DEGREBE

Development of Green Skills for Better Employability

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Module 1 Greenhouse gases, adaptability

Adaptability is one of the key qualities in today's world that we all need to learn and work on. The current times bring new challenges and obstacles that have never been there before to this extent, and it is up to us how we deal with them. We have the climate crisis, the economic crisis, the war in Ukraine, rising inflation, the housing crisis, and other stressors on all sides that we must learn to work with and adapt to an ever-changing society. That is why it is important that we pay due attention to adaptability and integrate it into our teaching.

1. Importance of adaptability in the current world

Adaptability is one of the key qualities in today's world that we all need to learn and work on. The current times bring new challenges and obstacles that have never been there before to this extent, and it is up to us how we deal with them. We have the climate crisis, the economic crisis, the war in Ukraine, rising inflation, the housing crisis, and other stressors on all sides that we must learn to work with and adapt to an ever-changing society. That is why it is important that we pay due attention to adaptability and integrate it into our teaching.

Each person must learn a set of skills that benefit the environment and communities in which they live. Adaptation skills are the stepping stones to accessing and using local or remote communities. This means that in an urban environment, in order to go to the cinema, a child will need to learn how to navigate the city or take the bus, read the film schedule and pay for a film. Adaptive skills allow for safer exploration because they provide the learner with a greater awareness of his or her environment and the changes in context that require new adaptive responses to meet the demands and dangers of this new context. Adaptive skills can create more opportunities to engage in meaningful social interactions and to be accepted. Adaptive skills are socially acceptable and desirable at

any age and regardless of gender (with the exception of gender-specific biological differences such as menstrual care skills, etc.).

When you think life couldn't be any more predictable, a situation can happen that throws everything you've been thinking out of the window. A critical life skill everyone must develop in some capacity is adaptability. Whether it's in your personal or professional life, changes are going to introduce themselves, and you can choose to embrace them or resist them. Having the skills to adapt to certain situations can help you move forward and make the right decisions. Adaptability is a mindset, and here are reasons why it's important to develop this mindset.

2. Adaptive and maladaptive behaviour - psychological background and definitions

Adaptive behaviour is a type of behaviour that serves to adapt to another type of behaviour or situation. It is often characterized by the kind of behaviour that allows an individual to change unconstructive or disruptive behaviour into something more constructive. These behaviours are most often social or personal behaviours. For example, a constantly repetitive activity may be reoriented to something that creates or builds something. In other words, the behaviour can be adapted to something else.

Maladaptive behaviour is a type of behaviour that is often used to reduce anxiety, but the result is dysfunctional and unproductive. For example, avoiding situations because of unrealistic fears may initially reduce your anxiety, but in the long run it is unproductive in alleviating the real problem. Adaptivity is often used as an indicator of abnormality or mental dysfunction because its assessment is relatively free of subjectivity. However, many behaviours considered moral may be seemingly maladaptive, such as dissent or abstinence.

Adaptive behaviour includes age-appropriate behaviour that is necessary for people to live independently, function safely and appropriately in everyday life and manage activities of daily living. It includes demonstrated self-care skills, appropriate social skills and self-management of problem behaviours. This term is typically used in the field of rehabilitation and special education for disabled or disturbed populations.

3. Career Adaptability

Career adaptability means the psychosocial resources to cope with changing work and working conditions. It involves the ability to adapt to changing tasks, engage in continued self-learning, and regulate one's career direction. Career adaptability is also needed to respond to the changing demands from employers who are increasingly seeking an adaptable workforce. A prominent conceptualization of career adaptability characterizes it as psychosocial strengths or capacities for solving unfamiliar, complex, and ill-defined problems presented by developmental vocational tasks, occupational transitions, and work traumas. Taken together, identity and adaptability tell the person when and how to change in a fast-moving world of work.

Recent labor market developments – such as globalization, rapid technological advancements, and the increasing use of outsourcing, part-time and temporary employees – have significantly altered the work context, creating changes in how individuals manage their career. Furthermore, these changes also have a fundamental effect on students' career development. The transition from higher education to work has always been a stressful period for young adults, with students suffering from stress brought along by such factors as examinations, study tasks, leaving home, and financial pressures. Yet, today's labor market also requires students to already start planning and managing their long-term careers during their studies. For example, over and above good performance throughout their curriculum, students need to develop work readiness and employability skills, explore possible career paths, form more specific vocational goals and plans, and act to implement those goals. Taken together, it is clear that young adults have to start proactively managing their careers already during their studies if they are to make a successful transition into the labor market. In order to achieve this, they need

certain resources and competencies that help them to successfully manage their (study) career and to stimulate their well-being and performance.

4. Adaptability mindset

When you think life couldn't be any more predictable, a situation can happen that throws everything you've been thinking out of the window. A critical life skill everyone must develop in some capacity is adaptability. Whether it's in your personal or professional life, changes are going to introduce themselves, and you can choose to embrace them or resist them. Having the skills to adapt to certain situations can help you move forward and make the right decisions. Adaptability is a mindset, and here are reasons why it's important to develop this mindset.

4.1. Embrace Changes in Your Life

Change is inevitable in your life. You will have control over some of the changes, but many of them will occur unexpectedly. Things like losing your job or experiencing a physical disability are some of the negative changes people have to adapt to immediately. But other positive changes in your life could happen as well, like the birth of a child. Being stuck in how you've always done things in life will limit your ability to adapt and be happy with the new changes. Instead of resisting them, practice embracing them slowly until you get to the point where you realize the changes aren't as bad as you initially thought.

4.2. Remove Yourself from Dangerous Situations

When you focus on adapting to situations and the environment around you, you'll be able to identify scenarios in which you need to act appropriately and think clearly. A good example is if you're driving down the highway and your car stalls and breaks down. If you're thinking clearly, you'll pull over to the side of the road and safely call for assistance. But if you don't have the skills to adapt to this situation, you could be put in a dangerous spot with traffic still moving around you. The ability to recognize this and react appropriately could save your life and the lives of others.

4.3. Adaptability Allows You to Control Your Emotions

It's easy to get emotional when things don't go your way or how you expected them to. But when you practice adaptability, your mind will immediately go into the mode of finding solutions to adapt to the situation. It's human nature to be negative about change without thinking rationally about what happened. Most of the time, when you're able to control your emotions and think positively when things don't go your way, you'll come up with a reasonable solution and can move on with life much easier.

Being able to adapt to situations around you is important for many reasons. One of the hardest things to adapt to is experiencing a sudden physical disability. While it can feel devastating at first, when you have the right mindset, you can be stronger and persevere and come up with solutions to help.

5. Adaptability skills

Adaptability can include a variety of skills that help you adapt to change. Some examples of these important soft skills include:

- Communication skills
- Interpersonal skills
- Problem-solving skills
- Creative and strategic thinking skills
- Teamwork skills
- Organizational skills

Communication skills

Being able to ask for clarification during transitions or seek out additional information or resources for a new and unfamiliar project can show your team leaders how motivated you are to learn and ask for help when you need it.

Active listening and other forms of communication like nonverbal communication are also equally important aspects of adaptability. Active listening shows you are attentive and ready to take a new direction, and developing your nonverbal communication skills can help you navigate changes in team relationships or dynamics in the workplace.

Interpersonal skills

Similar to effectively communicating with others, having excellent interpersonal skills can also play a key role in your overall adaptability. Being able to interact with others in healthy and positive ways can help you avoid miscommunication and conflict during operational shifts.

Problem-solving skills

You might use your problem-solving skills to find creative solutions to challenging topics at work. Moreover, being able to observe and analyse how you might approach solving a new problem can show your managers your willingness to make adjustments or improvements to the way you approach solving problems.

Creative and strategic thinking skills

Adaptability can also require creative thinking and the ability to think strategically. For instance, developing new ideas to market products, finding ways to adapt to a changing market and implementing methods to improve and develop new strategies can all showcase your overall adaptability skills.

Teamwork skills

Teamwork skills can be essential to being able to adapt to different personalities and working dynamics. Your colleagues can be a combination of different skills, backgrounds and experiences. Being able to work on a diverse team of people and deal with conflict, differing ideas and other dynamics that can occur can positively benefit how adaptive you are in a team environment.

Organizational skills

Organizational skills can include several different aspects that can make this skill necessary to develop your adaptability skills. When you maintain an organized work area, including paperwork, digital files and other aspects of your job, you can be better prepared if operational changes happen at work.

More adaptability skills

Here are additional important adaptability skills that can help you become flexible and ready for changes in your professional life:

- Collaborative
- Curious
- Determined
- Empathetic
- Innovative
- Observant
- Open-minded
- Resilient

5.1. Important Workplace Adaptability Skills

Being able to adapt to changing environments and work processes makes you a competitive job candidate and a strong overall professional. Having adaptability skills means you are open and willing to learn new things and take on new challenges. Additionally, developing your adaptability can also mean developing other soft skills like communication and interpersonal skills.

What does adaptability mean?

Adaptability means the ability to be flexible and adjust to changing factors, conditions or environments. Being adaptable is a highly valued skill in nearly every workplace.

What are adaptability skills?

Adaptability skills are qualities that allow you to adjust to changes in your environment. Being adaptable at work means you can respond quickly to changing ideas, responsibilities, expectations, trends, strategies and other processes. Being adaptable also means possessing soft skills like interpersonal, communication, creative thinking and problem-solving skills.

Being adaptable can be important when working on projects, developing strategies and implementing different approaches to meeting goals. By showing adaptability skills, you reveal how motivated you are to try new things and learn new skills.

5.2. How to improve adaptability skills

Being adaptable and open to change may not always be easy, however, you might consider the following steps to help you develop and improve your adaptability skills:

1. Be aware of changes in your environment

One key method that can help you develop your adaptability skills is to be aware of changes in your work environment. For instance, you might observe the finance team's new budget and stay updated on current allowances if your team's responsibilities involve the use of company funds. You might also remain aware of policies, procedures and other operational processes to stay abreast of changes to various company practices.

2. Develop a growth mindset

Being adaptable also means being willing to learn and try new things. Developing a growth mindset can positively influence your ability to take on new challenges, find new opportunities to develop your knowledge and contribute to new projects. Your willingness and motivation to keep improving upon your skills can also show your employer your commitment to your professional growth.

3. Set goals for yourself

Another method that can help you develop your adaptability skills might be to set goals for yourself. For instance, if you feel you might be weaker in your nonverbal communication or you tend to procrastinate when expected to complete challenging tasks, you might set a goal to work on each aspect of your skills so you can improve your overall ability to adapt to changes in the workplace.

4. Ask for feedback

As you develop throughout your career, you might think about requesting feedback or constructive criticism from your managers to help you improve on your weaker skills. Positive and constructive feedback can be beneficial for setting goals and achieving success in your career.

5. Learn to acknowledge and accept change

Learning to acknowledge changes in your career can help you prepare yourself and adapt to differing circumstances. Additionally, learning how to be willing to accept change can

be an effective step toward recognizing when you need to make adjustments to make transitions smoother for yourself.

5.3. Adaptability skills in the workplace

Here are some additional tips to help you apply your adaptability skills in the workplace:

- If there are changes to processes, procedures or operational practices, you can ask for clarification from teammates and managers to help you better plan for transitions.
- You might request opportunities to work on tasks that may be new to you or offer to take on responsibilities that require creative approaches.
- If sharing your ideas with your colleagues is something that makes you anxious, you could set a goal to contribute to team meetings and collaborations.
- Try getting all aspects of your work organized, such as documents, required paperwork, projects and other work information, so you're prepared in case there are transitions within your job.

How to highlight adaptability skills

Being adaptable can require a variety of combined skill sets. The following information illustrates how you might showcase these skills on your resume, in your cover letter and during an interview.

Adaptability skills on a resume

You might consider the required job skills and compare them with your developed skill sets. You can then highlight these skills on your resume by providing examples of how you were successful because of your skills. Some skills you could include might be your communication, teamwork or leadership skills.

Adaptability skills in a cover letter

Consider describing your accomplishments that can be directly contributed to your adaptability skills. Maybe you successfully solved a technical problem on a software development project, or perhaps you found a creative solution to a customer's problem.

However, your adaptability skills have helped you achieve goals, consider mentioning it in your cover letter.

Adaptability skills in an interview

You can highlight your adaptability skills by providing the interviewer with examples of how you have applied your skills in past roles. For instance, maybe you relied on your strategic thinking skills in a past role to find new marketing strategies that would position your company ahead of its competition. You can use your past experiences and achievements to help you answer the interviewer's questions in a way that shows how adaptable you are.

6. Challenges for European agriculture

Agriculture provides food, services and resources and guarantees the livelihood of millions of people worldwide. In the EU alone, 22 million people are directly employed (part-time included) in the farming sector — up to 44 million people rely on the wider food sector (farming, food processing and retail/services). Agriculture is one of the most climate-dependent socio-economic sectors, since most of the agriculture productivity and quality are directly dependent on different climatic factors. Climate change is already affecting agriculture, with effects unevenly distributed across the various regions of the world and within Europe.

6.1. Summary of main climate change impacts on agriculture in Europe

Growing season and crop phenology

• An increase in the duration of the thermal growing season has led to a northward expansion of the areas suitable for several crops.

• Changes in crop phenology have been observed, such as the advancement of flowering and harvest dates in cereals.

Water demand

• Expected increases in temperature will lead to increased evapotranspiration rates, thereby increasing crop water requirements across Europe, which are expected to be most acute in southern Europe.

Crop productivity

• Climate change is projected to improve the suitability for growing crops in northern Europe and to reduce crop productivity in large parts of southern Europe.

• Increases in crop productivity are expected in northern Europe, as a result of a lengthening of the growing season and a decrease in the effects of cold on growth.

• Decreases in crop productivity are expected in southern Europe, caused by faster crop development rates with subsequent negative effects, especially on grain filling.

• Extreme weather and climate events (including droughts and heat waves) can greatly reduce the yield of some crops. The projected increase in the occurrence of such events is expected to increase the risk of crop losses, with consequent increases on food prices and reduction of food security.

• Climate change is likely to extend the seasonal activity of pests and diseases and the risks associated with these effects.

Livestock systems

• Higher temperatures and the increasing risk of drought are expected to reduce livestock production through negative impacts on grassland productivity and animal health and welfare.

• The increased growing season for crops and grasslands may boost livestock system production in northern Europe, but across Europe changes in the distribution of pathogens and pathogen vectors present challenges. In addition, intestinal parasites and insect annoyance may affect animal production negatively.

• The projected increase in rainfall in northern Europe may pose challenges for grazing livestock and harvesting grass, owing to the accessibility of land and the declining soil fertility through soil compaction.

6.2. Adaptation to climate changes

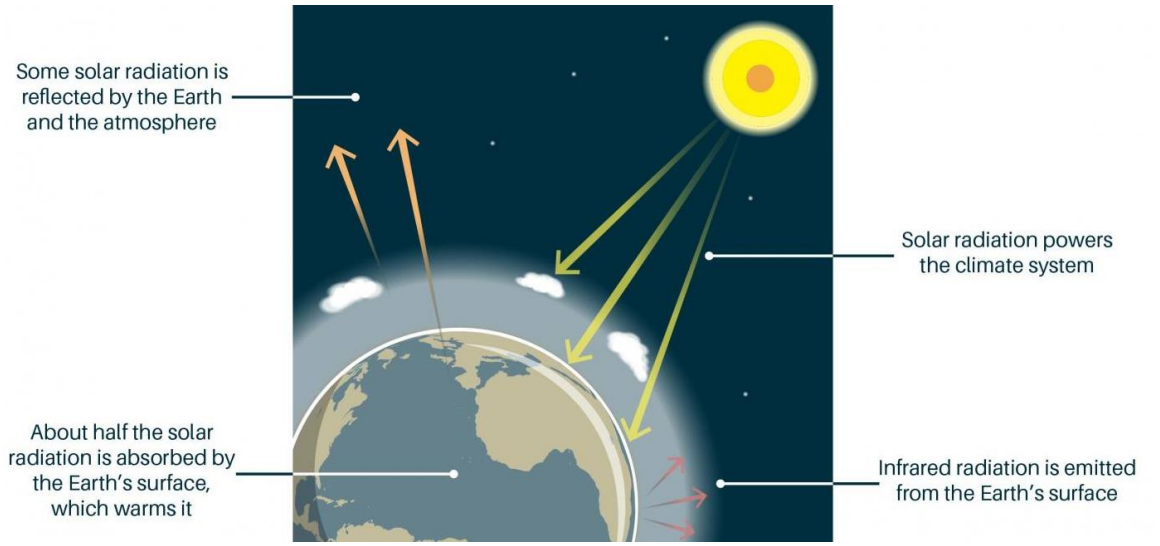
Adaptation to climate change is widely recognised as a fundamental response to climate change for society for the next few decades. Adaptation is especially important for sectors such as agriculture, as it has important socio-economic implications for society and food security. This is reinforced by the Paris Agreement, which underlines the fact that adaptation measures need to be implemented in synergy with mitigation action, and it is emphasised that food production systems need to be less vulnerable to the adverse impacts of climate change. Therefore, the implications of the Paris Agreement for food and agriculture are significant.

Current intensive agricultural production and food systems are unsustainable from a natural resource perspective and can cause land degradation, nutrient losses and loss of biodiversity, contribute to decreased water quality and water scarcity, and ultimately contribute to emissions of greenhouse gases (GHGs) and air pollutants, which in turn contribute to climate change.

6.3. Greenhouse effect

'Greenhouse gases' are crucial to keeping our planet at a suitable temperature for life. Without the natural greenhouse effect, the heat emitted by the Earth would simply pass outwards from the Earth's surface into space and the Earth would have an average temperature of about -20°C.

The greenhouse effect: some of the infrared radiation from the Sun passes through the atmosphere, but most is absorbed and re-emitted in all directions by greenhouse gas molecules and clouds. The effect of this is to warm the Earth's surface and the lower atmosphere.



A greenhouse gas is called that because it absorbs infrared radiation in the form of heat, which is circulated in the atmosphere and eventually lost to space. The CO2 released from the burning of fossil fuels is accumulating as an insulating blanket around the Earth, trapping more of the Sun's heat in our atmosphere. Actions carried out by humans are called anthropogenic actions; the anthropogenic release of CO2 contributes to the current enhanced greenhouse effect.

