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# The Abstracts of the Environmental Protection Session

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**Implementation of the ISO 14001: 2015 Standard at S.C. SEFAR SRL Sighişoara. Author: Ştefania ALĂMOREAN, Scientific Coordinator: Associate Professor Tania MIHAIESCU PhD.** Industrial companies are subject now to fierce market competition, leading them to become more concerned with quality and environmental protection as required by company as well as specific standards of social responsibility. Recently there is a growing interest by organizations regarding environmental issues and environmental protection. A number of organizations have begun to introduce environmental management and environmental protection measures in their strategies. ISO 14001: 2005 is a standard that provides requirements for the design, implementation and certification of an Environmental Management System that helps organizations identify, monitor and manage their environmental issues in a "holistic" manner. This paper presents the aspects regarding the implementation of the environmental management system according to ISO 14001: 2005 at S.C. SEFAR SRL Sighişoara, a company that produces precision fabrics from monofilaments for the screen printing and filtration markets. The case study refers to the methodology for identifying and evaluating the environmental aspects inherent in the production process. **Keywords**: assessment, environmental aspects, significant impact, manufacturing process, ISO 14001.

**Means and Methods for Investigation of Environmental Pollution in the Victoria Locality, Braşov County. Authors: Roxana ANDREIAN, Alexandra NAGY, Scientific Coordinators: Professor Camelia SAVA PhD., Lecturer George MOISE PhD.** In the present study, analyzes of the environmental factors: water and soil were conducted around the Viromet Plant, located 2 km from Victoria on pollution sources and agents. The main sources of surface water pollution from the analyzed rivers are the industrial platform discharges, respectively from S.C. The Viromet Victoria. By the nature of the sewer system built in the area, wastewater is collected from all the enterprises operating here: S.C. Carmolim S.A. and S.C.Vilmar S.A. Town Victoria there are other industrial enterprises that generate wastewater that is discharged into municipal sewage suffering before discharging into the environment a purge station biological Victoria city. Other sources of water and soil pollution are agro-livestock farms in the area. For data analysis and centralization of City of Victoria soil quality, the samples were removed from the wheat and corn at distances (500 m, 700 m and 1 km) from near Plant Viromet. After the soil pH determination is neutral between 6.9-7.29 the degree of saturation in the bases is in the parameters and the soil analyzed does not have good fertility for agriculture. In conclusion from the analysis lab and after data processing can be said that not all parameters analyzed from sources of pollution caused by a combination Viromet are normal, the study fits into the category of areas subject to various factors of pollution of the environment, due to industrial pollution. **Keywords**: environmental pollution, physico-chemical analysis, water, soil, Viromet Victoria plant.

**Air Pollution. General Consideration on Acid Rain. Author: Nicoleta APAHIDEAN, Scientific Coordinators: Associate Professor Antonia ODAGIU PhD., Claudia BALINT PhD.** Air pollution is a mixture of solid particles and gases in the air with negative effects on humans and other living organisms, but also on the environment. Car emissions, chemicals from factories, dust, pollen and

mold spores may be suspended as particles. Some air pollutants are poisonous. Inhaling them can increase the chance you'll have health problems. People with heart or lung disease, older adults and children are at greater risk from air pollution. Air pollution isn't just outside - the air inside buildings can also be polluted and affect your health. Acid rain describes sulfuric and nitric acids deposited from the atmosphere. Often associated with precipitation, the term also applies to dry acidic materials. These acids commonly result from sulfur dioxide and nitrogen oxides reacting with moisture and other substances in the atmosphere. Although there are natural sources for these chemicals, much attention has been given to man-made sources, such as coal power plants. Acid rain is problematic due to acidification of soil, rivers, and lakes beyond the tolerance range of plants and animals. Acid rain can also erode man-made structures. The only way to fight acid rain is by curbing the release of the pollutants that cause it. This means burning fewer fossil fuels. Many governments have tried to curb emissions by cleaning up industry smokestacks and promoting alternative fuel sources. These efforts have met with mixed results. But even if acid rain could be stopped today, it would still take many years for its harmful effects to disappear. **Keywords**: air pollution, acid rain, environment, atmosphere, pollution.

**Rotating Tower. Author: Nicoleta APAHIDEAN, Scientific Coordinator: Lecturer Călin SAFIRESCU PhD.** The Rotating Tower (also known as the Da Vinci Tower) is a 420-foot skyscraper with moving floors, designed by architect David Fisher. Each floor is designed to rotate independently, spinning up to 6 meters per minute or complete rotation in 180 minutes. Fisher said that 90% of the tower could be built in a factory and shipped to the site. This would allow the building to be built more quickly. The core of the tower must be built on the site. Prefabricated sections would reduce the cost of the project and the number of workers, and the construction will take 30% less time than a normal skyscraper of the same size. Most of the workers are in factories, working in safer conditions. The kitchen and bathroom equipment would be pre-installed. The core would serve on each floor with a special patented clean water connection based on the technology used to power mid-flight planes. The entire tower is proposed to be powered by wind turbines and solar panels. There should be enough surplus electricity to feed another five buildings of similar size. The turbines would be located between each rotating floor. Fisher said he could generate up to 1,200,000 kilowatt-hours of green energy each year. It is expected that the solar panels will cover the roof and the top of each floor. **Keywords**: rotating tower, skyscrapers, solar panels, wind turbines, green energy.

**Monitoring the Conservation Measures of Species And Habitats in the Iron Gates Natural Park. Author: Cristina Maria AVRAM, Scientific Coordinator: Professor Marian PROOROCU PhD.** The Iron Gates Natural Park corresponds to the V-IUCN category: "Protected Landscape: Protected Area Maintained for Landscape Conservation and Recreation". The Iron Gates Natural Park comprises a wide variety of natural and semi-natural habitats and pastures, rocks, forests that make up a mosaic of highly diversified ecosystems. The conservation activities of the natural and cultural heritage elements of the Iron Gates Natural Park are limited to a series of isolated measures, especially applied in the area of protected areas. The maintenance of species and habitats of community and national interest, preservation of characteristic landscapes and geological, geomorphological and paleontological elements are just some feasible activities inside the natural park. Control of scientific activities is carried out in areas with strict or full protection in order to preserve the integrity of ecosystems. The protection of habitats of flora and fauna species is necessary in order to eliminate the negative impacts caused by grazing with domestic animals in an unorganized and uncontrolled way, cutting of wicker rods, harvesting of medicinal and aromatic plants, extraction of construction materials: sand, gravel and others, as well as the prevention of water pollution with domestic and animal waste from households in upstream localities. **Keywords**: monitoring, species, habitats, conservation activities, elimination of negative impacts.

