarifications for the presentation¨ includes the text of the slideshow/video and the questions to be asked. You can use the information here to remind or to explain the content to your students so that you are going to increase your students' awareness on ecosystem issues. by the help of the questions and the answers.

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Outcomes of EEP

Primary and Secondary school students who completed the Ecosystem Awareness Program are expected to gain followings based on the gates:

1. Understands the concept of ecosystem.
2. Understand the ecosystem of the Ergene Basin.
3. Becomes aware of the threats to the ecosystem in the Ergene Basin.
4. Recognize the threat of personal behavior towards the ecosystem.
5. Understand that they can reduce threats to the ecosystem through their individual efforts.
6. Recognize the role of each individual in eliminating threats to the ecosystem.
7. Be able to establish voluntary organizations and targeted working groups.
8. Question the sustainability of the initiatives to be made in the basin.
9. Understands the importance and sustainability of the relationship between the use of resources and the lifting capacity of nature.

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1. What is an ecosystem ?

Ecosystem is a permanent system resulting from the mutual interactions of living organisms such as plants, animals, microorganisms and communities of non-living components surrounding them, e.g. soil, air and water.

Ecosystems are divided into two as land ecosystems and water ecosystems. Land ecosystems include both natural ecosystems and agricultural ecosystems that are products of human activities. Wild animals and plants surviving in urban areas are observed to keep their existence in ecosystems despite the human activities.

2. What are the components of an ecosystem?

Ecosystems have two main components: living and non-living beings.

The non-living components are energy, air, water, soil and rocks on the Earth's crust. An ecosystem primarily needs energy. The Sun is the source of energy flow in the ecosystem. Gases in air as well as minerals of water and soil can be considered as non-living components covering the needs of living beings.

Living components of ecosystem are plants, animals and human beings.

Living and non-living components come together through nutrition cycles and energy flows. Plants take the nutrients from the soil in and give their nutrition sources out to the soil by decaying, after they die.

Within the ecosystem, interactions take place not only between living and non-living components but also among different kinds of living species. Plants which absorb their nutrients from the soil, water and air supply the food required by herbivores. In this sense, ecosystems have definite spaces and have distinct but not very sharp borders. They have intersecting and flexible structures which are kept alive under the soil or underwater. Considering even inter-connections of farther ecosystems, some scientists assert that the whole planet is a mono ecosystem

3 How is the natural balance sustained in ecosystem ?

The main non-living ecosystem components are energy, nitrogen, phosphorus, water and minerals of soil. The energy spreading through ecosystem is mainly originated from the Sun and is usually transferred via photosynthesis. Green plants produce nutrients for themselves by combining carbon dioxide and water in the air by the help of solar energy and this process is called photosynthesis. Thus, plants having photosynthesis are one of the basic components of energy flow. Although the core of the chemical composition of all living beings is Carbone, the greatest amount taken into the system is processed during photosynthesis. Soil minerals and carbon from the air make up the primary nutrients for plants and animals. Herbivores nourished by plants and carnivores consuming herbivores function significantly in the ecosystem to transmit the nutrients and energy.

The main factor affecting the quantity of plants and microorganisms are animals. Each animal is a habitat itself for hundreds of different microorganisms. Plants, animals and microorganisms comprise the living body in the ecosystem.

After the drop of organic materials into the soil, discriminators such as bacteria and start the decaying process. In the end of this process, Carbone is re-loaded to the atmosphere and the nourishes from the soil such as nitrogen and phosphorus are regained to it. Thus, the nutrients get ready for being used by plants and microorganisms again. Air components as well as subterranean and aboveground components are formed by discriminators.

4. What is a basin ?

The word ¨basin¨ means ¨something included within the borders of another¨. Ergene Basin is accepted to be the area where Ergene River and its branches collect the water. The rainfall on highlands surrounding the area is collected I to meet Meric River and then streams to the Aegean Sea. This whole area lines the borders of Ergene Basin.