- water vapour (H2O)
- carbon dioxide (CO2)
- nitrous oxide(N2O)
- methane (CH4)
- ozone (O3)

Climate change is one of the most complex issues facing us today. It involves many dimensions – science, economics, society, politics, and moral and ethical questions – and is a global problem, felt on local scales, that will be around for thousands of years. Carbon dioxide, the heat-trapping greenhouse gas that is the primary driver of recent global warming, lingers in the atmosphere for many thousands of years, and the planet (especially the ocean) takes a while to respond to warming. So even if we stopped emitting all greenhouse gases today, global warming and climate change would continue to affect future generations. In this way, humanity is "committed" to some level of climate change.

Because we are already committed to some level of climate change, responding to climate change involves a two-pronged approach:

- Reducing emissions of and stabilizing the levels of heat-trapping greenhouse gases in the atmosphere (“mitigation”);
- Adapting to the climate change already in the pipeline (“adaptation”).

Mitigation and Adaptation

The mitigation piece of the puzzle is easy to explain, but difficult to accomplish. We must transition from powering our world with fossil fuels to using clean, renewable energy. And we need to stop deforestation and restore our natural habitats until we reach net-zero carbon emissions—meaning that the release of greenhouse gases into the atmosphere is balanced with the capture and storage of those gases in places like tree roots.

The goal of mitigation is to avoid significant human interference with Earth's climate, “stabilize greenhouse gas levels in a timeframe sufficient to allow ecosystems to adapt naturally to climate change, ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner” (from the 2014 report on Mitigation of Climate Change from the United Nations Intergovernmental Panel on Climate Change, page 4).

How You Can Help Reduce Greenhouse Gas Emissions at Home

- Get a home energy audit

Take advantage of the free home energy audits offered by many utilities. Then put the recommendations into practice. Simple measures, such as installing a programmable thermostat to replace your old dial unit or sealing and insulating heating and cooling ducts, can each reduce a typical family's carbon dioxide emissions by about 5 percent. Replacing single-paned windows with dual-paned windows and installing insulated doors will also greatly reduce heat loss from your home.

- Use Renewable energy

More than half the electricity in the United States comes from polluting coal-fired power plants. And power plants are the single largest source of heat-trapping gas. Fortunately, the use of alternative energy sources, such as solar, wind, geothermal, and hydro energy, is gaining increased support worldwide. The wind energy produced in Denmark, for example, provides about 10 percent of the country's total energy needs. These methods of energy production emit no greenhouse gases once they are up and running.

- Purchase Solar Panels

With the federal and state governments offering residential renewable energy incentives, solar energy is more accessible than ever before, not to mention an excellent long-term investment.

- Buy Green Tags

If your energy company doesn't offer green power, you can offset your carbon dioxide emissions by purchasing "green tags," or compensatory energy credits that add renewable power to the grid equal to the power you use. Numerous green tag programs exist and can be readily found on the internet.

- Purchase Carbon offsets

The principle of carbon offset is fairly simple: you decide that you don't want to be responsible for accelerating climate change, and you've already made efforts to reduce your carbon dioxide emissions, so you decide to pay someone else to further reduce your net emissions by planting trees or by taking up low-carbon technologies. Every unit of carbon that is absorbed by trees—or not emitted due to your funding of renewable energy deployment—offsets the emissions from your fossil fuel use. In many cases, funding of renewable energy, energy efficiency, or tree planting—particularly in developing nations—can be a relatively cheap way of making an individual "carbon neutral".

- Adjust your thermostat

Turning your thermostat down 3 degrees Fahrenheit in the winter and up 3 degrees Fahrenheit in the summer will reduce carbon dioxide emissions by about 1,050 pounds per year. By using a programmable thermostat, you can automatically lower your monthly energy bill by giving your heat and air conditioning a break while you are asleep or out, in addition to reducing carbon dioxide emissions another 1,050 pounds per year.

- Install solar lights

From outside, solar lights look like small skylights on the roof. Inside the house, they magnify the sun, delivering strong, natural light, with no power needed. While they are most useful to interior rooms with no windows, they could also be used to illuminate darker corners of rooms with windows.

- Use energy-saving light bulbs

If every household in the United States replaced one regular light bulb with an energy-saving model, we could reduce global warming pollution by more than 90 billion pounds over the life of the bulbs; the same as taking 6.3 million cars off the road. So, replace your incandescent bulbs with more efficient LEDs, which now come in all shapes and sizes. CFLs use a quarter of the energy incandescent lights use and last 20 times as long. Not only will you be reducing greenhouse gas emissions, but you will save money on your electric bills and light bulbs as well.

- Electronics

Reduce your use of energy reliant products, especially heavy consumers such as televisions and computers. Turn off computers when not in use. Many people may remember being told that turning a computer on and off several times a day reduced the computer's life span. With new computers, this is no longer true, particularly given that computers are rarely used for longer than a few years before being replaced. If you are going to be away from a newer computer for more than ten minutes, go ahead and turn it off. Reduce the amount of time spent aimlessly surfing the web. Reduce the amount of time you watch television and read a book. Many electronics continue to use electricity

even if they are turned off. By connecting electronics to power strips or surge protectors and turning these off when not in use, you can greatly reduce energy consumption.

- Install tankless water heaters

Tankless water heaters fit on walls under sinks and warm only as much water as is needed, so there is little energy wasted. A tankless heater costs $800 more than a regular heater, but reduces electric bills about $20 each month.

Adaptation – adapting to life in a changing climate – involves adjusting to actual or expected future climate. The goal is to reduce our risks from the harmful effects of climate change (like sea-level rise, more intense extreme weather events, or food insecurity). It also includes making the most of any potential beneficial opportunities associated with climate change (for example, longer growing seasons or increased yields in some regions).

Adaptation solutions vary from place to place, are difficult to predict, and involve many trade-offs. The first step to adapting to climate change is understanding local risks and developing plans to manage them. The next step is taking action—putting systems in place to respond to impacts we are experiencing today as we prepare for an uncertain tomorrow. These actions can include diversifying crops that can tolerate warmer and drier or wetter conditions; ensuring infrastructure can withstand more extreme weather; helping communities reduce their risk from sea level rise and increased floods; and making sure we manage our food, water, and other natural resources wisely in the context of a changing climate.

6.4. Policies on adaptation to climate change in agriculture

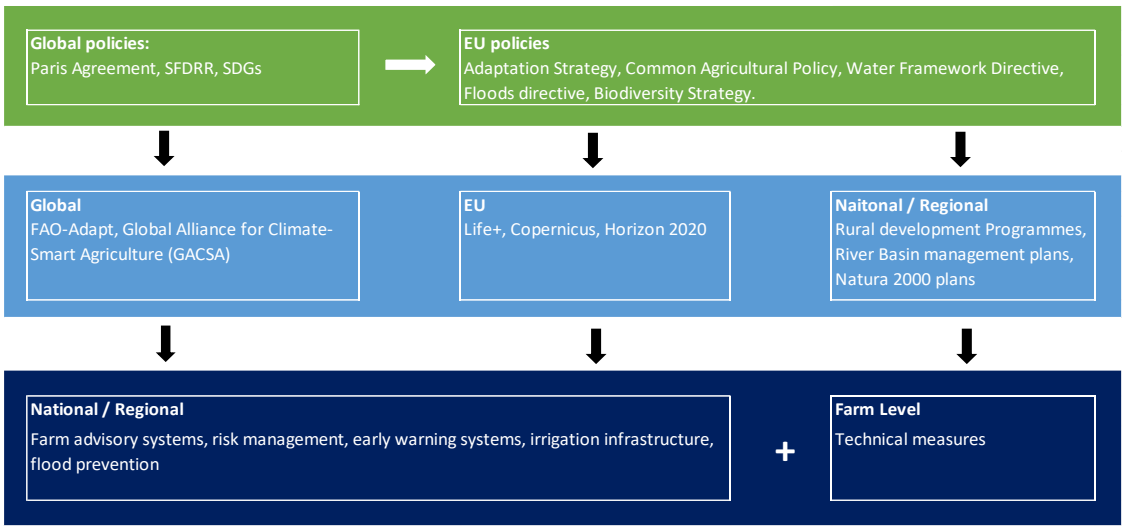
Climate change in Europe is expected to increase precipitation in some regions, leading to high risks of flooding and storm impacts on crops, and decrease it in others, leading to an increase in droughts. Increased temperatures might lead to longer growing seasons in northern regions, while further exacerbating water availability and drought events in other regions. Crop yields are therefore expected to increasingly vary from year to year as a result of extreme weather events and other factors, such as pests and diseases, thus increasing the sector's vulnerability to further climate impacts without adaptation. At the

same time, management practices in EU agriculture can lead to negative impacts on soil (through compaction and erosion), water (pollution and extraction), biodiversity (loss of habitat), air quality (through ammonia emissions) and climate (through greenhouse gas emissions). A range of policies at international and EU levels aim to address the sector's needs and to minimise its impacts. At the national level, Member States have developed national adaptation strategies or action plans and sectoral plans to not only implement these international and EU policies at the national level but also address national specific circumstances. These policies also offer opportunities to increase the sector's resilience to climate change impacts by supporting adaptation.

6.5. Responses to climate change: increasing the adaptive capacity of the agriculture sector

A range of programmes at global and EU levels offer opportunities to finance adaptation measures. The common agricultural policy provides a financial framework for financing adaptation at regional and farm levels. There are a number of adaptation measures available at various spatial scales for adapting crop, livestock, viniculture and horticulture production to climate change, with various benefits for mitigation, soil quality and biodiversity. Many adaptation measures at the farm level are largely extensions of existing climate risk management or measure to enhance production in response to a potential change in the climate risk profile. In the future, the need for risk management tools will probably increase because of the greater frequency and magnitude of extreme events. An opportunity to streamline climate change adaptation in the farming sector is presented through the farm advisory system. Such systems are mandatory under the common agricultural policy, and whether to include adaptation information as mandatory content should be considered.

Interaction between policies, programmes and measures at various geographical scales and governance levels



6.6. Adaptation measures

In agriculture, adaptation measures occur on a variety of spatial scales, including at national, regional and farm levels. At the same time, responsibility can be differentiated among the various stakeholders that undertake or facilitate adaptations in agriculture, including individual farmers, private industries and governments. Adaptation measures in the agriculture sector can be implemented at the national/regional level through, for example, early warning systems and risk management schemes that require collective action and can be implemented at farm level — usually technical measures — to address specific issues. Here is a brief overview of a selection of measures (non-exhaustive) at national, regional and farm levels that can be implemented to adapt the sector to various climate change pressures.

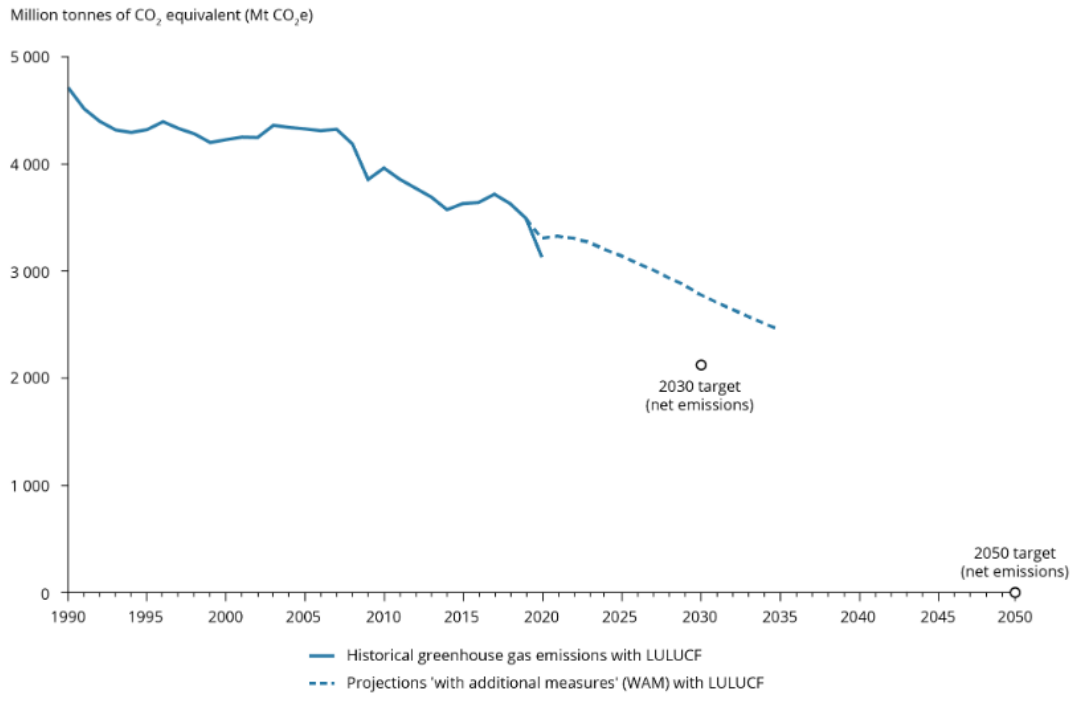
National / Regional level	• Integrating adaptation into farm advice • Risk management insurance against weather and climeate • Improving efficiency of irrigation infrastructure • Flood management and prevention

Farm level:		
· Arable cropping	• Ecosystem compatible drainage	• Crop diversification and rotation
· Livestock farming	• Improve irrigation efficiency	• Breeding livestock for greater tolerance and productivity
· Viniculture	• Precision farming	• Improve pastrue and grazing management
· Horticulture	• HNV or organic farming	• Improve animal rearing conditions
	• Modification of crop calendars	• Prevention of climate change induced diseases for livestock
	• Cover crops	• Modifying fertiliyation and spraying applications
	• Use of adapted crops	• Installation of greenhouses
	• Field margins	• Protection and monitoring equipment
	• No tillage or minimum tillage	• Farm activitz diversification

The European Union has made good progress in reducing its greenhouse gas emissions thanks to many factors, including the implementation of EU and national policies and measures, an increase in the use of renewables, a switch from coal to gas for power generation, improvements in energy efficiency and structural changes in the EU economies. GHG emissions in the EU-27 have declined rapidly in recent years, having reached 24 % below 1990 levels.

Greenhouse gas emissions targets, trends and projections in the EU, 1990-2050

Million tonnes of CO2 equivalent (Mt CO_2e)



Source: EEA, Trends and Projections in Europe 2021, European Environment Agency.

Key findings from the latest analysis of greenhouse house gas emission trends:

- Greenhouse gas emissions have decreased by about one third since 1990 in the EU27. This is mainly thanks to the implementation of EU and national policies and measures, an increase in the use of renewables, a switch from coal to gas for power generation, improvements in energy efficiency and structural changes in the EU economies.
- The EU has a set target for 2030 of a 55 % net reduction in greenhouse gas emissions.
- Emissions have decreased in almost all sectors, particularly in energy supply, industry and the residential sector. However, emissions from transport have not fallen rapidly enough, despite climate policies and efforts to improve vehicle efficiency. Emissions from agriculture have also increased in recent years.
- Despite the good progress in reducing greenhouse gas emissions, substantial efforts across all the sectors of the economy will be needed to achieve a climate neutral economy by 2050 in the EU.

7. Case studies – adaptation choices, income insurances for farmers, innovative farming

7.1. Wine production and quality in Spain: exploring adaptation choices

A study conducted in Spain analysed the main reasons for concern for diverse areas of the country due to climate change and explored the adaptation choices for grapevine cultivation. The territory was divided into four major agro-climatic zones, and the analysis showed that northern regions are mainly affected by late spring frost, while southern regions mainly suffer extreme heat in summer. Recurring drought episodes also occur in most of the territory. Significant impacts on wine production and quality are then expected mainly in southern Spain, owing to increased levels of heat and more severe water stress conditions. Adaptation efforts are needed to reduce negative impacts, but a different level of adaptation is required across Spain. Less adaptation effort is required in the northern regions, while more effort to maintain stability in wine production and

quality is needed in the southern regions, especially in the Castilla-La Mancha and Andalusia regions. In these regions, irrigation might become mandatory, as might the need to introduce varieties suited to a warmer climate. However, opportunities may arise as a result of an expansion of viticulture in the northern region, thanks to a decrease in frost damage, with resulting improvements in wine quality, as these regions will be more suitable for the cultivation of new premium wines varieties as a result of an overall increase in temperature.

7.2. Agricultural insurance, Austria

The indemnity-based yield insurance in Austria includes an option for index-based products against certain conditions, such as a reduction in rainfall, rather than actual yield loss. Index-based insurance pays compensation if, for example, rainfall deviates from a pre-specified level. Farmers can voluntarily insure crops against a list of risks by means of an indemnity-based yield insurance known as AGRAR Universal. Policy holders are obliged to insure the entire production for each insured crop. Drought insurance is available for all cereal crops (including maize), potatoes, pumpkins for seed oil production, soybeans, sunflowers and peas. Grassland, sugar beet, vineyards and fruit crops cannot currently be insured against drought.

The insurance covers damages if both of the following conditions are fulfilled:

1. The precipitation during the vegetation period is less than 90 % of the average precipitation during the last 10 years, or the precipitation on 30 consecutive days is less than 10 mm.

2. Yields per hectare are below the defined threshold value.

Premium subsidies for agricultural insurance are financed by a disaster fund (Katastrophenfonds). Compensation payments from the fund are matched by provincial governments, as is reflected in the law on subsidies for hail insurance. In response to the 2013 and 2015 droughts, and the extensive frost damage in spring of 2016, the Austrian government amended the law again, requiring that the existing subsidies for hail and frost insurance be extended to additional weather extremes such as drought, excessive rainfall and storm.

7.3. Flood meadows in the Marais Poitevin, France

Located in the regions Pays de la Loire and Poitou-Charentes, the Marais Poitevin is the second largest wetland in France. About 2 000 ha of flood meadows are owned by local municipalities and commonly managed by local farmers. The meadows are used to retain water during flood events, and water is stored there throughout the winter. To combat the trend of farmers abandoning these meadows, management agreements between municipalities, the Parc Interrégional du Marais Poitevin and environmental non-governmental organisations, as well as agreements between municipalities and farmers, have been signed to ensure that the meadows are used for extensive grazing. Farmers receive financing through the CAP to use the meadows extensively.

7.4. Reducing tillage in Sweden

The goal of Solmacc, an EU LIFE funded project coordinated by the International Federation of Organic Agricultural Movements EU group, is to test and share strategies for organic and low-input farming to mitigate and adapt to climate change. The project is scientifically monitoring 12 demonstration farms in Sweden, Germany and Italy. The farmers adjust their agricultural techniques over the course of 5 years, introducing new practices but adapting them to the particular climatic area and farm conditions. Since 2014, the project has been keeping them under close supervision and has maintained a constant exchange between the farmers and their advisors.