**The Risks of Genetically Modified Organisms on Human Health and the Environment. Author: Mihai Daniel BARBU, Scientific Coordinator: Professor Aurel MAXIM PhD.** Besides atomic fission and nuclear fusion, few discoveries of science have sparked controversy and public debate as genetically modified organisms (GMOs), called transgenic. The implications of GMOs are so complex that discussions on their behalf go beyond the level of specialists, media and continental and planetary decision makers. The issue of GMOs is, first of all, controversial. Researchers of manufacturing corporations mainly highlight their advantages while independent studies signal a range of risks for both the environment and human health, media and continental and planetary decision makers. In the paper are presented in detail and argued the disadvantages of the use of transgenic plants:

contamination of related plants from the spontaneous flora through pollen; contamination of conventional varieties by pollen; negative influence on soil detritivores, the microbial community in the rhizosphere and non-target organisms including natural parasites and predators, kidney and liver disorders, hormonal imbalances in mammals, malignant tumors in experimental animals. It seems that most of the risks come from the positioning of genes and the impossibility of genetic engineering techniques to identify the position of the transgene in the new genome. For farmers a major disadvantage is the prohibition of producing their own transgenic seed, based on the creator's copyright.. **Keywords**: genetically modified organisms (GMOs), genetic engineering, transgenes, risks, environment.

**Software Application for Remediating Waste Waters. Author: Răzvan BENDRE, Scientific Coordinator: Lecturer Cristian MĂLINAȘ PhD.** In today's contextual context, where resource sustainability is a concept to be taken into account, the present study aims to highlight the possibilities of surface water remediation, taking into account software supports. Sustainable development is one of the most important desiderate of our age, but the modern life exigencies make difficult the achievement of this concept. Another important reason concerning the difficulties in promoting of sustainable development is represented by the financial constraints. In this context, the problem of wastewaters is of extremely important concern. In our days, waste water remediation is conducted by automatized equipment involving the use of preformat software adapted to each special case. These software applications have different complexity degrees, but all of them have personalized study applications. An important accent is put on the smart networks destined to wastewater remediation. Usually they have a component destined to wastewater monitoring (in real time) giving qualitative and quantitative description, which also involve alarm systems with specific notifications, and function of results systems destined to deliver solutions for wastewater remediation. **Keywords**: alarm systems, automatized equipment, sustainability, waste water.

**Exploitation of Agricultural Lands and Global Heating. Author: Bogdan Ioan BOCȘA, Scientific Coordinator: Professor Aurel MAXIM PhD.** Global climate change has been the focus of all international and European bodies for about thirty years. Thus, in 1988, an Intergovernmental Committee on Climate Change was set up within the UNO. In 1992, the Rio de Janeiro Environmental Summit, which underpinned the Kyoto Protocol (1997), which industrialized countries have undertaken to reduce pollutant emissions by 2012. Of total GHG emissions (greenhouse gases), land use contributes about 30%. Agricultural greenhouse gases with the highest heating potential are: nitrous oxide ($N_2O$), potentially 310 times higher than $CO_2$ and methane ($CH_4$) with a potential 21 times higher than $CO_2$. Worldwide, there are a number of measures to reduce GHG in agriculture, depending on the specificity of the area. At EU (European Union) and, implicitly, in Romania, a favorable environment was created for the reduction of GHG in agriculture through the $10^{th}$ and $11^{th}$ measures of the National Rural Development Plan (NRDP) 2014-2020 and the application of good agricultural practices. Farmers applying these measures receive compensatory payments as a prerequisite for reducing GHG in agriculture. **Keywords**: agricultural land exploitation, greenhouse gases, good agricultural practices, organic farming.

**Nitrate Pollution. The Hidden Danger in Drinking Water. Author: Cristian BODEA, Scientific Coordinators: Associate Professor Antonia ODAGIU PhD., Assistant Bianca MOLDOVAN PhD.** In Romania, the nutrient pollution of drinking water is a real problem, more serious than in other European countries that have taken actions in this direction for many years. The most important source of nitrate and nitrite intoxication is water from fountains. In most communities and villages in Romania, most fountains are polluted with chemical substances, infiltrated into underground water from stables or farms, due to the leakage of animal manure directly in the groundwater. In this cases, the nitrate concentration in water from fountains exceeds the admitted limit for drinking water. The purpose of this study was to highlight the importance of nitrate pollution from drinking water, and to offer a set of preventive measures that can be taken in each household in order to avoid intoxication with nitrates and nitrites. Among the prevention measures taken at each household, at community level, the implementing of a waste management program and an appropriate manure management rests a mandatory requirement. **Keywords**: pollution, nitrates, drinking water, manure management.

**Study on the Dissolved Oxygen Role on Trout Growth. Author: Daniela BUDA, Scientific Coordinator: Associate Professor Tania MIHAIESCU PhD.** The profitability of fish production is dependent on the breeding, growth and development processes, in the conditions of ensuring

the optimal environment for exploiting the biological potential. Salmon farmers in EU countries and in the US are turning their attention to recirculating systems as they provide the best conditions for the biological material. The paper is a case study at the "Domeniul regilor" fish farm. The aim of the paper was to elaborate and implement a water quality monitoring plan for dissolved oxygen, considering that the technology of growing trout in intensive recirculating system can be controlled only by careful monitoring of water parameters and of functional state of the installations. Monitoring of the dissolved oxygen concentration as well as of other water quality indicators was performed over the course of a year on a daily basis. The obtained results were processed and analyzed in order to assess the influence of water quality parameters on the rainbow trout technological growth process flow **Keywords**: trout, dissolved oxygen, recirculating systems, intensive fish farming.