5. Where is the Ergene Basin ?

Ergene Basin is located on the Thrace Peninsula, one of those forming the country of Turkey. Trakya or the Thrace Peninsula is surrounded by the Black Sea on the north; the Marmara Sea and the Bosphorus on the east; the Aegean Sea and the Dardanelles on the south with Greece and Bulgaria situated on the west. It covers an area of almost 23.764 square kilometers. Ergene Basin within the Thrace Region covers just 14.447 square kilometers. In other words, Ergene Basin covers 61% of the whole area of the Thrace Peninsula.

Ergene Basin stands within the territories of Tekirdag, Kırklareli and Edirne.

Ergene Basin consists of two major inter-connected ecosystems.

The largest one of those is called agricultural ecosystem while natural ecosystems also exist in this area. In addition to natural and agricultural lands, there are urban and industrial ecosystems as well.

6. How was the Ergene Basin ingenerated ?

The prior studies imply that there was a sea existing in the place of Ergene Basin a long time ago. Beneath the rocks constituting the Ergene Basin, there are metamorphic rocks or stones which have undergone metamorphosis due to overloading or extreme temperatures. These stones are formed on the oceanic grounds. On the metamorphic rocks, there are sedimentary rocks formed in shallow sea and on lands. This indicates that Ergene Basin was transformed into solid earth by rising when it was an ocean ground. The majority of the rocks on the Ergene Basin are some kind of petrified terrigenous deposits which have layered upon coastal deltas, lakes, forest lands and wetlands. These sediments, which came to varying collapsed terrains from highlands, have formed rocks on which cities, factories and fields are standing today. The rocks underlying the Ergene Basin are composed of limestone, gesso or gypsum stone, argillite or claystone, psammite or sandstone, mudstone and charcoal. In addition to these types, andesite, tuff and agglomerate ingenerated by volcanic eruptions show that active volcanoes were erupting lava in the Ergene Basin a long time ago.

7. What are the general climate features of the Ergene basin ?

The climate pertaining to the Ergene Basin usually appears with innerland climatic conditions. Innerland climate refers to daily or annual temperature differences. Humidity in air determines the rate of variation between the hottest and the coldest time of the day and the year. The primary factor to determine the humidity is closeness to or remoteness from the sea level. Therefore, humid regions are called ¨coastal¨ but farther regions are called ¨inner¨ lands. Summer goes hot and dry; winter goes colder and severe at the northern parts of the Ergene Basin. The Mediterranean climate is seen at the south, which means that the summer season is hot and dry, but winter is warmer and rainier. On areas with coastal climate, warmer weather conditions are observed in autumn and winter. To the majority of the Basin, summer season has the least rain whereas winter becomes the period to have the highest rate of rain or snowfall

8. What are the components of the Ergene ecosystem?

Ergene River Basin covers 1.447.760 hectare area. This area comprises terrains at various percentages such as wetlands like swamp or morass at 0.2%, water surfaces such as rivers, lakes and dams at 1%, urban and industrial areas at 3%, forests and natural ranges at 17%. Agricultural lands, however, covers 79% of the whole basin. This means that Ergene Basin is substantially an agricultural ecosystem.

18% of this basin is composed of natural ecosystems. Ergene Basin includes several natural ecosystems such as İstanbul Catalca Cilingoz Wild Life Development Pitch, Kavaklımese Woods Nature Park, Gala Lake Natural Park and Meric Delta. Furthermore, there is a protection forest and there are 11 city forests within this area.

Ergene Basin hosts more than 300 rare and endemic plant species while being the top zone which is rich of almost 50 species kinds. Endemic plants are those indigenous types which live through the temperature, climate and daylight conditions merely in Ergene Basin. As you see, Ergene Basin is very crucial not only for human-based activities like agriculture and industry, but also for the existence of wild life.

9. What threats are there to the Ergene ecosystems?

The population of Ergene Basin has been gradually increasing. The higher the population is, the more the human activities in number are and the larger the urban settlements become. As a result, both agricultural ecosystems and natural ecosystems are threatened by this rapid change.

The major causes of threat to the ecosystem are industrial activities, uncontrolled agricultural practices and urbanization.