The farmers are all implementing four innovative, climate-friendly practices, each from four different categories on their farms:

(1) optimised on-farm nutrient recycling;

(2) optimised crop rotations,

(3) optimised tillage system; and

(4) agroforestry.

Reduced tillage practices on an organic farm have been shown to reduce costs while maintaining similar yields. On a medium heavy clay soil, farmers have eliminated

ploughing in the autumn, sowing cover crops in the winter and sowing directly into the soil in the spring.

7.5. Adaptation strategy for vineyards in Pulkautal, Austria

The pilot programme 'Climate change adaptation model regions for Austria — KLAR!' is funded by the Climate and Energy Fund and offers a process-oriented approach for regions and municipalities to raise awareness of climate change adaptation and to trigger concrete actions. As part of the pilot project in the Pulkautal region, the following agriculture-related measures are being implemented:

- guided tours of vineyards, focusing on providing information on the impact of climate change on the production of wine in the region; guides are trained on the topic, including the types of measures needed to adapt to climate impacts;
- wine tasting with experts, focusing on existing grape varieties as well as potential new varieties that could grow as a result of the expected climate changes in the region by 2050;
- training of farmers by the university on farm-level adaptation options for viniculture, focusing on soil protection, irrigation, pest control, planting periods and fertilisation, and developing new approaches to tackle impacts;
- a 'show vineyard' planted with existing grape varieties and potential new varieties;
- multi-purpose use of the water retention ponds (for flooding) to combat increasing drought periods;
- rainwater harvesting;
- information days for school children.

8. Conclusion

Adaptability is an essential skill not only for a successful personal life, but also for the prosperity of businesses, individual industries and entire national economies. This module focused mainly on the personal level and then on the situation in European

agriculture, where we highlighted the biggest threats and how they can be addressed. Case studies show selected projects operating in certain member countries that offer ways of coping with the emerging climate crisis.

9. Resources used

Jonathan Brooks J., Deconinck K., Giner C. (2019) Three key challenges facing agriculture and how to start solving them. *OECD Home, Agriculture and Fisheries* [online], available from: https://www.oecd.org/agriculture/key-challenges-agriculture-how-solve/ [Accessed 25 Nov. 2022].

The World Bank. (2021). *Five Key Issues in Agriculture in 2021.* [online], available from: https://www.worldbank.org/en/news/feature/2021/12/16/5-key-issues-in-agriculture-in-2021 [Accessed 10 Nov. 2022].

European Environmental Agency. (2020). Climate change threatens future of farming in Europe. [online], available from:

https://www.eea.europa.eu/highlights/climate-change-threatens-future-of [Accessed 1Dec. 2022].

European Environment Agency. (2019). Climate change adaptation in the agriculture sector in Europe. [online], available from:

https://www.eea.europa.eu/publications/cc-adaptation-agriculture/at_download/file

https://www.nextdayaccess.com/adaptability-is-key-in-all-life-situations/

https://justinthomasmiller.com/power-adaptability-adapt-anything-life-throws/

https://www.eea.europa.eu/publications/cc-adaptation-agriculture

https://www.frontiersin.org/articles/10.3389/fpsyg.2018.01678/full

https://www.indeed.com/career-advice/career-development/adaptability-skills

https://munispace.muni.cz/library/catalog/view/1855/5008/2674-1/0#preview

https://www.pulsus.com/scholarly-articles/challenges-for-future-agriculture-9341.html

https://www.sciencedirect.com/topics/psychology/career-adaptability

https://munispace.muni.cz/library/catalog/book/1855

https://dbterapie.cz/encyklopedie/adaptivni-chovani/

https://www.linkedin.com/pulse/why-its-more-important-than-ever-focus-adaptability-skills-roslansky

https://esoftskills.com/10-soft-skills-you-need-adaptability-and-flexibility-7/

https://learning.shine.com/talenteconomy/career-help/adaptability-skills/

https://ajgalvez.com/personal-en/adaptability-changing-environment/

https://www.bgs.ac.uk/discovering-geology/climate-change/how-does-the-greenhouse-effect-work/

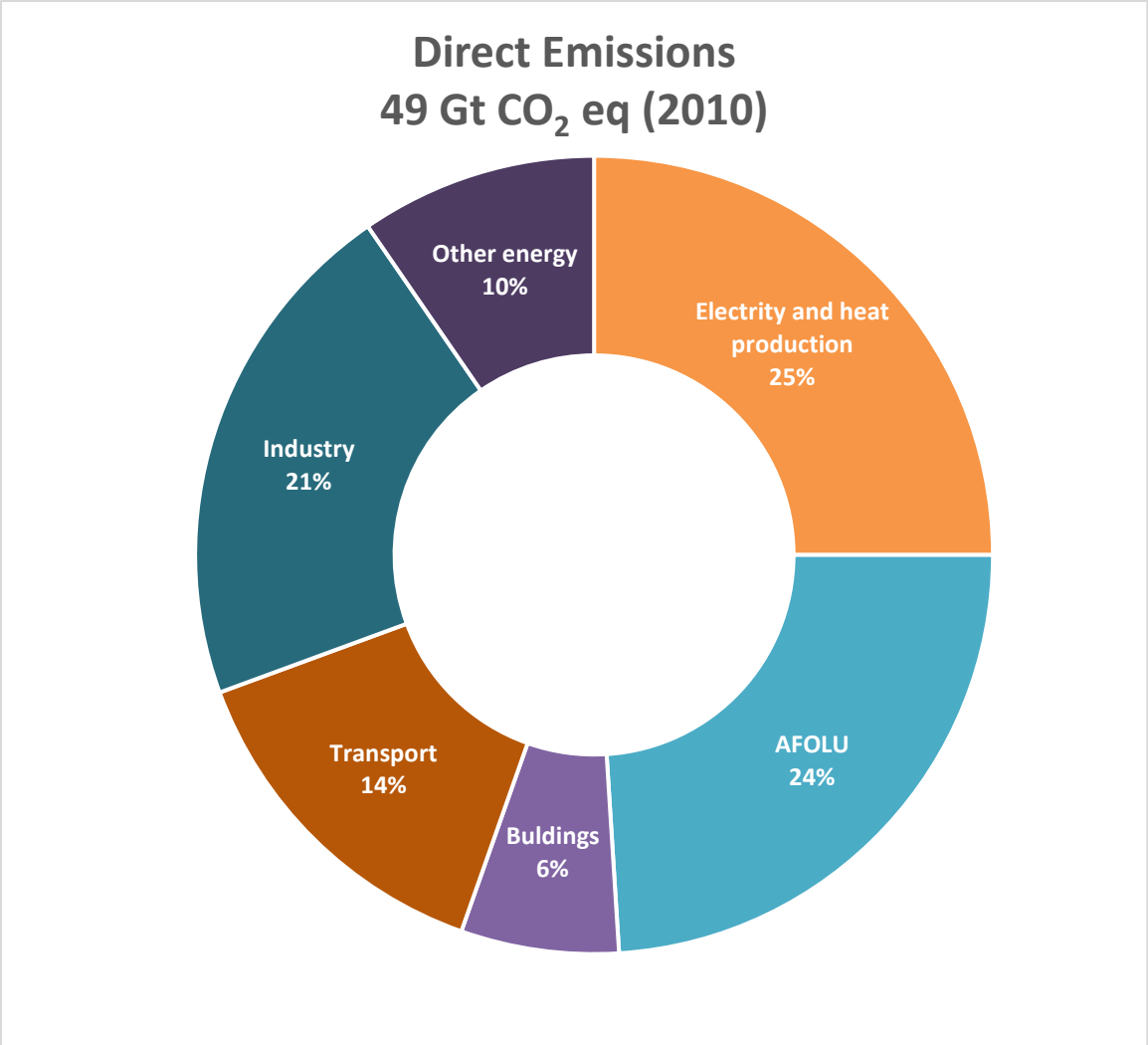
https://www.nps.gov/pore/learn/nature/climatechange_action_home.htm

https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_summary-for-policymakers.pdf

https://climate.nasa.gov/solutions/adaptation-mitigation/

https://www.eea.europa.eu/themes/climate/eu-greenhouse-gas-inventory

Greenhouse Gas Emissions by Economical Sectors



Which gases cause the greenhouse effect?

The contribution that a greenhouse gas makes to the greenhouse effect depends on how much heat it absorbs, how much it re-radiates and how much of it is in the atmosphere.

In descending order, the gases that contribute most to the Earth's greenhouse effect are:

Adaptability is one of the key qualities in today's world that we all need to learn and work on. The current times bring new challenges and obstacles that have never been there before to this extent, and it is up to us how we deal with them. We have the climate crisis, the economic crisis, the war in Ukraine, rising inflation, the housing crisis, and other stressors on all sides that we must learn to work with and adapt to an ever-

changing society. That is why it is important that we pay due attention to adaptability and integrate it into our teaching.

10. Importance of adaptability in the current world

Adaptability is one of the key qualities in today's world that we all need to learn and work on. The current times bring new challenges and obstacles that have never been there before to this extent, and it is up to us how we deal with them. We have the climate crisis, the economic crisis, the war in Ukraine, rising inflation, the housing crisis, and other stressors on all sides

5.1. that we must learn to work with

and adapt to an ever-changing society. That is why it is important that we pay due attention to adaptability and integrate it into our teaching. Each person must learn a set of skills that benefit the environment and communities in which they live. Adaptation skills are the stepping stones to accessing and using local or remote communities. This means that in an urban environment,

5.2. in order to go to the cinema,

a child will need to learn how to navigate the city or take the bus, read the film schedule and pay for a film. Adaptive skills allow for safer exploration because they provide the learner with a greater awareness of his or her environment and the changes in context that require new adaptive responses to meet the demands and dangers of this new context. Adaptive skills can create more opportunities to engage in meaningful social interactions and to be accepted. Adaptive skills are socially acceptable and desirable at any age and regardless of gender (with the exception of gender-specific biological differences such as menstrual care skills, etc.). When you think life couldn't be any more predictable, a situation can happen that throws everything you've been thinking out the window. A critical life skill everyone must develop in some capacity is adaptability. Whether it's in your personal or professional

life, changes are going to introduce themselves, and you can choose to embrace them or resist them. Having the skills to adapt to certain situations can help you move forward and make the right decisions. Adaptability is a mindset, and here are reasons why it's important to develop this mindset.

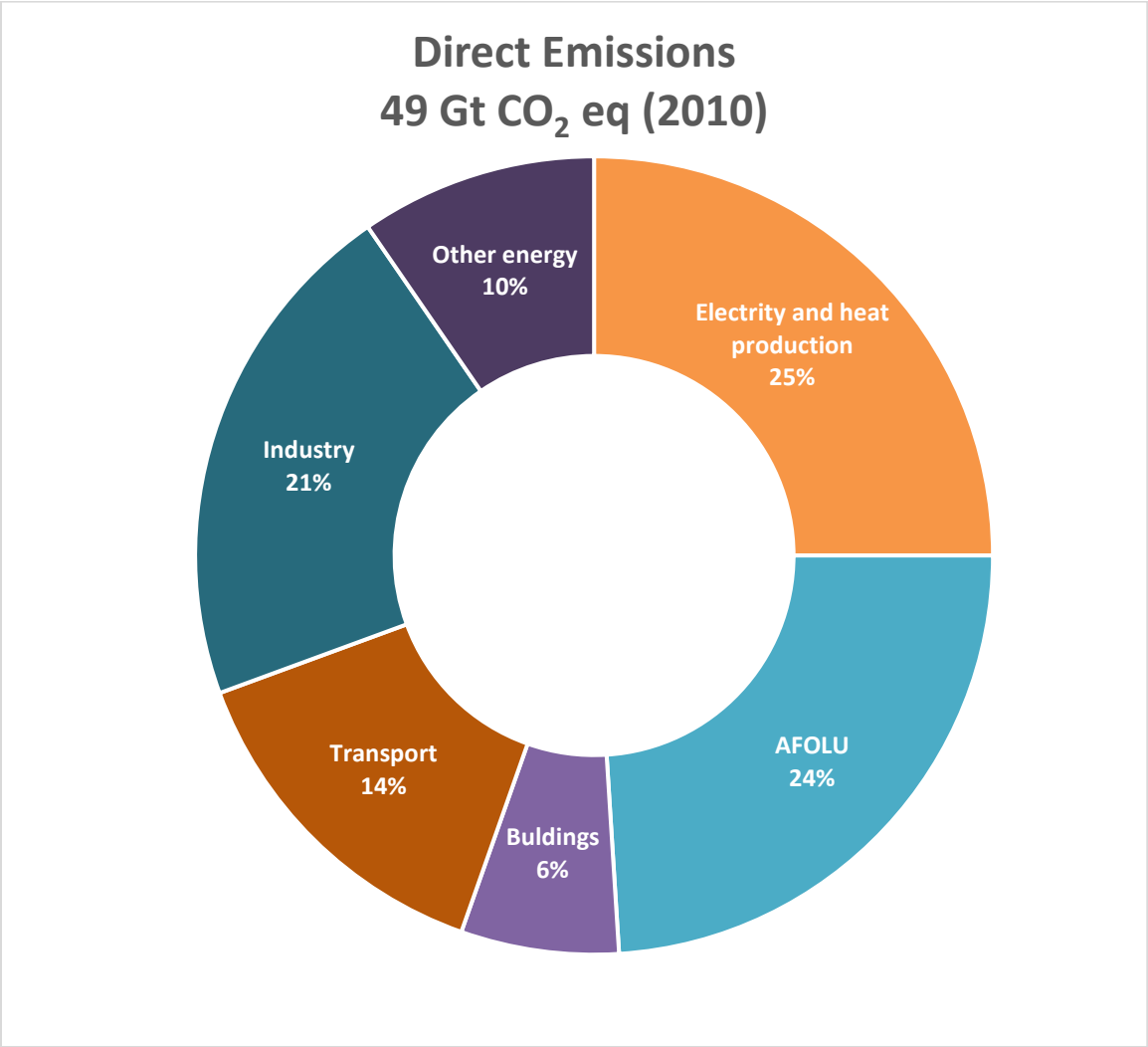
5.3. Wine production and quality in Spain: exploring adaptation choices

A study conducted in Spain analysed the main reasons for concern for diverse areas of the country due to climate change and explored the adaptation choices for grapevine cultivation. The territory was divided into four major agro-climatic zones, and the analysis showed that northern regions are mainly affected by late spring frost, while southern regions mainly suffer extreme heat in summer. Recurring drought episodes also occur in most of the territory. Significant impacts on wine production and quality are then expected mainly in southern Spain, owing to increased levels of heat and more severe water stress conditions. Adaptation efforts are needed to reduce negative impacts, but a different level of adaptation is required across Spain. Less adaptation effort is required in the northern regions, while more effort to maintain stability in wine production and quality is needed in the southern regions, especially in the Castilla-La Mancha and Andalusia regions. In these regions, irrigation might become mandatory, as might the need to introduce varieties suited to a warmer climate. However, opportunities may arise as a result of an expansion of viticulture in the northern region, thanks to a decrease in frost damage, with resulting improvements in wine quality, as these regions will be more suitable for the cultivation of new premium wines varieties as a result of an overall increase in temperature.

5.4. Agricultural insurance, Austria

The indemnity-based yield insurance in Austria includes an option for index-based products against certain conditions, such as a reduction in rainfall, rather than actual

yield loss. Index-based insurance pays compensation if, for example, rainfall deviates from a pre-specified level.



Greenhouse Gas Emissions by Economical Sectors

Embrace Changes In Your Life

Adaptability is one of the key qualities in today's world that we all need to learn and work on. The current times bring new challenges and obstacles that have never been there before to this extent, and it is up to us how we deal with them. We have the climate crisis, the economic crisis, the war in Ukraine, rising inflation, the housing crisis, and other stressors on all sides that we must learn to work with and adapt to an ever-changing society. That is why it is important that we pay due attention to

adaptability and integrate it into our teaching. Each person must learn a set of skills that benefit the environment and communities in which they live.

Remove Yourself From Dangerous Situations

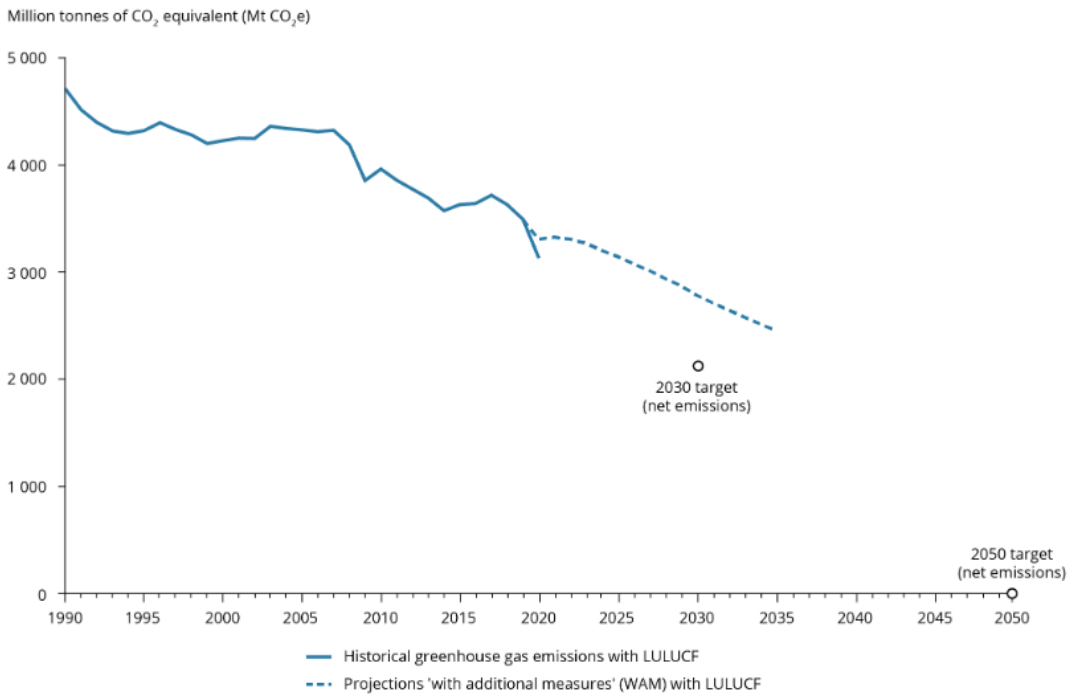
Adaptability is one of the key qualities in today's world that we all need to learn and work on. The current times bring new challenges and obstacles that have never been there before to this extent, and it is up to us how we deal with them. We have the climate crisis, the economic crisis, the war in Ukraine, rising inflation, the housing crisis, and other stressors on all sides that we must learn to work with and adapt to an ever-changing society. That is why it is important that we pay due attention to adaptability and integrate it into our teaching. Each person must learn a set of skills that benefit the environment and communities in which they live.