**Modeling Tools for Water Quality. Author: Sebastian CHIRICĂ, Scientific Coordinator: Lecturer Cristian MĂLINAȘ PhD.** The present paper was developed with the aim of presenting the present knowledge about the possibility of water quality modeling. Water quality is one of the most important, if not the most important problems of present times. This happens, on one hand, because the vital importance of water, and, on the other hand, because the problems linked to pollution issues, and continuous need of clean water. In this, respect, the managing water quality, in an efficient way, needs special approaches, as instruments designed for modelling water quality. In last decades, a series of software were developed in order to deliver modelling paths for water quality models (e.g. QUAL2E). All these models may concern one or more water quality indicators (pH, DO, SOD, photosynthesis formulation, bacteria formulation, etc.). Generally speaking, these model consist in a collection of mathematical formulas describing pollutants occurrence and position, used in order to identify not only the concerned pollutants position, but also their transport mechanisms, surface runoff, or long-term water quality (e.g. SPARROW models). These models may also serve to long-term water resources planning (e.g. WEAP model). **Keywords**: water, quality, indicators, models.

**Using Apartment Plants for the Purpose of Air Purification in Living Spaces. Case Study: Peace Lily (*Spathiphyllum*), Author: Andreea COSMA, Scientific Coordinator: Lecturer Cristian MĂLINAȘ PhD.** Poor indoor air quality has been correlated with health problems, especially at children. Some studies have suggested that indoor plants can reduce fatigue, cough, sore throats and other cold-related symptoms, and help lower blood pressure, and improving concentration. In addition to photosynthesis, apartment plants can remove toxic substances from air, soil and water at least in two ways, first they can metabolize some toxic chemicals, releasing harmless by products, and secondly they can incorporate toxic substances, such as heavy metals, by seizing them in plant tissues. Within 24 hours some plants can eliminate up to 87% of indoor air pollution. The capacity of apartment plants in combating indoor air pollution was first discovered by NASA in the 1980s. Researchers then established a list of 50 apartment plants that can absorb toxic substances in the air. Of these, the Peace Lily (*Spathiphyllum*) is placed in the top ten apartment plants being recognized for its capacity to remove chemical vapours in closed, unventilated spaces. Thus, the peace lily absorbs alcohols, formaldehyde, removes acetone (a plastic ingredient), benzene (present in glue), trichlorethylene (found in printers) and xylene (emitted by computers). In addition to the indoor air purifying properties, the peace lily, it is an easy-to-care and grow plant, resistant to disease and pest attack, making it an optimal choice for air purification in living spaces. **Keywords**: houseplants, *Spathiphyllum*, indoor air quality, purification.

**Improving Indoor Air Quality by Using Potted Plants. Case Study: Ivy (*Hedera Helix*). Author: Adina COSTEA, Scientific Coordinator: Lecturer Petru BURDUHOS PhD.** Air quality is a global problem that causes multiple economic losses and poses a threat to human health. Indoor air quality is dominated by many dynamic processes, including air exchange, human activities and the transfer of pollutants inside buildings and among occupants. Typical indoor air pollutants include volatile organic compounds (VOCs), microbial contaminants, gaseous contaminants and particulate matter (PM). In order to remove them from the indoor air, firstly, the sources of pollution must be identified. Formaldehyde (HCHO) is one of the most common VOCs that affects indoor air quality and, implicitly, that affects occupant's health. Nowadays, there are many studies that highlight the beneficial effect of *Hedera Helix* in purifying indoor air by removing formaldehyde. *Hedera helix* is a creeper plant, well suited to indoor conditions. Different varieties of *Hedera helix* are widely grown as ornamental plants, preferring wet and shady places. Also, according to the literature, ivy is ranked in the top ten plants for filtering indoor air by removing $VOC_s$. The present study is a bibliographic analysis aimed to reveal the importance of potted plants for purifying indoor air,

especially of ivy. **Keywords**: air quality, indoor spaces, *Hedera Helix*, $VOC_s$, potted plants.

**Greenhouse Effect. Causes and Effects. Author: Nicolae COZONAC, Scientific Coordinators: Associate Professor Antonia ODAGIU PhD., Claudia BALINT PhD.** The greenhouse effect refers to the trapping of heat by certain gases in the atmosphere. Although these gases occur in only trace amounts, they block significant amounts of heat from escaping out into space, thus keeping the Earth warm enough for us to survive. Without greenhouse gases, the average surface temperature of the earth would be about -18 degrees Centigrade. This warming is altering the earth's climate system, including its land, atmosphere, oceans, and ice, in far-reaching ways. Global warming is harming the environment in several ways including; increase of average temperature/desertification, rise in Sea level, rainfall variability and deviation in seasonal characters. However human have been adding greenhouse gases in excessive amounts to the atmosphere ever since the Industrial Revolution, which is enhancing the greenhouse effect. This increase in greenhouse gases has the potential to cause catastrophic problems for Earth and its inhabitants. The actual rise is not very much, but the Earth's ecosystem is very fragile and small, changes can have large effects. Almost 100% of the observed temperature increase over the last 50 years has been due to the increase of greenhouse gas concentrations like water vapour, carbon dioxide (CO2), methane and ozone. Carbon dioxide is the biggest reason for the greenhouses effect that leads to global warming. There are two key areas where individuals can help and reduce the emissions of CO2. These are electricity consumption and transportation. **Keywords**: greenhouse effect, global warming, environment, atmosphere, pollution.

**Pollution and Intelligent Solutions of Fighting. Author: Nicolae COZONAC, Scientific Coordinator: Lecturer Călin SAFIRESCU PhD.** Environmental pollution is contamination with materials that interfere with human health, quality of life or the natural function of ecosystems (living organisms and their environment). About 40% of urban population breathes contaminated air pollutant levels much higher than the thresholds recommended. Nowadays more and more people are turning their attention on environmental issues and living because the land is very rich deposit of natural resources that make possible the existence of life. Actions to reduce pollution are very important if we want to continue life on Earth. Cities have the ability to significantly improve local air quality through measures: reducing traffic by improving public transport, development of cycle paths, using technology and smart solutions. It developed an intelligent software which is based on artificial neural networks to predict accurately the degree of air pollution in big cities a few days in advance. In Chicago, Potsdam and London adopted an intelligent software which is based on artificial neural networks to predict accurately the degree of air pollution. Thus, in city stations have been installed sensor 150 for measuring air quality. The data are correlated with the weather forecast and traffic data and software can be said with an error rate of less than ten percent, how polluted will air in the next three days. Using these intelligent solutions to combat pollution we can have cities more clean and standard of living much higher. **Keywords**: pollution, contaminated air, combat pollution, agricultral, transport, industry.