10. What activities pollute the Ergene basin ?

The factors polluting the Ergene Basin are:

- Some industrial plants with no treatment facilities,
- Unproper or ineffective work of waste treatment facilities in some industrial plants,
- Inability to treat home-based waste water,
- Inappropriate construction of cesspools,
- Random disposal of cesspit discharged from the sewage.
- Insufficiency or absence of sewerage systems,
- Unconscious use of chemical fertilizers,
- Impossibility of joint waste treatment for small-scale industries,
- No active waste treatment in smaller settlements,
- Uncontrolled use of agricultural pesticides.

11. Am I also polluting?

There are responsibilities of individuals as well as organisations and institutions for the protection and sustainability of ecosystems. An individual's impact on the ecosystem is called ¨ecological footprint¨ or ¨carbon footprint¨. The following factors determine the individuals' footprints:

- The type and amount of food consumed,
- Home conditions and the amount of energy spent,
- The quality of transport and the amount of fossil fuels like petrol or diesel spent during the transportation,
- How much damage is caused by manufacturing and post-manufacturing of consumable products,
- The amount and features of change created on the nature by education, health, commerce and tourism services received by the individuals,
- The amount and characteristics of rubbish put out by people. The impact of human beings on the nature can be assessed via the ecological footprint. At that point, an individual is expected to leave the most unclear footprint.

The people living on the Ergene Basin territories may calculate their own ecological footprints themselves. After calculating their own ecological footprints, people can see which practices they should pay more attention to and which ones they should end up. This means that individuals self-assess their negative impact, independently.

The annual carbon release of a family of four people with average lving standards approximates three tones. In order to convert this carbon, each family member has to plant seven trees.

If you live in a flat of 100 square metres with a family of four people and consume some chicken once a week, some beef once a week, very few vegetables at every meal, some fish once in a couple of weeks, eggs or dairy products twice or three times a week and if you own a small car with four seats and take 25 kilometres per week by car, then in order to sustain your life style, you need 2.1-hectare area of the most productive lands on the Earth. This 2.1-hectare covers the space of approximately six football pitches.

12. Who pollutes the Ergene basin?

When analyzing the polluters of Ergene Basin, industry enterprises are particularly seen to have very influential activities on the area. Regarding the pollution sources, the industry enterprises seem to have critical imperfections.

There are also individuals who are responsible for negative effects caused by urbanization. The urbanized areas either naturally or by damaging agricultural areas may create irreversible results on the ecosystem. These types of constructions which devastate natural habitat also cause the multiplication of polluters. Thus, people leaving their rural lifestyles by moving to larger cities bring about significant ecological problems.

Another field coping with individual negativities is the field of agricultural activities. Utilizing agricultural pesticides and fertilizers unconsciously leads to the pollution of the basin and especially pollution of the ground water.

Sustainable waste policy is a requirement to avoid the potential irreversible damages caused by the wastes released into the ecosystem.

13. What should be done to protect the Ergene ecosystem ?

The steps below are required to be taken by people for the long-living, healthy and balanced existence of Ergene Basin Ecosystems:
Water storage facilities should be established.
Waste water should be treated.

- Hazardous waste treatment plants should be constructed.
- Flood warning systems should be established.
- The use of renewable energy resources like solar energy, wind power or geothermal power should be increased and funded.
- The devastation of Longoz Forests by illegal and uncontrolled mining activities should be hindered.
- The amounts of water use and illegal water use should be controlled rigorously.
- The level of contamination in waste water should be precisely monitored.
- The mud after waste treatment should be stored in an appropriate environment and its re-use should be provided.
- Industrial pollution check should be carried out in all facilities, for the overall ecosystem.

14. What can I do to protect the ecosystem?

Every individual living on the Ergene Basin is a part of the ecosystem they exist in. Therefore every individual, young or old, has got a potential of affecting the ecosystem. They react equally to every positive or negative effect they have caused. Even very slight behavior changes may lead to great results to protect the ecosystem.

There are more than one million people living in the territory of Ergene Basin. If every individual makes a slight change to reduce pollution or to protect the ecosystem, the effect will get larger. In order to lessen the threats to the ecosystem, Ergene Basin will become a cleaner, healthier and a better place to live when all the efforts of individuals are united.