Adaptability skills

Adaptability can include a variety of skills that help you adapt to change. Some examples of these important soft skills include:

- Communication skills
- Interpersonal skills
- Problem-solving skills
- Creative and strategic thinking skills
- Teamwork skills
- Organizational skills

Greenhouse gas emissions targets, trends and projections in the EU, 1990-2050



Source: EEA, Trends and Projections in Europe 2021, European Environment Agency.

11. Case studies – adaptation choices, income insurances for farmers, innovative farming

11.1 gfnfgnxng

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- cultivation. The territory was divided into four major agro-climatic zones, and the analysis showed that northern regions are mainly affected by late spring frost, while souther regions

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https://www.eea.europa.eu/highlights/climate-change-threatens-future-of

https://www.eea.europa.eu/publications/cc-adaptation-agriculture/at_download/file

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https://justinthomasmiller.com/power-adaptability-adapt-anything-life-throws/

https://www.eea.europa.eu/publications/cc-adaptation-agriculture

https://www.frontiersin.org/articles/10.3389/fpsyg.2018.01678/full

https://www.sciencedirect.com/topics/psychology/career-adaptability

https://munispace.muni.cz/library/catalog/book/1855

https://dbterapie.cz/encyklopedie/adaptivni-chovani/

https://www.linkedin.com/pulse/why-its-more-important-than-ever-focus-adaptability-skills-roslansky

https://esoftskills.com/10-soft-skills-you-need-adaptability-and-flexibility-7/

https://learning.shine.com/talenteconomy/career-help/adaptability-skills/

https://ajgalvez.com/personal-en/adaptability-changing-environment/

DEGREBE

Development of Green Skills for Better Employability

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Module 2 Circular economy, creativity

1. Introduction.

Society relies on nature to obtain raw materials from which, after some transformations by manual or industrial processes, it acquires the needed output that will be consumed as products or services by the entire population.

However, the extraction of both energy and materials has reached disproportionate levels, as well as the demand and consumption of products and services. This endangers the conservation of our precious nature, making it difficult to maintain its resources, and preventing the guarantee of its regenerative capacity.

It is in this context that the classic linear economic model has proven to be unsustainable from an environmental point of view.

As a consequence, the survival and sustainability of natural resources, endangered by the impact of human activities, is at stake. For this reason, many sectors around the world are concerned with designing alternatives capable of preventing, mitigating or compensating for the damage caused by human activities. Moreover, measures are being sought to mitigate the environmental consequences of excessive consumption, waste and the generation of wastes and residues.

2. Concept of circular economy.

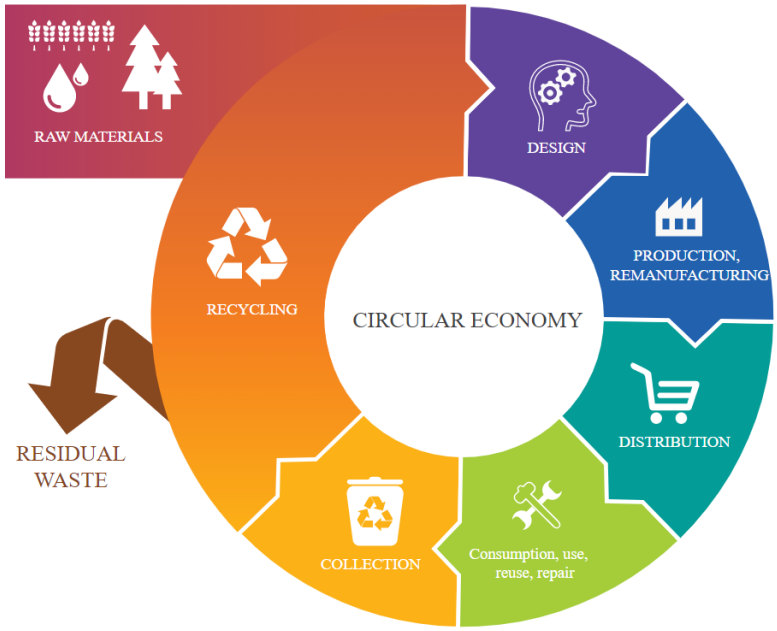
The current state of environmental conservation requires urgent changes in our socio-economic model. The circular economy, the new economic model proposed by the European Union, is presented as a viable alternative to the old production and consumption model, the **linear model**. It was created with the Industrial Revolution and has sustained our societies until today. This traditional method consists of extracting raw materials to manufacture products, produce them and then throw them away, without taking into account its respective environmental footprint and its consequences. In other

words, it is a "take, make, dispose" model. It seemed to be effective years ago, when society was living in an era when energy and resources were thought to be unlimited and easy to obtain. All this without being aware of the serious environmental consequences that this model provoked.

Consequently, the **circular economy** is proposed as a viable alternative, which corrects the main problems of the linear model. The goal of this new method is to ensure that the products, components and resources maintain their usefulness and value at all times. In other words, the system intends to have no waste. This new model implies a radical change in the current production and consumption systems.

In fact, it is a production and consumption model designed to share, rent, reuse, repair, restore and recycle existing goods and resources for the longest possible period. As a result, products' life cycle is prolonged.

Image 1: How does circular economy work?



Source: The World Economic Forum

Following this model, when a product reaches the end of its useful life, its components are, whenever possible, preserved within the economy. These can be applied repeatedly, which will create additional value.

Therefore, the circular economy concept focuses on the **3-R approach**:

- Reduce: diminish the use of raw materials to the minimum.
- Reuse: maximal reusability of products and components.
- Recycle: reutilization of raw materials.

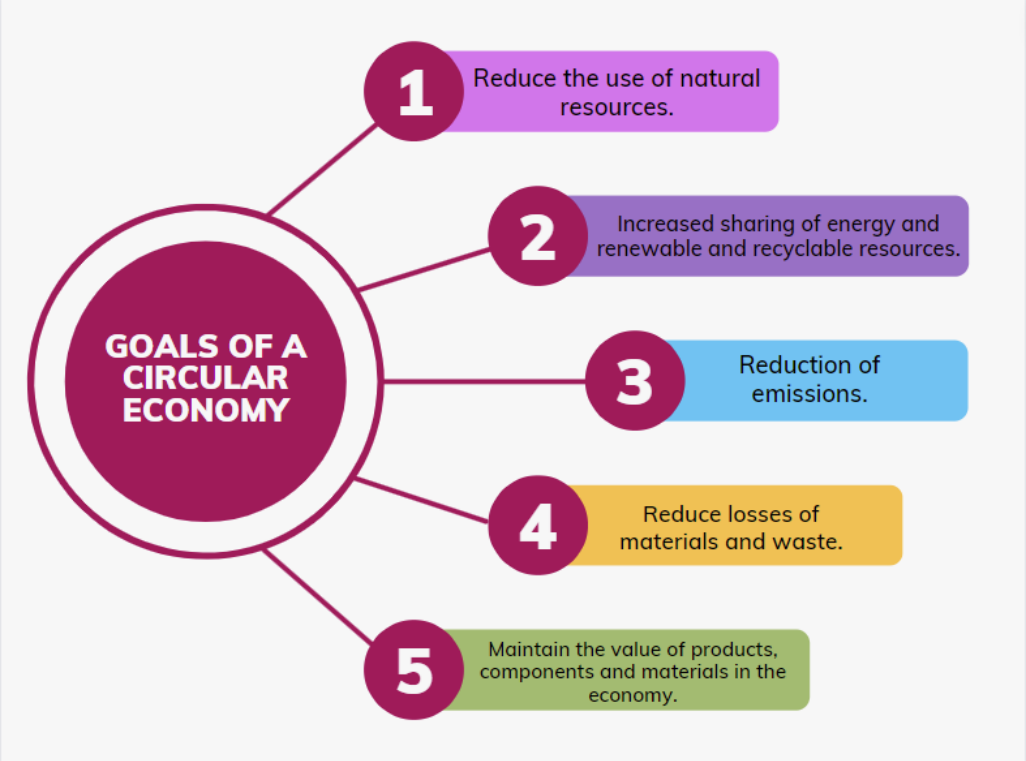
Under this approach, the circular economy advocates the use of biodegradable materials in the manufacture of consumer goods so that they can be returned to nature without causing environmental damage when they reach the end of their useful life.

In cases where it is not possible to use this type of environmentally friendly materials, the aim is to give them a new life, reincorporating them into the production cycle and creating a new output. This means that, in a perfect circular economy system, the value of products and materials is maintained for as long as possible; waste is minimized, and resources are conserved within the economy even when a product has reached the end of its useful life, so that they can be reused repeatedly and continue to create value.

2.1. Goals of implementing a circular economy.

This system gives great importance to the reduction of natural resource consumption and encourages their rational use: reusing and recycling those resources that still have a useful life or can be transformed to enter the new production chain. This makes the production and consumption processes more efficient, reducing possible negative effects to the environment.

Image 2: Goals of a circular economy.



Source: own elaboration.

To reduce the consumption of natural resources (our own or imported), it is necessary to carry out a minimum and optimal exploitation of raw materials. The main goal consists in replacing non-renewable resources by renewable ones. This way, a higher proportion of recyclable and recycled materials will be used.

Moreover, it is necessary to minimize the accumulation of waste, and limiting the amount of waste incinerated and landfilled. To this end, the model proposes extending the useful life of products while maintaining their value in use.

Another goal consists of eliminating the negative externalities, working to reduce the harm caused to different areas and ecosystems that, in turn, affect the people living there. If these negative externalities can be avoided, the circular economy proposes management and compensation for them. Some examples of these negative externalities

are polluted air, water and land; noise pollution; emissions of toxic substances and climate change.

In fact, this innovative method has many goals. Below, some of them are explained:

- **Eco concept:** considering the environmental impact throughout the life cycle of a product.
- **Industrial and territorial economy:** industrial organization characterized by an optimal management of stocks and flows of materials, energy and services.
- **The functionality economy:** favouring use over possession (the sale of a service over a good).
- **Second use:** reintroducing into the economic circuit those products that no longer correspond to the initial needs of consumers.
- **Reuse:** reusing certain wastes that can still be used to make new products.
- **Repair:** finding a second life for damaged products.
- **Recycling:** taking advantage of the materials found in waste.
- **Recovery:** taking energetic advantage from the waste that cannot be recycled.

2.2. Benefits of a circular economy.

The main reason why the society is not shifting towards a circular economy is the gigantic change and effort that this requires of individuals, governments, and businesses. This change would need a lot of coordination between different actors and a significant change in the mind and behaviour of the society.

However, if these challenges could be overcome, the benefits of a circular economy would significantly help not only the environment, but also society and companies.

Actually, the circular economy aims at the implementation of production and commercial processes that are committed to a better balance between economy and the environment. Companies that have implemented this system are finding that reusing resources is much more profitable than creating them from scratch. Therefore, it is a system that generates economic as well as social and environmental benefits, as opposed to other economic models, where the economic aspect takes precedence.

One of the great benefits of the circular economy is the fact that it prevents practices such as planned obsolescence. Planned obsolescence is a strategy to ensure that a current product will become outdated or obsolete in a predetermined amount of time. Consumers will definitely look for substitutes in the future thanks to this proactive move, which will increase demand. The avoidance of this type of practices can provide consumers with innovative and environmentally friendly products. Since these kinds of products are more durable, they will generate an economic benefit to consumers.

Other beneficial approaches in the circular economy include eco-design of products and services, waste prevention and reuse. These approaches help companies save money. They also contribute to a significant reduction in greenhouse gas emissions.

In addition to reducing pressure on the environment, the circular economy generates employment. A 2015 report by WRAP and the Green Alliance estimates that, based on the current policy towards sustainability, 200,000 new jobs will be created in the EU by 2030, reducing unemployment by 54,000. Another estimation, under a scenario where policy is more aggressive, the report estimates that 500,000 new jobs will be created, reducing unemployment by 102,000.

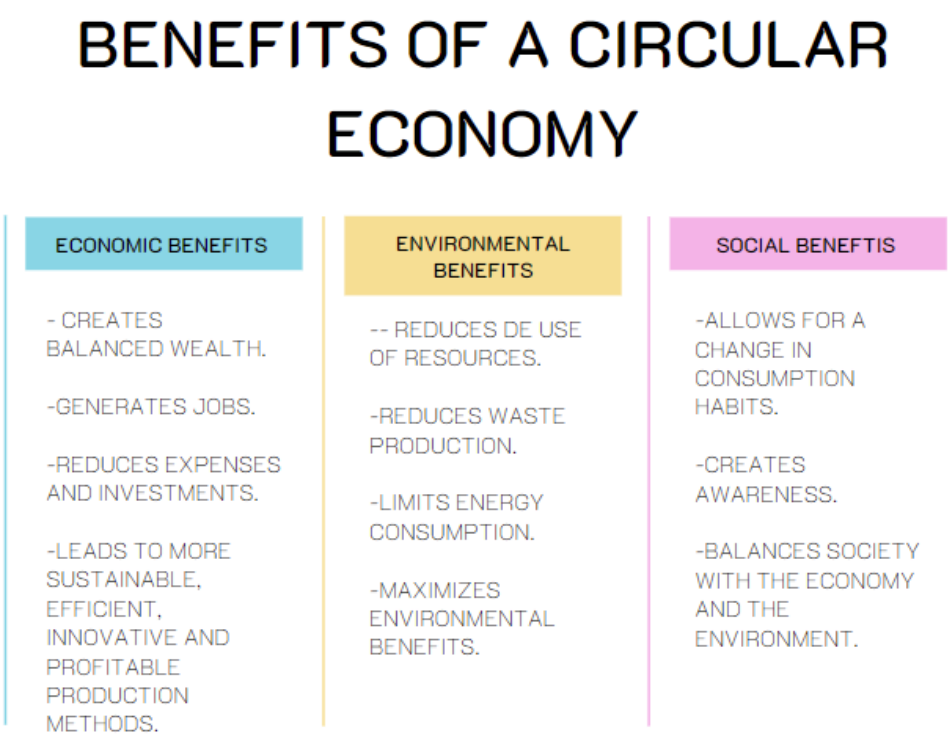
Apart from these benefits, a circular economy also improves competitiveness, innovation and economic growth.

Summing up, these are the main benefits of a circular economy:

- Economic benefits:
    - Creates balanced wealth.
    - Generates jobs.
    - Reduces expenses and investments.
    - Leads to more sustainable, efficient, innovative, and profitable production methods.

- Environmental benefits:
  - Reduces the use of resources.
  - Reduces waste production.
  - Limits energy consumption.
  - Maximizes environmental benefits.
- Social benefits:
  - Allows for a change in consumption habits
  - Creates awareness.
  - Balances society with the economy and the environment.

Image 3: Benefits of a circular economy.



Source: own elaboration.

In summary, the circular economy protects the environment by minimizing the consumption of natural resources and reducing waste generation, as well as reducing

greenhouse gas emissions. It also benefits the local economy by encouraging the reuse of nearby waste as raw material in new production models. It also favors independence from the importation of raw materials by being able to reuse local waste as raw material. It also stimulates innovation and the development of new jobs in line with a healthier and more ecological economic model.

2.3. Policies pursuing a circular economy.

Many institutions have acted in order to implement a circular economy. Measures to follow this path include more sustainable products, reduction of waste, promote circularity in sectors that use more resources and produce more waste and motivate society to adapt to these changes. These actions have been taken for different industries and scopes, which include electronics and ICT, plastics, textile, construction and buildings, packaging, batteries and vehicles and food. *(Circular Economy Action Plan - background guide — EUbusiness.com | EU news, business and politics*. (2020, March 11). EUbusiness.)

For the success of these objectives, the various organisations and bodies have created their corresponding policies and action plans. The EU has set specific measures to achieve the agreed targets. It provides the steps that all the organizations and citizens need to follow to reach a more competitive and cleaner Europe. The process in based on the cooperation of all the actors and it is future oriented. (*EUR-Lex - 52020DC0098 - EN - EUR-Lex*. (2020, March 11). EUR-Lex).

There is only one planet Earth, but the society is consuming its resources as if there were three. Therefore, to achieve climate neutrality by 2050 the EU must accelerate the process of giving back to the planet more than what we take from it. We must also lower the carbon impact and increase the usage of circular materials.

Collaborating to develop the framework for sustainable products will create new opportunities for companies within the EU and beyond. In fact, according to a recent study implementing circular economy concepts across the EU economy could boost GDP by an additional 0.5 percent by 2030.

There are various activities that have been undertaken for this cause. Hence, the EU commission has created a “right to repair”, which consists of increasing the duration of the products by making them more sustainable related to tablets, smartphones, and computers. Furthermore, they want to transform the market and convert all the plastics reusable and recyclable by 2030, maintaining an economic viability. In addition, the plan boosts the private financing through financial instruments (i.e. InvestEU) in order to obtain more support for the circular economy.

Regarding more specific plans, each European country has developed its own strategies and policies in order to achieve a circular economy. Here are some examples for country based Circular Economy policies.

In Greece the National Circular Economy Strategy has been developed, in order to improve the country's economic situation. This National Strategy aims to unlock growth potential and speed up circular economy initiatives. It can generate new employment opportunities, support small and medium-sized businesses, develop new trades, and stimulate Greece's underdeveloped social economy. Some of the actions that this strategy wants to implement are launching a series of institutional interventions that will reinforce circular economy, modular planning and open innovations, policies facilitating the establishment of ‘smart factory’ plants, which will be innovative, applying high technology, green, modular and, probably digitised, communicative strategy to raise citizens’ awareness along with the provision of incentives, etc. (Ministry of Environment and Energy, 2018).