**Study o Physico - Chemical Analysis of Târnava Mare River Water. Author: Alina Alexandra CRISTUREAN, Scientific Coordinator: Associate Professor Tania MIHAIESCU PhD.** The rivers must provide much of the amount of water needed for human activities. The knowledge of these complex systems is a key component of providing an efficient management that enables the use of this important resource for economic, social and environmental requirements. Aware of this reality, I chose the case of the Tarnava Mare watershed, in order to highlight the peculiarities, environmental factors and the anthropic activities that influence the quantitative and qualitative characteristics of the water environment. The study aimed to determine the water quality of the Tarnava Mare River upstream and downstream of Sighisoara town in four sampling points. The water quality assessment was carried out by sorting the analyzed physical and chemical parameters into quality classes according to Order 161/2005 as well as through the assessment of the ecological status (general physical and chemical elements) according to the methodology proposed in the 2nd River Basin Management Plan. **Keywords**: Târnava Mare, water quality, pollutants, physico-chemical parameters.

**The Iron Gates Hydropower System, the most important renewable energy producer in Romania. Author: Laurențiu CUHA, Scientific Coordinator: Professor Marian PROOROCU PhD.** Through the studies and researches carried out in this paper, I would like to present to you the energy potential of the Iron Gates Hydropower Station, which is part of the National Hydro-Energy System (S.H.E.N). The Iron Gates Hydroelectric Power Plant

is the largest on the Danube at present, with an installed capacity of 1080 MW per Romanian side, distributed in the country's energy grid and together with the Serbian one reaches 2160 MW. The maximum capacity of the turbines is 8700 m3 / s. Navigation on the Danube is ensured by locks on both banks both upstream and downstream, with an annual traffic capacity of 52.4 million tons for one-way locking. The total length is 1278 m, it is made of a spillway of 441 m, the Romanian center of 214 m, the Serbian power station of 214 m, the Romanian lock 53 m and of the Serbian one, and the 117 km non-Romanian barrier while the Serbian 186 m. **Keywords**: Iron Gates, capacity, energy, hydropower.

**Air Pollution from Motor Vehicles. Case Study Cluj-Napoca City. Author: Geanina DAVID, Scientific Coordinators: Associate Professor Antonia ODAGIU PhD., Assistant Bianca MOLDOVAN PhD.** Activities due to urban traffic are the main source of pollution that causes serious damages to human health. The activities in the urban environmental represent sources of pollution to all natural and anthropic factors, so they must be measured and controlled in a way that environmental impact and effects on human health are within the limits admitted by the legislation. Traffic-related emissions are a complex mix of pollutants consisting of nitrogen oxides, particulate matter, carbon monoxide, sulphur dioxide, volatile organic compounds, ozone, and many other chemicals such as trace toxics and greenhouse gases. The quantity of pollutants released in the urban atmosphere because of the traffic can be quantified with classical methods. In Cluj-Napoca the pollution problem is of growing importance given the escalating number of vehicle dynamics, but also increased levels of emissions due to the large number of old cars. The present study was conducted in order to quantify the emissions from traffic in Cluj Napoca City by using the available data from local authorities and available websites and comparing them with the limit values admitted by the regulations. **Keywords**: air quality, pollution, traffic study, emissions.

**Medical Waste Management in Cluj-Napoca City. Author: Roxana DRUȚĂ, Scientific Coordinator: Lecturer Ioan BRAȘOVEAN PhD.** Medical waste includes all waste generated by health institutions, research and laboratories institutes. In addition, they include waste from "minor" or "diffuse" sources, such as those produced during health care taken at home. Medical municipal waste presents a very dangerous impact on the environment when are not managed with responsibility. Between 75% and 90% of medical waste can be assimilated as household waste, being transported to waste landfill. This waste mainly comes from administrative and household activities hospital institutions and may also include waste generated during maintenance. The rest of 10 - 25% of medical waste is considered dangerously, presenting health and safety risks environment. In Romania, even if the legislation of medical waste it is aligned to European requirements, in practice exists in a very small proportion. The purpose of the research is to highlight the level of efficiency when managing hazardous medical waste in Cluj-Napoca city. The research method used is comparative analysis method between the general level of medical waste management used nationally and the medical waste management used locally, namely in Cluj-Napoca city. **Keywords**: medical waste, management, municipal, pollution.

**Study Regarding Cluj-Napoca Treatment Plant. Author: Mariana DUMITRIU, Scientific Coordinator: Associate Professor Tania MIHAIESCU PhD.** Ensuring good quality water is an essential requirement in terms of quality of life. Access to good quality drinking water is regulated in the European Union by the relevant directives. However, the production of sufficient quantities of good quality drinking water depends to a great extent on the quality of water sources. The Water Framework Directive indicates to Member States the necessary measures for efficient water management. The present paper is structured in two parts, a theoretical part that includes general aspects of water quality and the main European and national water regulations and an experimental part of the documentation stage at Gilau Treatment Station. For the water supply of the city of Cluj-Napoca and adjacent territories, in order to comply with the provisions of the directives on water quality assurance, measures have been implemented which have resulted in providing an alternative source of raw water for Cluj with better qualities; increasing the quality of water and services, lowering the treatment costs, better security in the water supply of the entire area serviced with the possibility to take over new localities, including Salaj County, but especially to better comply with the European Directives on Quality water and the environment. **Keywords**: drinking water, biochemical processes, the environmental factor, water quality, framework directive.