The individuals who pollute the air, water and soil less and who are more sensitive to polluters will help to reduce the polluters, the most important threatening factor against Ergene Basin Ecosystems. Farmers who become more conscious about using chemical fertilizers and agricultural pesticides may help decrease the waste released to the ecosystem. Furthermore, a young individual studying at primary school may protect the ecosystem by consuming less and accurately with the ultimate care of recycling.

What the individuals can do to protect the ecosystem are defined as follows:

- To avoid improvidence in daily life, consume less,
- Not to smoke,
- To ride a bicycle rather than drive a car,
- To go on foot rather than drive somewhere,
- Not to pour out waste oil after cooking into the sewer system or to prevent others doing it,
- To prefer public transport rather than personal car,
- Not to leave chemical and hazardous wastes like batteries, computer and mobile equipment parts to the nature,
- To conserve trees and the green,
- To consume water in a controlled way, not to waste it,
- To plant new trees and start forestation,
- To save energy in everyday life, to avoid unnecessary use of energy,
- During agricultural and industrial activities, to take more care of the ecosystem and to produce less rubbish and wastes,
- To re-use consumer durables,
- To prefer local fruit and vegetables, to consume them during their seasons,
- To get away from hazardous chemicals during daily practices,
- To prefer a healthy diet,
- To consume environment-friendly eco-agricultural products, To invite others to share the same vehicle,
- To practice waste treatment regularly.

15. Where do I stand about the ecosystem? What are my rights and responsibilities?

It is important to be aware of our legal rights and responsibilities as well as changing our consumption behaviours to hinder the threats against Ergene Basin and its ecosystems. The preliminary right is to struggle with the polluters threatening the habitat and devastating the biodiversity of living species in the Ergene Basin. There are various laws protecting ecosystems from unconscious practices of malevolent people and institutions. The main ones are the international acts protecting the environment against global-scale pollution as well as regulating the protection and utilization conditions for the sustainability of natural resources. Environmental laws and dijudication also support the progress. Living in a balanced and healthy environment is one of the constitutional rights. The Constitution declares: “Everybody has the right to live in a balanced and healthy environment. To improve the environment, to protect environmental health and to prevent environmental pollution is the duty of the government and its citizens.” Having this declaration and right in our Constitution is really important for our country. Additionally, the Environmental Act regulates all environmental practices. There are also some other regulations protecting the ecosystems. To know the legal rights will reinforce the individuals’ natural reactions against the threats and polluters to natural habitats in Ergene as well as in other ecosystems. In addition to personal reactions, each individual may work as a part of an organization to protect Ergene ecosystems. There is no limitation for environmental volunteers who share the same considerations and who get organized to become active about the issue. Individuals may establish new volunteer organizations as well as becoming a member of an existing non-governmental organization such as an association or foundation to protect the environment. This membership increases social sensitivity towards the problem and enhances the battle with biological, physical and chemical threats against the ecosystem.

16. Are there any volunteer organisations active in protecting the Ergene Basin ecosystems?

There are a large number of volunteer or non-governmental organizations acting in the provincial territories of Ergene Basin to protect its ecosystems. There are regional headquarters of national or international organizations such as Greenpeace and the Turkish Foundation for Combatting Soil Erosion, for Reforestation and the Protection of Natural Habitats (TEMA). There are also various associations of environment volunteers active in Tekirdağ, Edirne and Kırklareli.

One of the volunteer organizations acting for the Ergene Basin Ecosystem is the Turkish Marine Environment Protection Association (TURMEPA). TURMEPA is a civil society action which has been initiated to prioritize the protection of our coastal and marine environments at national level and to leave Turkey to young generations as a habitable country surrounded by waste-free coasts. TURMEPA is widely known in and out of Turkey with the projects it has implemented. These projects let TURMEPA become a leading marine-focused NGO in Turkey

17. What are the national and international actions taken to protect the Ergene Basin ecosystem?

One of the crucial stages to combat the threats against Ergene Basin Ecosystem is an international project which is called ¨Integrated Land-Use Modelling for the Black Sea Basin¨. This model considers ecosystems as a whole and all the studies to be implemented in countries on the Balck Sea coasts are aimed to collaborate internationally.