In Cyprus, the “Cyprus Action Plan for the transition to a circular economy 2021-2027” was approved by the Council of Ministers. Thanks to this plan of moving to a circular economy, more opportunities for the transformation of companies and industry will be created, in order to gain more competitive advantages and become more competitive, resilient and more sustainable at a local and international level (*Presentation of the Cyprus Action Plan for the transition to a circular economy*, 2021). This plan is based on the following pillars:

- Cultural change for a circular economy: It includes informing the business community and consumers about the prospects and business

opportunities of a circular economy, information campaign for the sustainable management plan “Pay as you throw” and providing training on circularity issues.

- Providing incentives for investments in a circular economy: It includes the development of a Consulting and Financial Guidance Plan, the development of “Go Circular” Grants schemes by the Research & Innovation Foundation for the development of new circular products and services and the utilization of HRDA plans for training on circular economy.
- Development of circular economy infrastructures: A study to identify the appropriate waste streams to be declassified, create an online sharing platform that will enable companies to share equipment, services, facilities, waste, etc., and create an integrated system of supervision and monitoring of waste management projects.
- Municipal Waste Management: Development of a “Pay as you Throw” scheme, for the separate waste collection in mountainous areas, development and operation of a network of Green Recycling Points to help remote communities, domestic composting of organic waste, etc.

The Circular Prague 2030 - Prague Strategy for Transition to a Circular Economy provides the city with a framework for activities that will support its continued growth in this direction. By approving the Strategy, Prague made a commitment to continuously reduce its environmental and carbon footprint (measure of the resource intensity of consumption) and to achieve carbon neutrality by the year 2050. Prague is encouraging the city's stakeholders, including the commercial sector and the general public, to manage resources and consume sensibly in order to realize this objective. Prague is reducing its overall CO2 emissions and saving money by putting cost-cutting measures into place and minimizing waste. The proposed strategy includes several objectives which then translate into specific measures (*Prague Strategy for Transition to a Circular Economy,* 2022).

One of the largest upcoming infrastructure projects in Prague is the biogas plant, which is to serve as the end technology for using biodegradable municipal waste (BMW)

unsuitable for composting, with an expected annual capacity of 50,000 tonnes. In addition, this waste is intended to be used in the construction industry. Apart from the city-wide collection of biodegradable municipal waste, there will be a creation of multicommodity collection (i.e. the joint collection of plastics, beverage cartons and metal packaging) that will promote the reduction of bulky waste by encouraging sharing, repair, and reuse (*Prague Strategy for Transition to a Circular Economy,* 2022).

In Bulgaria, the Action plan for increasing the share of circular procurement was developed by the Smart Circular Procurement project. Circular public procurement is an approach to greening procurement which recognises the role, which public authorities can play in supporting the transition towards a circular economy. It can be described as the procedure by which public authorities make purchases of projects, products, or services that aim to support closed energy and material loops within supply chains while minimizing, and in the best case scenario, avoiding, adverse environmental effects and waste creation throughout their entire life cycle. The main objective is to increase the implementation of circular procurement under the targeted policy instruments so that the circular economy principles and criteria are incorporated into them or taken into account as a horizontal principle (Bulgarian Association of Recycling. *Action Plan: Bulgaria 2021).*

This action plan has specific measures for the development and increase of the share of the circular public procurement in Bulgaria: the National Waste Management Plan 2021-2028. This plan will try to achieve a change in the behavior of the public sector and improvement of waste management in general. It will improve the capacity of the institutions dealing with waste management, as well as will expand the circle of stakeholders. Also, this plan will try to reduce the harmful effects of waste by preventing its generation and encouraging its reuse, with the sub-program for the prevention of food waste. In addition, non-investment measures to develop new product designs and technologies that require fewer natural raw materials will be created, which contain fewer hazardous substances, and generate less waste after using the products, and products and technologies with better "environmental behavior" (Bulgarian Association of Recycling. *Action Plan: Bulgaria 2021)*.

To finish with, we have the Climate and Nature-protection Action Plan in Hungary which provides a set of well-defined climate protection tools. Some of the objectives of this plan are: to get rid of illegally discarded waste, to ban single-use plastics and create deposit return schemes for glass and plastic bottles and metal cans, to protect Hungary's water resources, to revive habitats and create conditions for conservation across 150,000 hectares of protected natural areas, to support renewable energy production by SMEs, to transform the Mátra Power Plant into an environmentally friendly facility, which will enable Hungary to significantly reduce its greenhouse gas emissions; to plant one million trees every year, to increase Hungary's solar energy production capacity and to use affordable electric cars and having environmentally friendly public buses (Climate and nature-protection action plan – Policies – IEA, n.d.).

2.4. Circular economy in the agricultural sphere.

When it comes to the agricultural sector, there is still much to do to turn it to a circular economy. There are real challenges that stop the linear economy to convert in a circular one, and that is exactly the case in the agricultural sector. The waste generated is still a big problem, as food is highly related to single use plastic.

This sector is still very traditional and lacks innovation, which has a negative impact on the modernization of their techniques and capital, and therefore affects the conversion to the circular economy negatively. New systems should be developed to achieve the objectives set in the actions plans (*Agriculture and the Circular Economy*. (2021).

Agriculture has a significant negative impact on the environment. Actually, it is the industry that generates the most greenhouse gas emissions and water consumption. Given the many advantages of a circular economy, it might seem confusing why this sector still operates following a linear model. Indeed, circular economy could be used to reduce the negative impact that the sector has over the environment, at the same time that it keeps feeding the global population in a sustainable manner.

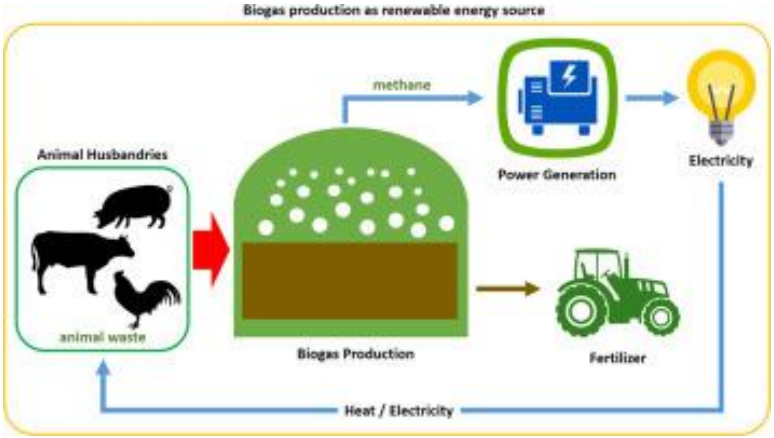
One of the main challenges that agriculture faces when turning into a circular economy is the existence of by-products, which are classified as wastes and immediately thrown to waste disposal. This way, the sector is not allowed to consider the possibility of using these

wastes as resources for other processes according to the present waste management regulations. Hence, the linear agricultural model does not extract economic value from waste.

There are many ways in which agriculture could support the shift towards a circular economy. First, by using organic waste to create fertilizers. This is a practice that has already been used for decades. Since biological waste (i.e. leaves, animal waste, crop stalks) is very rich in nutrients, it can be converted into fertilizers. This reduces the cost for agrarians and their demand for synthetic fertilizers, which are more harmful for the environment.

Moreover, agricultural activities create a lot of waste water. This, if treated correctly, could be reused for plant irrigation and pasturing. It is also possible to use plant and animal waste to create biofuels that can be used to generate heat, power, or vehicle fuel.

Image 4: Biogas production as renewable energy source.



Source: Waste to energy technology: The potential of sustainable biogas production from animal waste in Indonesia.

Furthermore, precision agriculture can be used to increase efficiency in the sector, controlling that the right quantity of resources is being used in the right place at the right time. It is a method that uses information technology (IT) to make sure that soil and crops

get the nutrients they require for their maximum health and productivity. Precision agriculture aims to guarantee efficiency, profitability, sustainability, and environmental preservation.

Lately, circular economy has been successfully implemented in some farms of different countries. One example is a farm in Uganda, where a variety of animals and plants are raised on the farm and their waste is reused within the system to create fertilizers, pesticides, and energy. In this farm, animal waste is used to feed worms, which are used as feed for fish. Moreover, insects' waste and wastewater are used as fertilizers and plant irrigation. Biogas production is also used to convert animal waste into biogas for cooking. Hence, this farm reuses residual waste within the system to create further value and consequently achieve environmental and economic sustainability.

Another example is an Australian company, GoTerra, which uses the protein that the larvae create in order to create animal, cattle and fish feed. This constitutes a cheaper and more sustainable protein source. Also, the waste generated by the insects is used as compost in order to improve the farm's soil quality.

As can be seen, the implementation of circular economy in agriculture is still not very popular, although it has a great potential to be the change towards sustainability that the future needs.

3. CREATIVITY

3.1. Concept of creativity.

Creativity is defined by Cambridge dictionary as the ability to produce or use original and unusual ideas, but it is far from being an easy word to define. There are many interpretations of this concept, as it encompasses a wide and unexplored scope. As it happens in all abstract topics, this causes many different views of what and what is not creativity.

From the beginning of the history this has been a difficult word to explain. In the ancient Greek the Hellenic philosophy this idea was connected with divinity. They considered that this was a supernatural inspiration given by gods to produce ideas or products. For them

creativity was a gift accessible only to some selected few people (*The Concept of Creativity throughout History*, 2022).

It was not until modern age that humanism arrived, and they started to have the idea that the individuals are the ones constructing their own future and present. With this new perspective, the creativity was not being seen as something innate although there were some trends held by Kant which state the contrary. Consequently, they were already facing some discrepancies about the idea, and this continued for decades (*The Concept of Creativity throughout History*, 2022). Indeed, after more than 2000 years we still don't have a clear answer to define the concept.

It is common to see this word as an adjective accompanied by other words, more or less accurate, such as: creative cuisine, creative medicine, creative writing, etc. They define the capacity for innovation that is related to creativity.

As mentioned, the exact meaning of creativity is ambiguous and therefore leads to many misunderstandings of the idea. There are many people that believe that it is a trait by which people are born, making some people better for it. In other cases, this is more related to an innate, trainable quality that can be developed.

According to experts, creativity could play an essential role in business and economics. In fact, latest data affirm that creativity should be developed as it could become the most weighted skill to have in a company (Skillicorn, 2021).

The word creativity appears continuously in the mass media and seems to be a very important tool in different fields of work, among other things, in the search for suitable staff in companies. In other fields, creativity is strongly related to the expression of art, music, science, and it has been an indispensable tool to renew education and change the future.

Nowadays, it is considered important to stimulate creativity, using strategies that adhere to the disciplines that guide the various proposals or theories developed for this purpose. A large part of the studies highlights the importance of creativity in areas such as philosophy, art, administration, politics, psychology, and education. Thus, the interest of

researchers has increased in order to widen the field of action, facilitating a novel approach of the concept of creativity with aspects such as intelligence, personality, motivation and human movement.

In short, creativity is a practical skill that leads to an alternative way of thinking which comes from an open-minded perspective and gives a range of new possibilities as a result. Although it is difficult to be accurate in such an abstract term, we can all agree that this skill is very valuable and it's a key factor for innovation.

3.2. Theories of creativity.

Different authors propose that the capacity to create creative outputs is directly influenced by the environment around the individual, which impacts the level of creativity they have. Therefore, this implies that this skill may consist of different components: the expertise, the creative thinking, and the motivation that the intrinsic task generates (Al-Ababneh, 2020)

Experts have discovered that each side of the brain has different uses, the right side being related to the creative aspect. They also found that people favour the left side of their brain for more logical thinking. However, both hemispheres are equally needed and equally essential to achieve the best performance. Therefore, it is not only the analytical way which we should train but also the creative one, with persistence, discipline, and some techniques (i.e. Brainstorming).

We must keep in mind that there are several theories to explain how creativity is created or from where it is obtained, but all of them have to be taken with moderation. The moderation refers to the fact that, although we refer to a change of perspective when talking about creativity, this variation should not be extreme since it can lose relation with the subject or problem treated (Al-Ababneh, 2020).

The literature on this subject has been created over the decades based on different methodologies and levels of analysis. Among the most notable theories we find developmental theories, psychometric theories, economic theories, stage process and componential theories, cognitive theories, theories based on problem solving and

experience, problem finding, evolutionary theories, typological theories, and systems theories (Kozbelt et al., 2010).

- **Developmental Theories:** Talk about how creativity can be evolved in time and that the contact with other people and the environment around the individual is a source of improving the skill. These theories believe that there is a process in which the individual can go from less creative to more creative.
- **Psychometric Theories:** stress that creativity is measurable and that it can be validated.
- **Economic Theories:** state that markets influence the behavior of individuals and therefore creativity depends on the cost-benefit analysis made.
- **Stage and Componential Process Theories:** These theories believe that creativity has a process in which the individual needs to go through different stages or components. The process can be linear and/or have recursive moments.
- **Cognitive Theories:** They are based on the idea that there cannot be creative achievements without some level of cognition. People who manage to be creative need a minimum of knowledge to be able to be creative. That is why this theory dictates that knowledge is essential for an individual to be creative. Some ideas focus on capacities such as memory or attention. On the contrary, others focus on much more differential capabilities such as the divergent thinking of the individual.
- **Theories Based on Problem Solving and Expertise:** Innovative solutions come from previous experiences and related expertise and a general knowledge related to a rational process.
- **Problem Finding Theories:** People who are creative don't just solve the problem but have the ability to identify them. This thinking goes against the previous theory, as that fails to explain how creative people identify the issues and find the motivation to solve them.
- **Evolutionary (Darwinian):** Creativity is the result of the development process of generations.
- **Typological:** Innovators differ along significant individual distinctions connected to both macro- and micro-level elements and can be categorized using typologies.

- **Systems:** Creativity is the consequence of a complex system of interconnected and interacting forces.

As we can see there are several thoughts, some that are complementary or similar in some points, and others that are contrary. However, most of them express creativity as a capacity which can evolve.

Source: own elaboration based on (Kozbelt et al., 2010)

3.3. How can creativity be improved?

A popular opinion is that creativity is a gift that some people possess since they are born. On the one hand, it is partially accurate to say so since this skill is acquired in a natural way by some personality types. But, on the other hand, creativity is a skill and like any other such, it can be learnt and developed. Hence, creativity is not only a skill which humans are born with, but it is also a skill that can be improved. Therefore, it is essential to find some methods and techniques to train these capabilities.

To improve creativity, constancy, discipline and effort are required, along with the practice of different techniques. These techniques can have different objectives and procedures and can be adapted for different situation. Among the most outstanding ones we can find Divergent, Vertical and Lateral thinking, Brainstorming, Six Universal Questions, Six Thinking Hats, Lotus Blossom Techniques and Checklist.

- **Divergent/Vertical/Lateral Thinking**

  - **Divergent Thinking**

Divergent thinking is to obtain many different solutions to one problem or idea. In other words, it means obtaining a range of possible solutions. The concept of divergence is related to the idea of having different directions, and when we connect this term with thinking, we obtain a way of finding as many outcomes as possible for one question or problem.

This is one of the most important techniques for creativity, as it is directly associated with generating many proposals. In addition, for this method to be correctly carried out, it should be spontaneous, free-flowing and should not be linear (Shrestha, 2019.) This is believed to be the opposite technique of vertical thinking.

  - **Vertical Thinking**

Vertical thinking is a method of assessing, interpreting, and applying information that is logical, systematic, or direct, which doesn't give much space for innovation here. There is

usually a pre-structured method for processing information and putting that information to use (Vertical Thinking: Definition, Method & Examples, 2017)

- **Lateral Thinking**

Lateral thinking is finding new solutions by looking at the problem from other perspectives. The lateral way of thinking provokes a wave of new ideas that could never come up by thinking vertically, traditionally, using the accustomed logic. People who are able to think in this way are much more creative because they have many more ideas and innovative solutions.

- **Brainstorming**

Brainstorming has become one of the most famous and used techniques in all fields. This well-known method is based on the creation of ideas, which boosts creativity and as a result, outcome is much more original and an effective result can be obtained.

It is based on defining a topic or problem, and then individuals expose all the ideas that cross their minds in connection with it, without exception. In this phase, there is no need to use logical thinking and ideas are not dismissed, all the contributions are received, no matter what they are. Then in the phase of evaluating the ideas obtained we can discard those that are not considered valid. Finally, among the best ideas, one is chosen, and with it an action plan is developed.

- **Six Universal Questions**

This method consists of asking 6 questions, each one of them starting with a different question word: How, What, Where, Who, When and Why. Through this beginning, we pose different questions about a topic or problem. The individual or group must give an answer to each one of them and in this way, we will understand the problem in a broader perspective, and we will be able to give a better solution.

For example, with the "*what*" question we will understand what our objective is and with the "*how*" question we will understand the way to act. The "*why*" question will give us the

reasons to do it. By answering the 6 questions we will find a much more innovative and creative way of thinking.