**Study on Song Damage Due to Automotive Traffic in Cluj-Napoca Municipality. Author: Eva GERGELY, Scientific Coordinator: Associate**

**Professor Tania MIHAIESCU PhD.** The paper presents a synthesis of the theoretical and practical aspects regarding the sources of noise produced by road traffic as well as the effects on human health, under the current conditions of development of the road infrastructure and of the car park. Sound pollution is a form of pollution that should not be omitted if we think it is a factor that adds to the many stress factors that are specific to today's life. The noise has entered into man's life, has penetrated into his home and has come to produce what we now commonly call noise pollution. Noise is very dangerous, its action is manifested in time, overwhelmed. More commonly in the medical world, there is talk of "noise malady", affecting the nervous and auditory system. The primary action of the noise strongly influences negatively not only on the ear, and the nervous system, causing dizziness, headache, fatigue. Strong music can create depression. Immediate effects are cardiovascular disease, diminished attention and memory capacity, agitation, visual field reduction, gastrointestinal disorders. Long-term effects, however, lead to physical fatigue and nervousness, insomnia, bulimia, chronic arterial hypertension, anxiety, depressive and even aggressive behaviors. **Keywords**: noise, road traffic, noise pollution, health.

**Biomonitoring Interior Pollution with Ornamental Plants. Author: Dalina HANOȘ, Scientific Coordinator: Associate Professor Antonia ODAGIU PhD.** The quality of indoor air is an important element in tight connection with human well-being. Indoor pollution is a field of environmental sciences that has been receiving special attention in recent years. The main indoor pollutants are: volatile organic compounds (VOC), polybrominated diphenyl ethers (PBDE), formaldehyde, suspended particulate matter (PM), radon, $CO_2$, CO, NO, etc. A solution that helps to purify the air in enclosed spaces, also being a way of biomonitoring air quality, consists in using indoor plants. This monitoring technique is less costly, also contributing to the aesthetic aspect of the spaces where the ornamental plants are located. The biomonorizing process can be highlighted by the use of plant tissue of plants. The mechanism by which indoor plants can purify the air consists in the absorption of pollutant molecules at the foliar level and their metabolic transformation into nutrients. In this context, the present study aims at presenting the most important types of interior plants that have potential in biomonitoring and at the same time the improvement of indoor air quality, namely: *Aloe Vera* (L.) Burm.f. (aloe), *Ficus benjamina* L. (fjus), *Philodendron cordatum* Kunth (heart-shaped filodendron), *Areca caechu* L. (Areca palm), *Dracaena* Vand.ex L. (dracena) syn. *Terminalis* Medik., Cactaceae (cactus), *Spathiphyllum wallisii* Regel (peace lily), *Dryopteris filix-mas* (L.) Schott (fern), azaleea, Rhododendron genus, and chrysanthemum, Chrysanthemum genus. **Keywords**: air quality, metabolic transformation, plant species, VOC.

**Forest Management in the Context of Global Changes. Author: Arpad JECAN, Scientific Coordinator: Lecturer Petru BURDUHOS PhD.** Forest management requires the need for response to global change ecology and its interacting factors. Forest ecosystems are impacted by multiple uses under the influence of global drivers. The need for providing environmental services, forest ecosystem services and goods will be greatly influenced by changes in global ecology, posing some new challenges to forest and environmental sustainability. This paper reviews the main perceived challenges that climate change poses to forests and global environment. At a global level and it is relevant to understand changing natural ecosystems whereby to all types of forests that include boreal, temperate, and tropical, to various management objectives (production, conservation, protection and multi- purpose) and to all types of management platform (public, private and community) are effected by environmental developments. This review paper addresses concepts like sustainable forestry, environmental developments and interacting factors of global change ecology in order to forcast models for forest dynamics, integration and analysis with reference to potential for solving climate change challenges in a global change ecology perspective. **Keywords**: forestry management; environmental development; climate change, conservation, ecology.

**Entrepreneurial Opportunities for Revaluating Electrochemical Waste. Case Study: Recovering Precious Metals (Au, Ag) from Used Mobile Phones, Author: Bogdan JURJ, Scientific Coordinators: Associate Professor Antonia ODAGIU PhD.** Entrepreneurship is the concept that underpins a business and consists of identifying and capitalizing on economic opportunities. The purpose of this study was to explore the possibilities of identifying entrepreneurial solutions in the field of electronic waste. Globally, the most attractive entrepreneurial opportunities for the recovery of electronic waste consist of the recovery of precious metals, namely gold and silver, from their components. Mobile phones are the electronic waste used predominantly for the recovery of precious

metals from their components. A particularly important consequence of identifying innovative gold recovery solutions in cell phone components is the potential for their impact on reducing the environmental impact of mining activity as a result of the decrease in mine extraction rate. Recovering gold from chips, integrated circuits, capacitors, conductors, etc. can be a very profitable business, provided the exact amount of gold is found in one kilogram of chips, integrated circuits, etc., especially in compliance with the environment in place in the area where the methodologies used are applied. An increasing entrepreneurial interest is growing for the silver-mining business of resources represented by electrical and electronic waste belonging to various constituent typologies. **Keywords**: silver, gold, entrepreneurial opportunities, efficiency, industry.

**Global Warming. Author: Olimpiu MOLDOVAN, Scientific Coordinator: Lecturer Călin SAFIRESCU PhD.** Global warming represents the rapid increase of the average global temperature recorded over the past 2 centuries, especially in the last decades. This paper presents the main characteristics of global warming, its causes and its related effects. Last but not least, it shows a few studies and predictions made by scientists who claim an acceleration of the phenomenon. Global warming has side effects in various domains such as raising the sea level, extreme climate change, melting glaciers, the extinction of many species and also changes regarding people's health. Even though in 2013 it has been stated that the icecap will disappear, it is now 60% larger than in 2012, its borders almost tie Canada and Russia (1.6 millions $km^2$ larger). Scientists claim that there will be a period of global cooling which will affect the planet until the middle of XXI century. Because of this, the Intergovernmental Panel of Climate Change from ONU has summoned an urgent meeting at the end of September 2013. Dr. Ed Hawkins from University of Reading states that we must oversea the evolution of the north icecap in the following 5 years in order to conclude whether the tendency of global warming is to increase or to decrease. **Keywords**: global warming, increasing temperature, climate change, raising the sea level, melting the icecaps.