In this context, ¨Integrated Land-Use Modelling Project¨, which has being jointly implemented by TURMEPA, Hayrabolu Municipality and (Tekirdağ) Namık Kemal University, was granted by the European Union in May 2013. This 24-month project aims to design an integrated land-use management model for coastal areas like deltas and lagoons as well as wetland areas on the Ergene Basin. In a parallel sense, land-use models will also be designed for Ropotamo and Veleka deltas in Bulgaria; Danube, Dniester and Dnieper deltas in Ukraine as well as Guria Region in Georgia. The data about land use not only in Ergene Basin, but also in other deltas and regions named above will be available online for public use. The project outcomes are also available on the website address http://www.e-blacksea.net/. These models will be easily used to monitor the changes in agricultural areas, natural habitats and urban zones located in so-called regions and basins.

18. What is being done currently to protect the Ergene basin

Ergene Basin hosts 300 different species while being an important agricultural ecosystem. There have been a large number of steps taken to protect it or to make it healthier. These initiatives are still being implemented and even new tasks are being planned. The tasks listed below are the ones that have been carried out or still being planned to make Ergene a cleaner, healthier and a better place to live:

- Stream beds are being treated.
- Municipal wastewater treatment facilities are being constructed by the General Directorate of Governmental Water Affairs.
- More modern, much cleaner and more organized industrial zones are being established.
- Wastewater treatment facilities are being established to serve all the industry in the region.
- The industry is taking the initiative to spend less water, less polluting raw materials and less energy.
- Ergene Basin is being forestrated and land erosion is being tackled in the region.
- Solid and hazardous waste treatment, retrieval and removal facilities are being set up.
- Agriculture-based pollution is being controlled.
- Continuous real-time monitoring of Ergene Rive is initiated.
- More strict control is being supervised.
- Disposal standards for industrial waste-water are becoming prescribed more strictly.
- Early warning system is being established for floods in the basin territory.
- Ground water use is getting under control.
- Dams, ponds and irrigation facilities are being constructed in the Thrace Region.

19. What can i do to make the Ergene Basin a long-lasting and healthier ecosystem

Similar to other basins, the resources of the Ergene Basin are not unlimited. It is reminded here that each negative impact in the basin will confront a negative reaction to the same extent. The contamination of non-living components of the basin, in other words the air, water and soil cause unwanted results for the living beings as well. The extinction of living beings leads to the irreversible destruction of natural balance.

The people living both in and out of the Ergene Basin territorial region have important duties to protect the ecosystem. The primary sources of threats against the ecosystem are industrial activities and the wastes from the urban areas. The unconscious agricultural pesticide and fertilizer use may also cause a permanent damage. During the human activities to live upon or to become wealthier, if people don't take the necessary precautions, then all the living things and particularly the human beings suffer. So, the individuals take significant roles to prevent those effects sufferings and to overcome the problem of pollution.

The most significant fact for the inhabitants of the Ergene Basin is to be aware of the environmental threats. It is a duty for everyone to be aware of the practices damaging the environment and to undertake the responsibility of overcoming them. Each individual can help giving less harm to the environment by these practices;

- They can less pollute by less consuming.
- They can decrease pollution by recycling the rubbish.
- They can help protect the basin by re-using the materials before getting rid of them.

It is very important that individuals know their rights and responsibilities about their environment. It is a constitutional right to live in a clean and healthy environment. People who are conscious of their rights and responsibilities on that issue can struggle with the threats against the ecosystem by various legal methods, either individually or in an organized group.

How healthy is the ecosystem can be assessed via the health of hunters on the top of the nutrition chain. For example, how healthy is an atoll (a coral island) is decided by the number and state of sharks. There are hundreds of living-beings in an atoll ecosystem and on top of its nutrition pyramid stand the sharks. There no familiar natural enemies of sharks and they are consumed by just the human beings. In Ergene Basin, human beings stand on the top of the nutrition chain. Agricultural ecosystem here feeds not only the basin inhabitants but also the inhabitants of Turkey and other regions on the world. Natural ecosystems are the most significant indicators of a proper working agricultural ecosystem. A proper working ecosystem in the Ergene Basin means healthy people.

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End Note

Dear Trainer;

You are to finish the file of presentations.

We appreciate your efforts to complete the procedures effectively.

Please ask your students whether they have any questions or comments about the presentations.

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