⚠ Six Thinking Hats

This method is used in order to get many perspectives and thus arrive at an optimal solution through constructive thinking. In this way the team examine 6 different approaches to the same insight and after using the technique you should have 6 different ways of dealing with the problem (*Six Thinking Hats®: Looking at a Decision in Different Ways*, 2020)

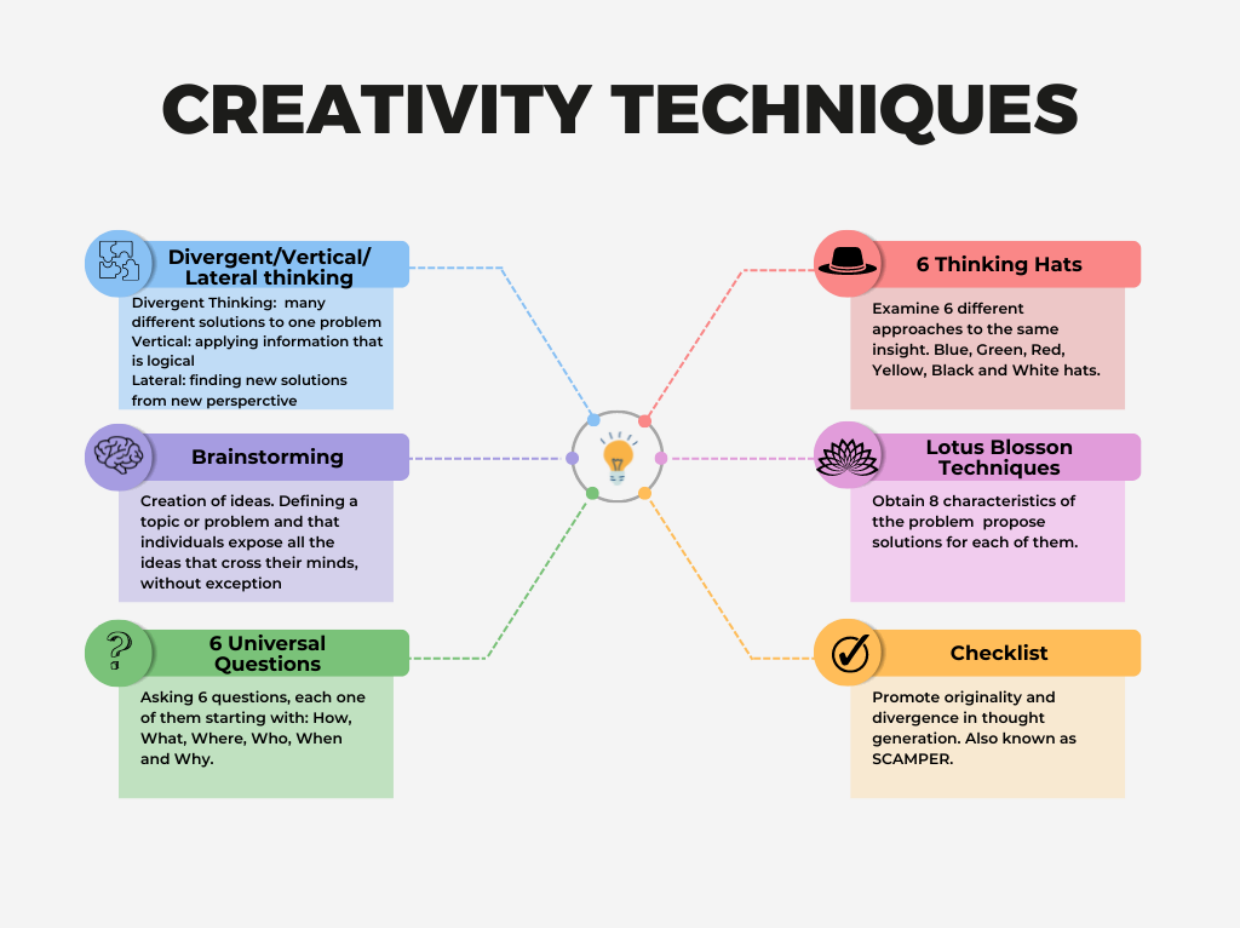
- **Blue hat**: Manages the decision-making process
- **Green Hat**: Represents creative thinking
- **Red Hat:** Represents the heart, that is, feelings.
- **Yellow Hat:** Looks at the problem in the most positive way.
- **Black Hat:** It's the critical judgment and it represents the risk and concerns.
- **White Hat**: It's the one in charge with information gathering. It provides the information for all the others.

⚠ Lotus Blossom Techniques

From the original concept there are 8 characteristics generated. Each of these characteristics becomes the core of the problem and solutions are proposed for each of them. With this process, a new range of solutions is generated and a diagram with many solutions is created. This method is based on brainstorming that focuses on the problems of interest and expands to other areas, generating a much broader vision.

⚠ Checklist

Osborn's checklist is a basic tool that can be used individually or in groups to promote concept development and to transform ideas. The goal is to promote originality and divergence in thought generation. Sometimes it's also referred to as S.C.A.M.P.E.R., which means Substitute, Combine, Adapt, Modify, Put in other use, Eliminate and Reverse.



Source: own elaboration.

Some **other** recommendations for improving creativity are:

- Use “what is…” questions.
- Use metaphors and analogies.
- Do not ignore little ideas or ideas that at first glance seem insignificant.
- Daydream and let your mind fly.
- Play “let’s suppose…”.
- Try alternative ways to express creativity (art, cooking, photography, dance, sports)
- Write down all your ideas.
- Play strategy games such as chess.
- Learn a foreign language and open your mind to be able to think in different ways.

3.4. How can creativity be used in order to achieve sustainability?

Creativity improves performance in the areas of the environment, society, and the economy. Hence, enhancing creativity is essential for fostering green innovation inside firms and improving sustainability performance (Laužikas & Mokšeckienė, 2013).

It is important to take into consideration that creativity leads to new ideas, innovation, technology. Therefore, companies should seek for employees who are creative. This skill will provide a lot of value to the company, since it will make it more efficient, profitable, and sustainable due to the implementation of new and creative ideas (Laužikas & Mokšeckienė, 2013). Hence, in order to make the agricultural sector more sustainable and turn it into a circular economy, it is essential to encourage young farmers to be more creative and therefore innovate in their practices, leading to a more efficient sector.

Moreover, in this constantly changing world in which sustainability is the main concern, creativity plays a key role. In fact, it is essential for developing innovative processes, products, and services, and find alternative solutions to issues.

In conclusion, creativity is the core competence of sustainability and therefore new generations should be educated on creative thinking and be prepared to implement innovative solutions and processes to achieve sustainable businesses.

REFERENCES

Agriculture and the Circular Economy. (2021). Centre for Entrepreneurial Agri-Technology. https://ceat.org.au/

Al-Ababneh, Mukhles, The Concept of Creativity: Definitions and Theories (January 8, 2020). International Journal of Tourism & Hotel Business Management, 2020, Vol. 2 (1) 245-249, Available at SSRN: https://ssrn.com/abstract=3633647

Bulgarian Association of Recycling. *Action Plan: Bulgaria 2021*. https://projects2014-2020.interregeurope.eu/fileadmin/user_upload/tx_tevprojects/library/file_1637154977.pdf

Circular Economy Action Plan - background guide — EUbusiness.com | EU news, business and politics. (2020, March 11). EUbusiness. https://www.eubusiness.com/topics/environ/circular-economy-plan/

Circular economy: definition, importance and benefits | News | European Parliament. (2022, April 26). News European Parliament. https://www.europarl.europa.eu/news/en/headlines/economy/20151201STO05603/circular-economy-definition-importance-and-benefits

Climate and nature-protection action plan – Policies - IEA. (n.d.). IEA. https://www.iea.org/policies/11625-climate-and-nature-protection-action-plan

EUR-Lex - 52020DC0098 - EN - EUR-Lex. (2020, March 11). EUR-Lex. https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1583933814386&uri=COM:2020:98:FIN

International Energy Agency. (2021). *Climate and Nature Protection Action Plan*. https://www.iea.org/policies/11625-climate-and-nature-protection-action-plan

Kozbelt, A., Beghetto, R. A., & Runco, M. A. (2010). Theories of Creativity. *The Cambridge Handbook of Creativity*, 20–47. https://doi.org/10.1017/cbo9780511763205.004

Laužikas, M., & Mokšeckienė, R. (2013). The role of creativity in sustainable business. *Entrepreneurship and Sustainability Issues*, *1*(1), 10–22. https://doi.org/10.9770/jesi.2013.1(2)

Ministry of Environment and Energy. (2018). *National Circular Economy Strategy*. Retrieved from https://circulareconomy.europa.eu/platform/sites/default/files/national_circular_economy_strategy.pdf

Munawar Khalil, Mohammed Ali Berawi, Rudi Heryanto, Akhmad Rizalie. (2019). *Waste to energy technology: The potential of sustainable biogas production from animal waste in Indonesia* (Volume 105). Renewable and Sustainable Energy Reviews.

Pauline Deutz. (2020). *Circular Economy* (Second edition). International Encyclopedia of Human Geography.

Prague Strategy for Transition to a Circular Economy. (2022). https://klima.praha.eu/data/Dokumenty/circular-prague-2030-eng.pdf

Presentation of the Cyprus Action Plan for the transition to a circular economy. (2021). Cyprus Circular Economy Network. https://cypruscircular.org.cy/cyprus-action-plan-circular-economy/

Shrestha, P. (2019, June 16). *Divergent Thinking*. Psychestudy. https://www.psychestudy.com/cognitive/thinking/divergent

Six Thinking Hats®: Looking at a Decision in Different Ways. (2020). Mind Tools. https://www.mindtools.com/pages/article/newTED_07.htm

Skillicorn, N. (2021, June 16). *What is Creativity? The Definition, history and science of creativity*. Idea to Value. https://www.ideatovalue.com/crea/nickskillicorn/2021/05/what-is-creativity-the-definition-history-and-science-of-creativity/

The concept of creativity throughout history. (2022, July 5). Yes, Therapy Helps! Retrieved July 6, 2022, from https://en.yestherapyhelps.com/the-concept-of-creativity-throughout-history-11469

Vertical Thinking: Definition, Method & Examples. (2017, November 25). Retrieved from https://study.com/academy/lesson/vertical-thinking-definition-method-examples.html

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Module 3 Water pollution, Resilience

Water is the Earth's most abundant chemical compound. It is used everywhere in households, industries, energy production and agriculture. Other than being essential for the survival of mankind it is also essential for sustainable and socio-economic development. Nevertheless, considering the vast number of settings that water is used in it can be inferred that it is susceptible to contamination and in turn pollution. The UN has coined access to sanitary water as a human right and as such water pollution is a topic of utmost importance.

There are approximately 326 million trillion gallons of water. What is noteworthy, however, is that only less than 1 percent of the Earth's water is drinkable. In light of this fact, the proper handling of water is a prerequisite for the sustainability of humanity and the planet. In other words, it is crucial that we take action to eliminate cases of water pollution.

What Is Water Pollution?

Water pollution occurs when substances are discharged into water bodies rendering the water unsafe for human use and impairing aquatic ecosystems. Examples of water bodies include but are not limited to oceans, rivers, streams, lakes, groundwater, reservoirs and aquifers.

Point source pollution vs Nonpoint source pollution

- ***Point source pollution*** *refers to pollution from a single source that can be identified easily, such as a sewage pipe, drain etc. Point source water pollution is a common type of pollution; one example is whenever industrial waste is dumped into rivers or other water bodies.*
- ***Nonpoint source pollution*** *refers to pollution that does not necessarily originate from a single source that can be easily identified. For example, rainfall can mix*

with contaminants and transfer them into water bodies such as lakes. Nonpoint source pollution is the most significant cause of water pollution, as its source cannot be identified and managed easily.

What Are the Causes of Water Pollution?

Water is widely known as a "universal solvent," as it can dissolve more substances than any other liquid. Due to its dissolving capabilities, water is especially susceptible to pollution by toxic substances from farms, towns, and factories readily dissolve into and mix with it.

Groundwater makes up the largest share of freshwater in most countries. According to the UN, out of 89 countries with water quality data, only 52 have information regarding the quality of groundwater. (UN-Water, 2021). This suggests that in almost half the countries, bad-quality groundwater can potentially spread contamination to the population and the environment as it flows into streams, lakes, and oceans.

Most commonly, water gets polluted when contaminants such as fertilisers, pesticides, and waste find their way to it from landfills and septic systems. Decontamination is extremely costly and difficult; polluted aquifers may remain unsafe and unusable for many years.

1. Agriculture as a Polluting Industry

Agriculture ranks as the number one consumer of water globally. That is, on an annual basis, approximately 70 percent of global freshwater withdrawals are used for agricultural purposes and consequently, this sector is the greatest polluter of water. What is special about the agricultural sector is that it is both a cause and a victim of water pollution. In fact, water pollution is triggered by a variety of agricultural practices such as:

a) Livestock breeding

Livestock excretes a significant amount of organic matter. Excess nutrients in organic matter can produce algae in water bodies. The presence of algae in an aquatic ecosystem depletes the level of dissolved oxygen which is a necessity for the ecosystem's species'

survival. Improper management of livestock wastes (manure) can cause surface and groundwater pollution. Water pollution from animal production systems can be by direct discharge, runoff, and/or seepage of pollutants to surface or groundwater. Manure constitutes the main source of nitrogen and phosphorus in surface and groundwater. Manure can contain antibiotics and hormones which have affected the reproductive system of fish in some cases. It also can contain pathogens such as Salmonella, E. coli, Cryptosporidium, and faecal coliform. Animal waste has the ability to pass on over 40 diseases to humans! In addition to diseases, animal poo can contain heavy metals like lead which is known to cause kidney issues and nervous system disorders.

b) Pesticides

The term pesticides refers to any chemical that is used to eliminate or regulate pests such as insects, fungi, weeds, bugs and others. The use of pesticides has brought about increased food production and affordability. Thus, they are an important element in keeping crops healthy. Nevertheless, the use of pesticides in agriculture may cause several problems for humans and animals. By being mixed with water and consumed, pesticides can cause:

- Acute and chronic poisoning
- Allergies
- Carcinogenic effects
- Death to animals

c) Fertilisers

Fertilisers are natural or artificial substances that contain nutrients for plants, and are used for improving growth and production. In summary, fertilisers enhance the fertility of soil or even replace chemical elements that are missing. As mentioned above, excessive nutrients from fertilisers in water can produce algae in water bodies.

The agricultural sector is one of the main pillars of the EU economy. It encompasses farmers from multiple countries, equipped with different natural resources. In addition, agriculture is not exclusively about production but also processing, distribution, retail,

consumption and waste management. Considering this interconnectedness, unpredictable events have the potential to create a domino effect across the whole agricultural supply chain and at a European level. As such, there are numerous risks for which farmers have to be prepared for; some of the major ones being:

- **Production risks**: These are any factors that may impact the expected quantity and quality of production. For instance, a drought or poor weather conditions.
- **Market risks**: As a result of globalisation and trade liberalisation, markets for agricultural commodities are quite integrated. Nevertheless, this feature of the market can act as a double-edged sword. For instance, at times this high level of integration can be beneficial because it promotes competition and improves product quality and prices. On the other hand, it can be detrimental for farmers because it increases the volatility of prices and can also increase operation/production costs.
- **Human risks**: These are any factors that may impact farmers or the human resources of the agricultural sector. For instance, if employees/employers become ill.
- **Financial risks**: These are any factors that might influence a farmer's cash flow such that it proves inadequate for them to meet financial obligations. For instance, if banks increase their interest rates which increases the cost of borrowing.

It should be obvious that not all risks can be eliminated but rather they can be managed.

Water, climate change and agriculture are highly related. Extreme weather conditions increase water scarcity, unpredictability, pollution, or all three. These repercussions on the entire water cycle pose a number of dangers to farmers' access to clean water:

- Flooding and rising sea levels - they have the potential to contaminate water bodies with seawater or other waste.
- Melting glaciers and ice caps - their meltwater can feed into rivers.

- Droughts and heatwaves - they can bring about wildfires which have the potential to wipe out whole agricultural fields.

Furthermore, agriculture is water-intensive and can further intensify water scarcity. As such, growing water shortages and environmental water demands are putting more pressure on farmers to regulate water use. More importantly, it is crucial not to waste scarce water by allowing it to become polluted. This necessitates the development of resilient agricultural systems.

2. The Role of Resilient Farmers in the Modern Agriculture Sector

In the 21st century, the responsibilities and duties of 'farmers' are not limited to the production and distribution of crops and animal products. The modern agricultural sector is going through a major shift towards the implementation of highly technological means that improve yield overall, as well as render farmers more capable to act as 'socially/environmentally responsible businessmen'.

More specifically, farmers/entrepreneurs in Agriculture (Agri-preneurs) should be in a position to:

- Provide eco-friendly services and products to consumers; they should participate in local/regional recycling schemes and become ambassadors of Green Practices in Agriculture.
- Exploit beneficial means that will enable them to save energy and raw materials; this often requires to be involved in Innovation Projects as well as training in new technologies.
- Assess the capacity of their farm to incorporate new technologies that will allow them to utilise solar, wind and hydro energy.
- Utilise resources and raw materials in a responsible manner; running a successful farm should not come at the cost of limited natural resources or at the cost of the well-being of local/regional communities

Now more than ever, farmers and agripreneurs are required to hone their skills, future-proof their farms and make their business (Socially and Environmentally) 'sustainable' while remaining profitable in a highly competitive, challenging and ever-evolving market; in other words, they need to be **'**resilient**'.**

Resilience in agriculture

Resilience is defined as the ability to recover swiftly from adversities. More importantly, note that being resilient is about recovery which implies that difficulties are likely to occur at some point and it's only a matter of overcoming them. With that being said, being resilient does not imply one does not experience any stressors. Instead, it requires one to embrace a given stressor and work through it.

Throughout history, a range of unpredictable events negatively affected the agricultural sector to the point where it had to take drastic measures in order to adapt. Resilience in the context of agriculture measures the amount of disruption an agricultural system can endure before a crucial "threshold" is passed and the system must undergo a significant transformation. In the past, wars used to be the main stressor that would prompt agricultural resilience. In the present it could be argued that stressors on our agricultural systems are climate change and changes in the way land is used. In fact, it could be argued that the agricultural sector is at a turning point. That is, in order to meet global food demand by 2050 production must increase by more than 70 per cent. Furthermore, while demand for food is on an increasing trajectory, global production is predicted to steadily decline anywhere between two to six per cent with each decade as a direct consequence of climate change (Time, 2022).

Resilience in Agriculture - Soft Skills Development

Which Soft Skills Make Farmers 'Resilient'?

Critical Thinking	• **Identification of potential benefits and opportunities that emerge** • **Dynamic decision making** • **Risk Management;** - Identifying risks - Implementing actions against risks - Assessing the potential impact of risks - Assessing the effectiveness of risk management actions
Creativity and Innovation	• **Thinking outside the box** • **Putting bold ideas to the test** • **Exhibiting persistence upon failure**
Resource management	• **Time;** planning ahead, frequent evaluation of the impact/effectiveness of technologies and development actions/initiatives • **Raw materials;** ethical raw material sourcing, sourcing locally, assessment of the quality of resources • **People;** staff and management training
Team management	• **Maintaining a positive attitude in the face of uncertainty** • **Cultivation of Innovation-oriented organisation culture** • **Assessment of the formation and performance of teams, for the purpose of developing future strategies** • **Implementation of Team Support Systems** - Acceptance of failure - Acceptance of new ideas from employees - 2Employee skills development (Training)

Adaptability	• **Comprehension of local/national/regional/European laws and regulations** • **Cultivation of a common vision among organisation leaders** • **Willingness to adopt both innovative and conventional ways of thinking** • **Being up to date with technology (training, workshops, becoming members of local/regional professional groups)**

3. Managing Water Pollution in Agriculture

When thinking about the problem of water pollution and the skills required to deal with it in the context of agriculture, one is most likely to first think about technical/hard skills rather than soft skills. Soft skills are competencies that have to do with how one operates and relates to others. Moreover, while having the technical know-how is crucial in crafting a given solution plan, successfully implementing such a plan may often require collaboration with other parties. As such, this necessitates the possession of various soft skills such as communication, teamwork, problem-solving and so on. Nonetheless, in the case of agriculture 'resilience' is arguably among the most needed qualities.