**General Considerations on Forest Regeneration. Author: Robert MOGA, Scientific Coordinator: Lecturer Petru BURDUHOS PhD.** Forest regeneration is the process by which new tree seedlings become established after forest trees have been harvested or have died from fire, insects, or disease. Regeneration is key to sustainable forestry and can be accomplished through two basic approaches: natural regeneration, which occurs when new seedlings or sprouts are produced by trees left on or near the site (as with aspen) and artificial regeneration, more commonly known as tree planting. In areas that have been deforested either by timber harvesting or as a result of natural events such as wildfires, the rapid and successful re-establishment of trees is often a primary management objective. Once trees are growing again on the site, other values such as erosion control, timber value, wildlife habitat and esthetical appeal tend to increase. Management activities that occur before, during and after harvest have a great influence on the ecological, esthetical and economic value of the future forest. Planning for regeneration begins with the landowner examining the land and then defining the objectives for regeneration and management. Successful establishment of seedlings may depend upon a number of factors such as soil characteristics, exposure, elevation, climatic conditions, diseases present, and the population density of herbivorous mammals and the control of competing vegetation. Studies such as these are completed routinely to determine the best methods for reforestation in a region, by explaining the main advantages and disadvantages of each regeneration approaches. **Keywords**: reforestation, natural regeneration, artificial regeneration, forestry management.

**Forest Curtains. Importance and Role in the Urban Environment. Author: Horaţiu MOLDOVAN, Scientific Coordinator: Lecturer Petru BURDUHOS PhD.** Forest curtains are forest vegetation set up by planting with lengths different and narrow relative widths, located at a certain distance from a goal in order to protect it against the effects of harmful factors. Recognition of the potential benefits to health of retaining and restoring trees in the urban environment must be a key component of planning strategies and policy. Of particular importance within public and private open space is the role of trees. The impact of trees in urban environments also clearly extends beyond the issue of heat. Trees hold significant roles in ecosystems and can provide many benefits to urban communities, namely: reduction of air pollution, reduction in volume of storm water, mitigation of wind and noise, provision of habitat and support for biodiversity, reduction in UV exposure, enhanced sense of place & identity, improved mental well – being, encouragement of outdoor activity, reduced demand for energy (and therefore GHG emissions), increased property values. In Romania, the area covered by forest has decreased in the last period of time is currently below the average of developed countries

in the European Union. Meanwhile, a series of extreme weather phenomena have increased, representing the greatest threat facing humanity and the environment. The present study aims to analyse and highlight the role and importance of green coverage in Romania in the current context of climate change, which requires the plantation of protective forest curtains. **Keywords**: orest curtains, air quality, urban environment, climate change.

**The Photoelectric Effect. Operation of Solar Panels. Author: Oana MUREȘAN, Scientific Coordinator: Claudia BALINT PhD.** The photoelectric effect was discovered by H. Hertz in 1890, but was explained only in 1904 by A. Einstein on the basis of corpuscular light theory. Thus, by external photoelectric effect is meant the emission of electrons by metals under the influence of electromagnetic radiation. There is also an internal photoelectric effect, which consists in generating new free charge carriers within a semiconductor under the action of electromagnetic radiation. Based on the principle of photoelectric effect, the photovoltaic cells (solar cells), which work transforming light energy into electricity. An assembly of several photovoltaic cells, all oriented to the same plan, form a solar panel. From a constructive point of view, solar panels are made up of multiple cells and can be highly flexible and subtle modules (great mobility to be exposed wherever there is sunlight), to compact modules that can become an integral part of the home roof, or mounted on the soil surface, or even outside on the balcony (there are a variety of locations and positions for optimal solar energy capture). Solar panels are used in several areas where budget savings are desired. This is the least polluting way of obtaining electricity, and the facility does not produce noise, vibrations or harmful emissions and requires only sunlight and nothing more to operate. Moreover, photovoltaic cells are obtained from quartz sand (silicon) and from recycled materials or waste. **Keywords**: photoelectric effect, photovoltaic cell, electromagnetic radiation, solar panel, pollution.

**Researches on Water Quality Analysis in the Main Rivers in Vâlcea County. Author: Alexandra NAGY, Alice VOICU, Scientific Coordinators: Associate Professor Mihaela ANTOFIE PhD, Lecturer Cristina MOISE PhD.** This paper evaluates the water quality situation in the main rivers in Valcea County (Olt, Olănești, Govora and Ocnele Mari), by physico-chemical analysis, in order to indicate their quality and to determine if the causes lead to their pollution. In Vâlcea there are commercial companies with different fields of activity, resulting in wastewater that flows into these rivers. Following the sampling of water from the four rivers, analyzes were conducted on: turbidity, temperature, pH, alkalinity, acidity, nitrogen compounds (nitrogen), dissolved ammonia and phosphorus compounds. Based on laboratory determinations after data processing, we analyzed: the turbidity values of the four samples falling within the normal range, the temperature of the water varies according to the season, appropriate to the sampling period, the pH of the water was in accordance with STAS, the Ocnele Mari River had values of less than 7 due to the presence of salt because salt deposits are exploited in the area. Water samples taken from the four rivers showed alkalinity and acidity framed within STAS. From the point of view of nitrogen compounds (nitrates, nitrates), their values do not exceed the admissible limits. Dissolved ammonia is found in small quantities without affecting the quality of the water. The presence of phosphorus compounds was not found in any of the water samples under analysis. In conclusion, as a result of analyzes of the samples taken from the four rivers and after the data processing, it can be said that all analyzed parameters are within normal limits, these waters do not fall within the category of industrially polluted waters. **Keywords**: water quality, rivers, physico-chemical analysis, industrial pollution.

**The Wastes and the Biomass as a Source of Energy. Author: Andrei OȚEL, Scientific Coordinator: Professor Aurel MAXIM PhD.** The production and use of energy from renewable sources is very well represented in the Romanian legislation transposing various EU normative acts. Nevertheless, more than half of Romania's energy consumption is covered by coal, gas and oil, while about 20% of nuclear power comes from nuclear power. Particular attention should be paid to biofuels for transport, which by 2020 must reach 10% according to Directive 2009/28/EC. The Common Agricultural Policy (CAP) Pillar I (CAP), which stimulates the introduction of short-range forest species (willow, white poplar, black poplar and acacia), also contributes to the improvement of the situation. Domestic, municipal and industrial organic wastes resulting from the processing of vegetable crops are increasingly used for energy production through composting, incineration, waste pyrolysis, anaerobic fermentation with biogas, etc. Biofuels have many advantages: SO2 emissions are very low compared to fossil fuels, resulting in a significant reduction in the risk of acid rain. Petroleum biomethane mixtures do not require additives and aromatics (benzene, methylbenzene and xylene) to improve their combustion characteristics. Research in Europe and

the US shows that biodiesel in a mixture of 20% of oil has led to a significant decrease in smog and odor. Perennial energy crops increase soil fertility, reduce erosion, contain wastewater vegetation filters, and increase biodiversity as they allow the development of more complex ecosystems. The answer to the dilemma "FOOD OR ENERGY?" Is the following: the use of agricultural land for energy plants can only be done to the extent that the food safety of the population is not affected. **Keywords**: biomass, waste, energy plants, biofuels, biogas.

**Air Quality. The Implementation of European Legislation at National Level. Author: Raluca PAȘCALĂU, Scientific Coordinator: Associate Professor Antonia ODAGIU PhD.** Air care is one of the factors that support our environment is favouring transport of pollutants version environment. The main objectives at international level and National version are represented by the policies adopted to reduce emissions of greenhouse gaze. Therefore a particular attention is paid in order to supervisory activity and improving air quality. Current laws and measures on air quality address specific sectors, processes, fuels and pollutants. Some of these laws and measures set limits on the amount of pollutants that countries can emit into the atmosphere. Other measures are aimed at reducing exposure of the population to levels of harmful pollutants for health by limiting high concentrations - the amount of a particular pollutant in the air in a given area at a certain point in time. The aim of the present study was to expose the main regulations concerning air quality at European level by transposing it nationally, through Laws and Regulations. **Keywords**: air quality, environment, pollution, politics, legislation.

**Soil Pollution. Causes, Effects and Solutions. Author: Alexandra PETRA, Scientific Coordinator: Associate Professor Antonia ODAGIU PhD.** Soil pollution, in other words, means degradation or destruction of earth's surface and soil, directly or indirectly as a result of human activities. Soil pollution has increased over the last decades and may pose a risk for human and ecological health. The main causes of soil pollution are associated with human activities, resulting in the accumulation of contaminants in soils that may reach levels of concern. Soil pollutants include a wide variety of contaminants (organic and inorganic chemicals), which can be derived from anthropogenic related activities, or naturally occurring in soil. Soil pollution differs slightly from land pollution because while they are affected in some of the same ways by the same contaminates, soil pollution focuses solely on the soil, while land pollution includes all of the land. However, the causes and effects are roughly the same. Soil quality monitoring may be a hard task due to the lack of well-stated monitoring variables and indicators. On the other hand, the pressure on soil quality and the need for sustainability of soil fertility is ever increasing due to the issues related to the world's population increase. Therefore, due to the combination of all the above-mentioned issues, the soil pollution becomes a hot topic. This chapter overviews the main aspects of soil contamination and demonstrates the main causes and types of soil pollution such as waste disposal, mining, agrochemicals, industry, and atmospheric deposition. **Keywords**: soil pollution, contamination, types of pollutants; pollution sources.

**Water Pollution. Causes, Effects and Solutions. Author: Lucian PETZOCAȘ, Scientific Coordinator: Associate Professor Antonia ODAGIU PhD.** Water quality rests a major challenge that humanity is facing in the twenty-first century. Human activities including industrialization and agricultural practices contributed immensely in no small measure to the degradation and pollution of the environment which adversely has an effect on the water bodies (rivers and ocean) that is a necessity for life. This paper tries to discuss basically what water pollution is and equally to address the source, effect control and water pollution management as a whole The review addresses along the different temporal and spatial scales of global water pollution. Agricultural chemicals and waste-water sources exert shorter-term effects on regional to local scales. There are many approaches that could be adopted in water pollution control and management. It could be through prevention, practice efforts or join a project/program; regulation and monitoring or engaging in control measures by reducing or minimizing waste. We can conclude that water pollution is an environmental problem that is of major concern both globaly and nationaly. Human contribution to water pollution is enormous by way of defecating; dumping of refuse, industrial wastes and washing of clothes etc. Apparently, environmental education is of immense importance to use particularly in schools and should have a place in the school curriculum. In this way they will be less inclined to pollute our waters. **Keywords**: water pollution; management; human activities, control, effects.

**Implementation Services - Specific Activities for Inventory and Monitoring Habitation and Species Necessary to Update the Inventories Regarding Species and Habitats of**

**Community Interest on the Territory the Site (Rosci0263 Valea Ierii) and the Monitoring of the State of Conservation. Author: Andreea Cristina POPA, Scientific Coordinator: Professor Marian PROOROCU PhD.** The Natura 2000 network is a European network of protected natural areas comprising a representative sample of wild species and natural habitats of Community interest. Since 1992, the European Union has promoted as the main nature conservation tool the development of the Natura 2000 network of protected areas, targeting both EU and candidate countries. The establishment of the Natura 2000 network is based on two European Union directives, the Habitats Directive and the Birds Directive, which regulates the way of selecting and designating sites and protecting them, and Member States have the right to regulate the practical implementation and implementation of the provisions of Directives at national level. Natura 2000 site ROSCI263 Valea Ierii, with an area of 6,194 ha, is a protected area of average size in our country and, at the same time, one of the largest wild areas in the Apuseni Mountains. Administratively, the protected natural area is entirely on the territory of Cluj County. Valea Ierii was declared a protected natural area of Community importance with landscape value through Decision 147/1994 of the Cluj County Council. The following habitats have been identified within the site: natural grasslands, deciduous forests, coniferous forests, mixed forests, transition forests. **Keywords**: Natura 2000, habitats, birds, protected area, conservation.