In light of growing water shortages and environmental water demands, there is more pressure on farmers to regulate their use of water. More importantly, it is crucial not to waste scarce water by allowing it to become polluted.

Types of Water Pollution

1. Nutrient pollution

Nutrient pollution refers to the contamination of water as a result of an input of excessive nutrients. The main nutrients that are responsible for this type of pollution include but are not limited to nitrogen and phosphorus.

Two of the most common causes of nutrient pollution are pesticides and fertilisers. Once they are sprayed, they can very well mix with the water and seep into the soil. As such, any local water bodies that are supplied with groundwater are contaminated. Nitrate fertilisers are very soluble in water and are easily washed off fields by rain and then into rivers and reservoirs. Because nitrates are all soluble, they cannot easily be removed from the water. Pesticides used by farmers to kill weeds or insects may be washed or blown into streams and rivers.

When an abundance of the aforementioned nutrients is present within a water body it can lead to eutrophication which is a process that stimulates the growth of algae, a phenomenon known as "Eutrophication". This presents a problem because a) algae depletes the dissolved oxygen from the water (which is needed for the survival of aquatic species) and b) it blocks sunlight from reaching aquatic ecosystems.

Sources of Nutrient Pollution:

- Fertilisers and Pesticides
- Animal manure
- Sewage treatment plant discharge
- Stormwater runoff
- Car emissions
- Emissions of power plants
- Failing septic tanks

Protection against Nutrient Pollution:

- Implementation of risk assessment of the economic, social and environmental risks associated with Nutrient Pollution
- Having the necessary knowledge to:

apply fertilisers at appropriate times and amounts

avoid over-watering so as to prevent sedimentation

- Using environmentally friendly materials such as phosphate-free detergents and soap

2. Sewage and Wastewater Pollution

In modern societies, sewage is a common cause of water contamination. Sewage-polluted water can transfer bacteria and viruses to people and animals that come in contact with it or even worse, by consumption. Sewage-polluted water is usually treated in special treatment plants and disposed of through pipes that lead into the sea. Untreated waste which is discharged into aquatic basins can contaminate the water with pathogens. Unfortunately, even in today's highly technological world, a large proportion of wastewater is discharged untreated directly into the closest drainage channel with total disregard of the consequences. If untreated, sewage flows into rivers where it is decomposed by microorganisms, therefore starving aquatic species of oxygen.

Sources of Sewage and Wastewater Pollution:

- Chemical substances
- Pharmaceutical substances
- Detergents
- Feces
- Urine

Protection against Sewage and Wastewater Pollution:

- Compliance with local water laws and regulations
- Process improvement
  - Not disposing of chemical waste in sinks/toilets
  - Not disposing of cooking oils and fats
  - Not flushing pharmaceutical substances
  - Not dumping trash into freshwater bodies
- Displaying leadership by volunteering in community water clean-ups

3. Pollution by Oil Spills

An oil spill is a type of pollution that occurs when liquid petroleum hydrocarbons are released into the marine environment. In most cases this is a direct consequence of human activities such as drilling in the ocean. In other cases, oil is also naturally released from underneath the seafloor through fractures known as seeps. When oil contaminates the oceans, it can very well flow into lakes, rivers or other drinking water bodies which are naturally connected to the ocean. As a result, water becomes inconsumable. Moreover, when considering the fact that only a litre of oil has the ability to contaminate 1 million litres of water, the impact of oil spills in contributing to water pollution becomes quite apparent.

Protection against Oil Pollution:

- Preventive Maintenance; Oil companies should be proactive by inspecting their equipment and infrastructure so as to prevent the probability of oil spills from happening altogether. In addition, it is a good practice to conduct maintenance work periodically.
- Recycle and reuse plastic products - plastic is a petroleum product
- Participation Oil Pollution awareness campaigns on local/regional/EU levels

4. Radioactive Water Pollution

Radioactive waste is a type of hazardous waste that contains radioactive material. Radioactive water pollution, in particular, emerges as a consequence of improper handling of nuclear materials and debris following an explosion. Additionally, the mining and exploitation of radioactive elements like uranium can introduce radioactive pollution into our water supplies.

Causes of Radioactive Pollution:

- Nuclear power generation
- Rare-earth mining
- Nuclear medicine
- Nuclear research
- Reprocessing of nuclear weapons

Protection against Radioactive Pollution:

- Being proactive by:

  - Disposing of radioactive waste in thick concrete containers so as to prevent its leakage
  - Labelling radioactive materials

- Embracing innovation by using renewable sources of energy rather than nuclear power which also relies on the mining of radioactive uranium

5. Sediment Pollution

'Sediment' refers to particles such as sand, clay and silt that settle at the bottom of a body of water. Sediment can have a number of negative impacts on the quality of water, and subsequently the health of humans and animals. Sediment particles are carried and settle in water by the wind, water and ice. Sediment water pollution can have significant impacts such as:

- It clogs water passages and increases the possibility of flooding
- It causes water cloudiness, making it harder for animals to find food
- It prevents aquatic vegetation from thriving
- It destroys the natural habitat of aquatic species
- It increases the water treatment costs and reduces the quality of drinking water

Protection against Sediment Pollution:

- Training of staff on available means that can be used against sediment pollution such as:

  - Installing storm drain filtration devices
  - Installing perimeter control (i.e silt fences)

- Floating turbidity curtains may be used as a last resort for when sediment has already settled into water bodies

6. Thermal Pollution

One form of pollution which is commonly caused by industrial facilities is thermal pollution. This form of pollution occurs when there is a rapid shift from the natural temperature of a given water body as a result of human influence. Industrial plants draw water from nearby bodies to cool down their machinery and then eject it back but at a higher temperature. This can be problematic for the reason that hot water decreases the water's dissolved oxygen concentration.

Protection from thermal pollution:

- Using artificial lakes to let the heated water naturally lose its temperature with time to then be released into water bodies or recycled for further use.
- In power plants, steam is used to power turbines which generate electricity. This implies that waste heat is produced. As such, reducing energy consumption will reduce levels of thermal pollution.
- Reusing the hot water to heat homes and buildings.

7. Pollution by Inorganic Matter

a) Marine Dumping and Plastic Pollution in the Sea:

Every year a multitude of materials are either dumped or flow into the ocean. Out of all the litter that is present in the aquatic environment, plastic is the leading one. To illustrate, it is estimated that 40 percent of the ocean’s surface is covered by plastic materials. Moreover, given the rates at which plastic is currently being dumped into the ocean it is expected that by 2050 there will be more plastic than fish in the sea (World Economic Forum, 2016).

Plastic is a synthetic, organic polymer made from petroleum. Its features deem it ideal for a range of purposes including (but not limited to): packaging, construction, farming and agriculture, electronics and household items. Due to this versatility some 380 million tons

of plastic are produced every year globally and of which 14 million eventually flow into the ocean (Statista, 2020).

Certain particularities make the presence of plastic into the ocean problematic. Firstly, depending on the material and its structure, plastic can take anywhere from 20 to 500 years to decompose (Global Recycle, 2022). Moreover, only 9 percent of plastic is recycled. The implications are that the rate at which plastic decomposes is much lower than the rate at which it flows into the ocean and this discrepancy is only increasing year after year. As a result, most plastic found in the ocean may stay there until it decomposes. However, plastic may decompose to smaller micro pieces which are not even visible to the naked eye.

b) Industrial waste:

Water is used by industrial facilities in order to flush waste away from the plant. Examples of industries which cause water pollution include but are not limited to petroleum refineries, iron and steel mills, power plants, and food processing industries. While there are certain regulations in tact to protect water bodies from harmful waste, there is always the possibility that the process of discharging waste is mismanaged, thereby resulting in water pollution.

4. Module Summary

In light of climate change, growing water shortages and environmental water demands there is now more pressure than ever to regulate the use of water such that water pollution is minimised. On that note, agriculture ranks as the number one polluter of water globally. These facts necessitate the development of resilient agricultural systems. In fact, agriculture that is resilient is sturdy and flexible enough to respond to the increasing environmental, economic, social, and institutional problems of the modern world.

Water pollution has many sources (see table below) and therefore dealing with it requires a number of collaborations to happen. While coming up with solutions is mostly about

having technical skills, successfully implementing solutions is about being able to work with others synergistically. This calls for farmers to also possess soft skills such as teamwork, communication, adaptability and so on. By developing their soft skills, farmers can improve agricultural resilience to ensure that the system can cope with the challenges of the future.

Source	Contaminant	Impact
Organic matter from Sewage and Wastewater	• **Pesticides, fertilisers, animal manure, human waste, nitrates & phosphates** • **Human waste, Pathogens** • **Detergents** • **Pharmaceuticals**	• **Oxygen depletion, the life of the aquatic ecosystem suffers.** • **Transfer of pathogens (bacteria, viruses) to people and animal**
Oil spills	• **Power plants** • **Petroleum refineries** • **Cargo ships/tankers**	**On aquatic species and birds:** • **Hypothermia** • **Drowning** • **Deformities** • **Blindness** • **Poisoning** **Oil spills destabilise ecosystems to an extreme degree.**
Radioactive matter	• **Nuclear power generation** • **Rare-earth mining** • **Nuclear medicine** • **Nuclear research** • **Reprocessing of nuclear weapons**	• **Makes water unusable for generations** • **Cancer** • **Destabilize ecosystems to an extreme degree** • **Mutations**

Sediment	• **Soil** • **Slit** • **Dust** • **Dirt**	• **Flooding** • **Destabilisation of aquatic ecosystems** • **Starvation of aquatic animals** • **Expensive water treatment cause** • **Lowers the quality of drinking water**
Thermal	**Rapid shift from the natural temperature of a given water body as a result of human influence.**	• **Reduction of dissolved oxygen in the water, starving aquatic species of oxygen** • **Destabilisation of aquatic ecosystems**
Inorganic matter	• **Heavy metals (i.e. mercury, lead)** • **Excess nutrients such as nitrates and phosphates** • **Metal particles** • **Rubber residues** • **Toxins from pesticides and herbicides** • **Pharmaceuticals** • **Microplastics**	• **Oxygen depletion, the life of the aquatic ecosystem suffers.** • **Transfer of pathogens (bacteria, viruses) to people and animal** • **Destabilisation of aquatic ecosystems** • **Lowers the quality of drinking water**

References

Galán, L. (2022) "*How long does plastic decompose for?*"

Little, Amanda, and Hotter The Fate of Food: What We'll Eat in A Bigger. "What Climate Change Will Do to the Global Food Supply."

More plastic than fish in the ocean by 2050: Report offers blueprint for change (2016) *World Economic Forum*.

Ian Tiseo and 27, J. (2022) *Plastic production worldwide 2020*, *Statista*

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Module 4 Sustainability, Empathy

The concept of sustainability has been used since the 1970s. Since then, a number of related concepts and metrics have been developed to promote sustainability. Numerous guidelines, reports and sets of recommendations have been produced at global level, but the idea of sustainability is still little known and practised.

Empathy is the capacity of the personality to empathize with the other person's state of mind in direct communication with the other person. The main means of understanding and intuition is the evocation of the emotions and various tensions of the other person through empathy. This can also be expressed in terms of the personality projecting itself into the other. The experience of the other person's state of mind can be expressed on an emotional-inductive level. Sympathy becomes empathy when the experience is consciously processed, and the context of the other person is named and interpreted for oneself.

1. Sustainability

1.1. The concept of sustainability

The concept of sustainability was jointly developed by Club of Rome scientists in the 1970s in the Limits to Growth report, by the Brundtland Commission's (the UN World Commission on Environment and Development) report Our Common Future in 1987, and by the 1992 UN Conference on Environment and Development.

Sustainability is broadly defined as living in the present in a way that ensures a happy, healthy and liveable future for us and our descendants in the long term, while keeping consumption, resource use and economic growth within the limits set by nature.

The most important element of the idea of sustainability is to rethink consumption and production, questioning the consumer society and the economic system that serves it. Current consumption and production patterns in society make it impossible to meet the needs of future generations. It is now clear that the trends established and maintained by

a technocratic civilisation that exploits energy and natural resources to the limit are unsustainable.

Sustainable development rests on three pillars: the social, economic, and environmental pillars.

In addition to the concept of sustainable development, the Brundtland Commission also set out the principles needed to achieve sustainability. These are the following:

- Respecting and protecting communities,
- Improving the quality of human life,
- Minimising the use of non-renewable resources,
- Growth that respects the limits of the Earth's carrying capacity,
- Changing individual behaviour and habits,
- Motivating and empowering local communities to care for their own environment,
- Building national cooperation to develop sustainability strategies,
- Global partnerships, agreements.

Sustainability issues can be examined at many levels (individual, family, corporate, national, regional, global). Sustainability issues can be examined at many levels (individual, family, corporate, national, regional, global). Different challenges, perspectives and interests are and can be brought to the front at each level.

As part of its sustainable development agenda, the United Nations has set and adopted the Sustainable Development Goals (SDGs) by its member states. These are the goals that states are expected to adhere to in their economic processes in order to achieve them by 2030.

The 17 general objectives are as follows:

- Goal 1: Eradicate all forms of poverty in all parts of the world;
- Goal 2: End hunger, improve food security and nutrition, promote sustainable agriculture;
- Goal 3: Ensure healthy lives and well-being for all, regardless of age;

- Goal 4: Ensure high quality, inclusive and equitable education and lifelong learning opportunities for all;
- Goal 5: Ensure gender equality and empower women and girls;
- Goal 6: Ensure access to water and sanitation for all and sustainable water and sanitation management;
- Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all;
- Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all;
- Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation;
- Goal 10: Reducing inequalities within and between countries;
- Goal 11: Building inclusive, safe, resilient and sustainable cities and other settlements;
- Goal 12: Develop sustainable consumption and production patterns;
- Goal 13: Take immediate action to address climate change and its impacts;
- Goal 14: Conserve and sustainably use oceans, seas and marine resources for sustainable development;
- Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainable forest management, stop desertification, stop and reverse land degradation, stop biodiversity loss;
- Goal 16: Creating peaceful and inclusive societies for sustainable development, ensuring access to justice for all, building well-functioning, accountable and inclusive institutions at all levels;
- Goal 17: Strengthen the means of implementation and renew the Global Partnership for Sustainable Development.

In addition to the concept of sustainability, we need to be familiar with other related concepts.

One of these is the concept of ecosystem services. These include the benefits that people derive from the ecosystem for people and communities.

The concept of a green economy is to green the economy as a whole, to mainstream sustainability into everyday life. This includes advanced environmental thinking, cleaner, more material-efficient production, waste minimisation, environmentally friendly products and product chains, green energy production based on renewable energy sources, more efficient energy use and energy saving. In general, the term refers to an economy in which all production and consumption decisions are made with regard to the well-being of society and the overall health of the environment.

The concept of corporate social responsibility expresses the commitment of the company's management to the well-being of the environment and society, in addition to the economic and efficient operation of the company. In practice, this means that management takes environmental and social aspects into account when carrying out a risk analysis prior to a decision.

The concept of sustainable food production

Sustainable food production and consumption is about promoting more environmentally friendly, resilient, healthy, and equitable food systems. Food systems are responsible for around a third of the world's greenhouse gas emissions, mainly through agricultural production. It is a priority to reduce carbon emissions from agriculture. At the same time, other sectors of food production, such as packaging, processing and transport, also have a major climate impact. More environmentally friendly production systems that respect biodiversity and ecological aspects must be introduced. However, it is clear that this change cannot happen overnight, especially if we do not provide adequate support for producers to change their current production practices and move to more sustainable production methods using new agro-ecological methods. The production of food to feed a growing population is a challenge for the global economy. Food production damages arable land, reduces habitat for living organisms, requires huge amounts of drinking water and increases greenhouse gas emissions. To keep our planet liveable, reforming the way we produce and consume food is more relevant socially, environmentally and economically than ever before.

It is important to know that about 1/3 of the crops consumed by humans benefit to some extent from **pollination** by bees or other insects. In Europe alone, 4,000 vegetable

varieties depend on the work of flower pollinators, but so do many of our fruit trees need insects to pollinate them. Cherries, sour cherries, strawberries, tomatoes, apples, pears, almonds, sunflowers, wheat, rice, maize and many other crops we eat regularly are pollinated by bees. In addition to crops in cultivation, 90% of wild plants are also reproduced by insect pollination. Wild pollinating insects are becoming increasingly scarce all over the world. For this reason, it is important to try to provide suitable habitat for pollinators. Centuries ago, they lived almost alongside us, nesting in the walls of a mud house or under our roof. Today the situation has changed, and our building methods are less favourable to them. Moreover, many people have an unjustified aversion to them. If we put bee colonies in areas where there are flowering hedges, small gardens, community gardens, parks with a variety of plants, flower-covered balconies, we have already helped.

Major reforms are needed in food production to meet the ever-changing needs of a growing population and consumers, as well as to respond to the challenges of climate change. In the absence of arable land and agriculture, large cities rely on imported food, often from surrounding areas, but more often hundreds or thousands of kilometres to reach store shelves. This long supply chain is extremely demanding in terms of human and natural resources, and also has a serious environmental impact. As more and more conscious consumers seek to eat local food, food production is moving closer to the consumer.

The concept of sustainable consumption

There are several definitions of sustainable consumption. On the one hand, it can mean unsustainable consumption, consumption in a different way or a lifestyle that goes back to tradition, and it can also mean less consumption or even more efficient consumption. There is no clear definition of what is right and what is professional behaviour if we want to live sustainably.

Basic conditions for shifting consumption patterns towards sustainability:

- education and awareness raising,
- creating a value system and infrastructure,
- developing efficient technologies and products,

- developing public regulation.

Also related to this the concept of socially responsible consumers, who are consumers who take into account the social consequences of their individual consumption or take care to reverse negative changes in society through their purchasing power, who take sustainability into account in their purchasing decisions, and who consider the social, economic and environmental impacts of their purchasing decisions.

1.2. Key theories of sustainability

It is known from literature that consumers are generally aware of environmental problems. Yet, surveys show that the average European is reluctant to act in an environmentally friendly way, especially if it affects their lifestyle. The average European is not willing to give up the everyday convenience of driving, shopping, etc. Yet some researchers argue that radical lifestyle changes are needed to reduce environmental impacts, while others suggest more modest, less radical changes for the time being.