**Solar Energy – an Inexhaustible Source of Energy. Author: Teodora Maria RUSU, Scientific Coordinator: Lecturer Călin SAFIRESCU PhD.** Solar energy is a renewable source of energy that has recently had a huge impact on worldwide methods of sustainable development. This paper presents: 1. The main characteristics of solar energy and the main resources available for its use as a renewable resource; 2. Legislation about promoting the conversion of renewable sources of energy into electricity *and energetic efficiency*; 3. Case study. Solar energy consists of radiant light and heat from the Sun that are harnessed using a range of ever-evolving technologies such as solar pannels, solar power towers and thermal power stations**.** The annual national average flow of solar energy exceeds 1250-1350 kWh/$m^2$/year. However, there are some areas in our country, in which the annual flowof solar energy rises up to 1450-1600 kWh/$m^2$/year such as the Black Sea area, Dobrogea as well as most of Southern Romania. European and national legislation imposes the necessity of removing areas containing solar pannels from the agricultural circuit and establishesthe measures of promoting the use of renewable sources of energy and marketing. The case study presented in this paper addressesthe topic of the Livada photovoltaic park Satu-Mare county, Romania. The park spans 135 ha and is the second largestin Europe and the seventh largest in the world. It has an integrated capacity of 56 MW and is capable of producing enough energy to power 60000 homes **Keywords**: renewable resource, sustainable development, electricity, photovoltaic park**.**

**Software Application for Remediating Chlorides and Solvents Caused Pollution. Author: Raul SABĂU, Scientific Coordinator: Lecturer Cristian MĂLINAȘ PhD.** This paper has been developed to present current, existing and used practices worldwide to automate the remediation of polluted waters with chlorine and solvent substances. Sustainable development is one of the most important desiderate of our age, but the modern life exigencies make difficult the achievement of this concept. Another important reason concerning the difficulties in promoting of sustainable development is represented by the financial constraints. In this context, the problem of wastewaters is of extremely important concern. In our days, waste water remediation is conducted by automatized equipment involving the use of preformat software adapted to each special case. These software applications have different complexity degrees, but all of them have personalized study applications. An important accent is put on the smart networks destined to wastewater remediation. Usually they have a component destined to wastewater monitoring (in real time) giving qualitative and quantitative description, which also involve alarm systems with specific notifications, and function of results systems destined to deliver solutions for wastewater remediation. **Keywords**: chlorides, decontamination, pollution, solutions, solvent.

**Action Programme for the Protection of Waters against Pollution Caused by Nitrates from Agricultural Sources. Author: Vasilena SUCIU, Scientific Coordinator: Associate Professor Tania MIHAIESCU PhD.** Within the European Union various legislative instruments have been promoted for the protection and sustainable management of water sources. Their purpose is to reduce water pollution caused or induced by nitrates from agricultural sources and to prevent any new pollution of this type. The Action Program for the Protection of Waters against Pollution with Nitrates from Agricultural Sources implements the measures provided for, in the Code of Good Agricultural

Practice. It establishes the specific responsibilities of structures under the subordination of the Ministry of Agriculture and Rural Development and the Ministry of Environment and Climate Change.The provisions of the program are mandatory for all farmers managing or holding agricultural holdings, but also for the local public administration authorities of communes, towns and municipalities on the territory of which there are agricultural holdings. Control of compliance with the water protection action program addresses various indicators including compliance with the ban on fertilizer application, crop rotation to limit nitrogen losses to water bodies, manure storage capacity on individual or communal platforms, etc. The monitoring activity of the program is carried out by the Romanian Water Administration through the Water Basin Administrations regarding the state of the water sources and the National Research Development Institute for Pedology, Agrochemistry and Environmental Protection - ICPA Bucharest, with the support of the Office of pedological and agro-chemical studies in agriculture. This paper contains information on the requirements and provisions of the action plan for the protection of waters against pollution from agricultural sources. **Keywords**: fertilization, pedological study, agricultural exploitation, pollution.

**Software Application for Remediating Hydrocarbons Pollution. Author: Vlad UNGUREANU, Scientific Coordinator: Lecturer Cristian MĂLINAȘ PhD.** Through this paper, we aim to highlight the basic structure of the environmental resources remediation systems that are subject to hydrocarbon pollution. Worldwide are developed and implemented software for monitoring hydrocarbon pollution. These systems are usually destined for precise monitoring of water pollution with hydrocarbons in situ, involving movement to target points and making observations in real time. Usually, such systems are equipped with the three main components, as follows: 1. devices destined to identify the location points, which possess the position location identifier, meaning a GPS system, 2. sampling device, which usually is a probe that is sensitive to hydrocarbons occurrence, and 3. a connection of GPS/GPRS type with a central server on a PC using any system of operation (Windows, Unix, Linux), and a large area of dedicated server software. The most performant and specialized software, available to date, allow not only the temporal identification of hydrocarbons pollution, but also their spatial distribution, in the meantime, making possible the design of specific patterns for each hydrocarbon specie identified in polluted site. Based on these data, remediation systems are designed. **Keywords**: GIS, hydrocarbons, monitoring, pollution.

**Software Application for Remediating Oil Pollution. Author: Vlad Florin VILȚ, Scientific Coordinator: Lecturer Cristian MĂLINAȘ PhD.** In the present paper we intend to draw up a review of current world issues related to the remediation of oil-polluted sites. Water quality is one of the most important, if not the most important problems of present times. This happens, on one hand, because the vital importance of water, and, on the other hand, because the problems linked to pollution issues, and continuous need of clean water. In this, respect, the managing water quality, in an efficient way, needs special approaches, as instruments designed for modelling water quality. In last decades, a series of software were developed in order to deliver modelling paths for water quality models (e.g. QUAL2E). All these models may concern one or more water quality indicators (pH, DO, SOD, photosynthesis formulation, bacteria formulation, etc.). Generally speaking, these model consist in a collection of mathematical formulas describing pollutants occurrence and position, used in order to identify not only the concerned pollutants position, but also their transport mechanisms, surface runoff, or long-term water quality (e.g. SPARROW models). These models may also serve to long-term water resources planning (e.g. WEAP model). **Keywords**: oil, pollution, software, strategy.