However, there are now social groups who recognise their own responsibility and are trying to take action to reduce their environmental impact. Such groups include, among others, the followers of the LOHAS (lifestyle of health and sustainability), low waste, zero waste lifestyles. While the first group is conscious of their health and sustainability, members of the other groups aim to reduce and minimise their waste and their ecological footprint in general.

It is typical of human behaviour that we know how we should act, but we choose to act differently and often take the easy way out. Because of this phenomenon, some experts argue that knowledge of environmental information is not enough, because it does not immediately lead to environmentally conscious actions. However, there is evidence in the literature that knowledge of environmental problems and actions is a necessary condition for action, but not a sufficient condition for action. Nevertheless, a group of researchers believe that increasing knowledge can have a positive impact on environmentally responsible behaviour.

Csutora-paradox

That knowledge is not enough is further reinforced by the fact that the environmental impact of green and uncommitted consumers with the same income is not significantly different. In fact, consumers do not always do what could have an effective outcome in reducing their environmental impact due to a lack of (usable) information and the choice of an easier route. Moreover, many act on the basis of non-professional assumptions. So there is behaviour change, but it does not have the results that we would expect. This phenomenon is known as. This is known as the Csutora Paradox or the Behaviour-Impact Gap. This theory states that behaviours that are easy to perform or actions that are perceived to be environmentally conscious based on misinformation can easily result in a higher ecological footprint than neutral or non-environmentally conscious actions. The Behaviour-Impact Gap clearly shows that individuals need professionally based guidance in order to practice environmentally responsible behaviours with the right impact.

Circular economy

The circular economy aims to preserve and maintain the value of the products, materials and resources used in the economy for as long as possible and to minimise waste. The concept combines several theoretical concepts and practical solutions: from industrial ecology, cradle-to-cradle and the blue economy concept to biomimicry. The circular economy is a new development paradigm with a holistic vision that integrates the different subsystems of the pillars of sustainability (economy, society and environment) in a multifaceted way. The initiative aims to transform an economic system based on the "take-what-you-use" principle into a resource-efficient system.

The economics of localisation

This approach argues that the vast majority of human needs can be met locally and economically. This is based on the fact that technological progress has made it possible to make relatively small-scale operations economically viable. And on this basis it is not inefficient to transfer control of the means of production and of the flow of goods from producer to consumer back to local communities from global and multinational organisations. The approach offers a social, political and economic framework for individuals, communities and business actors to rediversify local economies.

Boosting and developing the local economy is of paramount importance today. This includes the promotion of local products, their recognition, promotion and marketing, the development of local businesses, local alternative energy production, autonomous small community energy supply, etc..

The local product

A local product is a product produced in a particular municipality or region using local resources and involving local economic actors. Local products are typically produced by the population and by micro and small enterprises. They are typically produced, sold and consumed locally and the distribution channels may be shorter than for non-local products. The resulting added value is local and contributes locally to the development of the economy and society.

1.3. Quality of life and consumption

In the last hundred years, the use, exploitation and presence of many things have increased (e.g. nature, resources, pollution, extinction of species), while the presence and use of other things (happiness, local values, natural environment) have decreased.

The Earth is finding it increasingly difficult to support the human population and to compensate for the negative effects of human existence. This has been documented since the 1700s, but has not been halted or reversed, despite the opportunities offered by technological progress.

This path could easily lead us into a new world of scarcity, where resources are scarce not because they are not well distributed or not good enough, but because they are depleted.

We have built our economy on a few scarce (limited) resources, including oil and gas, which are not available forever. The more sophisticated our way of life becomes, the more vulnerable we become to these resources.

Building on these resources, we have created vast monoculture systems that are highly efficient, but based on these scarce resources. This makes these super systems vulnerable and unstable. They lack flexibility and diversity and the capacity to change.

Our globalised world has also evolved with the help of cheap oil and gas-based transport, and today almost all our tools, objects and food depend on a raw material, component or ingredient found in a remote part of the world. It is obvious that if these transport routes are disrupted or become more expensive, our tools, objects and foodstuffs could disappear from the shelves or become prohibitively expensive. Today, however, we have quickly become accustomed to this prosperity and abundance, and we can no longer imagine our lives without it, without almost unlimited consumption.

In connection with this, society is often confused by calls to reduce and cut back consumption.

However, there are initiatives that focus on other aspects rather than consumption and try to give life a different meaning.

These initiatives focus on human creativity, contemplation and a willingness to act, and encourage people to own and buy fewer things. They give a central role to small communities in the face of a globalised world, where human relationships and the environment are once again at the forefront.

One such initiative is the bioregional model, which is not a 'back to nature' type of concept, but an economic philosophy in which economic actors focus on local resources and meeting local needs in a non-hierarchical society. In a region-based society, multicultural communities of diverse values can be built or developed, in which members of society are interdependent.

Such models are based on, and are also premised on, an intelligent, broad-minded citizen who prefers local goods and services, who is "different and more" than what global capitalism requires as a "consumer".

1.4. The sustainability indicators

Gross Domestic Product

GDP (gross domestic product) is the monetary value of all the final consumption goods (goods and services) produced in an area over a given period of time (usually one year).

GDP measures national income and economic output. GDP per capita is often used as an indicator of average living standards.

One method of determining GDP is to calculate it on an output basis. In this method, the total output of all the actors in society is calculated separately and then summed. The components of GDP are: household consumption, government consumption, business investment, net exports (difference between exports and imports).

GDP also has economic shortcomings because it does not take into account the informal economy or work done within the household, but it does take into account activities to repair environmental damage. However, perhaps the biggest problem with GDP is that it does not take into account the cost of increasing economic output. The Earth's resources and living things are finite, and over-using them will be at the expense of future generations.

The fact that GDP per capita is higher in one country does not mean that people are better off in another, because income is not used with the same efficiency everywhere. Moreover, if a country's GDP increases, it does not necessarily mean that well-being increases. As has been said, rebuilding after a natural disaster increases GDP, but not welfare. It is therefore recommended to look beyond GDP to other (alternative) measures that give a more accurate picture of the well-being of a society.

Measure of Economic Welfare (MEW)

This index, which is a better measure of well-being than GDP (the economic well-being index), adds the value of leisure time and the value of non-wage activities to the value of GDP, which is based on goods and services only, but subtracts the value of the environmental damage caused. The index is monetised and takes into account only monetary values.

Index of Sustainable Economic Welfare (ISEW)

Several elements of the ISEW indicator are identical to the MEW index. ISEW = personnel expenditure + public expenditure (excluding defence) + value of unpaid works - private defence expenditure - cost of environmental damage.

The starting principle of the construction is clear: certain items do not serve welfare and should not be added to the welfare index but subtracted.

What MEW and ISEW, and similar indicators, have in common is that they rely on the national accounting system, the backbone of GDP calculation, and include some non-market factors in this system. The obvious disadvantage of this approach is that it tries to transfer the monetary values from the social and environmental spheres to the economic sphere: on the one hand, it gives priority to real economic values that are actually measured in monetary terms, and on the other hand, it inevitably neglects important social and environmental aspects that cannot be expressed in monetary terms or are simply left out of the calculation.

Two main procedural strands have emerged to overcome the methodological problem. One is to retain the different sub-indicators in their own dimension and produce a multidimensional indicator system instead of an aggregated unidimensional indicator, while the other procedure seeks to find unifying dimensions other than money to produce an aggregate value, such as ecological footprint, carbon footprint, or water footprint.

The ecological footprint

The metric was first introduced in 1996. The Ecological Footprint is defined as a measure of environmental space consumption, the amount of living space that can sustain a given human population at a given standard of living indefinitely. It measures the number of hectares of ecologically productive land required for the production of food and consumer goods, for infrastructure and built-up areas, and for the disposal of production waste and carbon dioxide sequestration by forests.

The ecological footprint is a measure of how much land and water a population needs to produce all the resources consumed, to neutralise all the waste, using the prevailing technology.

The ecological footprint is expressed in units of land per capita: gha/person (gha = global hectare).

Biocapacity

A concept related to the ecological footprint is biocapacity. It is also expressed in units of area per capita. This indicator shows the amount of productive land per capita on Earth and the number decreases as the Earth's population increases. The total biocapacity of a country is expressed as the amount of fertile land available in the country, measured in global hectares. If the biocapacity of a country is less than its ecological footprint, then that country's farming is not sustainable in the long term. We then talk about an ecological deficit and the country or region is operating in an ecologically unsustainable way.

Gross National Happiness

Gross national happiness (GNH) is an indicator designed to measure the happiness of a society. But since we all have a subjective understanding of happiness, what may mean happiness for some may mean unhappiness for others.

Areas of Gross National Happiness:

- Psychological well-being,
- Health
- Use of time
- Education
- Diversity and cultural resistance
- Good government
- Community vitality
- Diversity and ecological resistance
- Standard of living

Human Development Index

According to the Human Development Index, development is the process of expanding human capabilities. Every year since 1993, the United Nations Development Programme (UNDP) has published HDI values in the Human Development Report (HDR). The HDI emphasises human life in health and creativity, and in making meaningful choices, in addition to consumption in the traditional sense.

This indicator measures the development of countries by combining health, education and wealth as an alternative to GDP, which is unilaterally expressed in monetary terms. While the HDI makes a significant step towards the human and social dimension, it neglects to include the environmental factor.

1.5. The role of environmental education in relation to sustainability

In ancient communities and religions, people looked upon nature and living things with admiration and humility. However, in the course of social and economic development, this view has changed and nature and living beings have come to be seen as capital, as resources to be exploited, as means to be used, and in some cases as obstacles. This attitude has led to problems on a global scale that we cannot solve and to a lack of uniform recognition of the problems at world level.

Modern pedagogy was initially dominated by nature education (nature education or conservation education), with the main aim of protecting living things, and later on, habitat protection. At that time, man was still a defined actor in the biosphere, a moral man living in harmony with nature.

By the end of the 20th century, mankind had reached a stage of technosphere development where it had become quite distant from its former natural environment, the biosphere. With technological progress, it has been able to exert progressively greater and greater environmental transformations and degradations, first at local and then at regional level. By the 1980s, it had become clear that environmental degradation was not only regional, but global. The majority of the damage can only be calculated over a long period of time, and the problems involve natural, economic and social elements, requiring a complex approach.

Environmental education has been around since Rachel Carson's Silent Spring in 1962. The author's book raised awareness of the harmful biological effects of chemicals used in nature and the global nature of the problem. It is also seen as the beginning of modern environmentalism.

In 1972, the UN convened the first World Environment Conference in Stockholm, called the UN Conference on the Human Environment. The conference focused on the impact

of economic growth on the environment. The conference concluded that interdisciplinarity and the development of in-school and out-of-school forms of environmental education should be introduced into the international environmental education agenda.

In 1975, the Helsinki Conference on Security and Cooperation in Europe stated that preventive measures are the most effective way of dealing with environmental damage and that the protection of the environment is promoted by the responsibility of all sections of the population, which requires continuous and intensive work of information and education, especially among young people.

Environmental education was defined in 1977 in the final report of the UNESCO conference in Tbilisi. "Environmental education is a process of raising a world generation that knows and cares about its wider environment and its problems. They have the knowledge, skills, attitudes, motivation and commitment to work individually and collectively to solve current problems and prevent new ones". Its recommendations included suggestions for adapting school curricula and developing materials to support environmental education.

Since the 2000s, the view has been accepted that the practice of environmental education, which encourages love and protection of nature, has broadened to include sustainable development and society. On this basis, pedagogy of sustainability means that environmental education also means changing attitudes and lifestyles, supported by the transfer of good practices, professional development of teachers and good education policies.

The World Conference on Sustainable Development, held in Johannesburg in 2002, also stated that education is an essential tool for development, that sustainable development requires educated and active citizens, and that education plays a key role in this process, which requires increased financial and infrastructural support.

The period 2005-2014 has been designated by the United Nations as the Decade of Education for Sustainability, with the aim of integrating the core values of sustainability into all aspects of learning. Number of programmes, curricula and initiatives have

contributed to this goal, but overall attitudes have not changed at the societal level and have not been integrated into the system.

For the 21st century, one of the key issues in the pedagogy of sustainability has become the relationship between people and people, recognising the importance of cooperativity, the role of local knowledge and small communities, the need to combine individual and social responsibility, and the need for international cooperation. The solution, according to this principle, lies in the individual, the family, small groups of people who feel responsible for each other and for our environment.

It is now accepted that our global world is full of crises, whether social, cultural or environmental. Understanding these crises requires a holistic approach. And they can only be combated, or at least reduced, by aware and responsible people with a broad perspective.

This kind of holistic education includes the recognition that care and love for the environment only occurs when there is self-respect and care and love for other people. In contrast to material goods, the importance of joy, security, health, community is enhanced, and social capital, a resource hidden in the relationships between people, is valorised. This is also linked to the growing cooperation between the environmental profession, the green civil movement and the churches in recent years, and the launching of environmental awareness movements in the churches and their commitment to environmental responsibility.

1.6. Promoting sustainable behaviour among the population

Consumer behaviour is very complex and determined by many factors. In studying it, we look for characteristics such as what and how much consumers buy, who buys in a family and how they buy products, what their individual needs and feelings are, what information they have and where it comes from, or what they feel after having or acquiring a product. Based on this, knowing where consumers get each piece of information will help us to achieve more effective results by targeting messages through the identified channels. For example, promoting products with recyclable packaging, encouraging selective waste collection, raising awareness of the environmental impact of

eating meat, exposing hidden environmental costs or offering alternatives to environmentally conscious consumer behaviour.

In addition, the literature suggests that there are many motivations for greener behaviour. It can be due to tax or price increases, marketing effects, community power, internal attitudes or even the health of the individual and changes in health, among others. It can also be said that society and culture have a strong influence on people's behaviour. It is known that different relationships and group consciousness, for example, strongly influence the behaviour of individuals. There is research evidence that emotions have a greater influence on environmental behaviour than reason (e.g. environmental knowledge).

Consumer decision-making is also strongly influenced by family, friends, and other groups. "According to the so-called Easterlin paradox (or happiness paradox), relative income has a greater impact on our life satisfaction than absolute income, i.e. our satisfaction is more strongly influenced by how our relatives or neighbours live compared to us than by how much money we actually have".

We also know that comparing oneself to others can also lead to a form of follower behaviour (e.g. copying the behaviour of celebrities or respected people). In addition, some experts argue that to ensure that individuals do not spend their time according to the expectations of consumer society, community education is needed. It would be important to promote non-consumption activities such as socialising with friends, gardening, community activities, etc. However, in today's world system, this is a very difficult, long-term and often seemingly impossible challenge. Therefore, many researchers believe that being environmentally responsible is a responsibility that individuals cannot even manage on their own. They suggest initiating community-based activities rather than motivating individuals. Their research shows that community initiatives are often more successful because campaigns aimed at individuals fail to trigger the kind of community-based pattern-setting in people that communities can achieve.

Some have argued that choice-editing can address situations where people are not sufficiently environmentally aware and there is an urgent need for intervention. This could

be the case of government intervention to protect the environment, by introducing a new rule or imposing a mandatory service (e.g. mandatory selective collection, higher taxes on products with a proven high environmental impact).

But because people are reluctant to change their routines and avoid changes that involve sacrifice, they often reject regulations that they perceive as restrictions. Another group of experts therefore argues that creative, disguised solutions should be used to encourage consumers. Such methods include influencing consumer behaviour through information campaigns (social advertising) and good consumer behaviour, but also social communication (e.g. community marketing) or education.

An additional motivator for the uptake of environmentally responsible consumer behaviour can be to create the perception that consumers will benefit most from using green products, services or behaving in an environmentally responsible way. This is particularly important because some economic theories suggest that consumers seek to maximise benefits and make rational choices. So, if they perceive that the environmentally friendly activity (e.g. purchasing an environmentally friendly product as opposed to a conventional one) is the least costly and the most beneficial, they will undertake it and choose it from the alternatives available to them. And this perception can be achieved through a number of motivating factors (e.g. taxes, discounts, marketing, community impact).

In many cases, service development can also contribute to reducing the environmental burden on users. For example, in a suburb, if residents use a gardening service, they are acting in a much greener way than if they buy their own machines to carry out the activity in each household. This of course requires the availability of appropriate services. In addition, experts say that the shift from a consumer to a service society is key to reducing the environmental burden, while keeping GDP production constant.

It is therefore important to design and develop services that are environmentally friendly, yet also beneficial to consumers. Since consumer attitudes and available services are a major determinant of environmentally conscious action, it is in vain for an individual to have an environmentally conscious attitude if there is no infrastructure to support it (e.g.

he would sort but no organised collection or collection island; he would buy local produce but no opportunity to connect with local farmers - e.g. a local produce market). Experts argue that if a consumer is environmentally motivated but lacks the supporting infrastructure, the attitude is less likely to translate into real action. So, concrete solutions need to be given to individuals to translate environmental awareness into real action.

We also know that by sending positive messages, we reinforce in consumers the feeling that they can do something to protect the environment. Therefore, consumers should not be made to feel that their actions are useless, as this could undermine their awareness.

This brings us to the role of the media in promoting environmental awareness. However, the media currently have no interest in encouraging responsible consumer behaviour. However, by using different communication channels, using celebrities, well-known people and celebrities who are followed by many, and by creating a green trend, consumers who tend to follow the patterns of others could be encouraged. Stars and celebrities can help to set a good example to their fans and followers. As people tend to copy patterns of behaviour, the use of celebrities in an environmentally conscious campaign can be successful. One example is the so-called "got milk" campaign in the US, where celebrities promoted milk with a "milk mustache" on their portrait to promote milk consumption. In such campaigns, where individuals follow models who are perceived as attractive or prominent, the literature speaks of social learning.

It can be said that there is no single solution to reduce negative environmental impacts, but it is certain that individuals' choices have an impact on the environment. In summary, the following motivational tools can be used to motivate individuals to achieve environmental awareness and sustainability goals:

- improving the infrastructure of green services (e.g. accessible recycling service, gardening),
- green marketing strategies, tools,
- community marketing campaigns,
- legislation,
- community initiatives,

- other (e.g. education).

However, it is important to note that researchers believe that becoming a conscious consumer is a long journey, taking years and decades. In today's fast-paced world, this often seems too far away. Therefore, until this coveted goal is achieved for as many individuals as possible, methods and motivational tools are needed to promote faster results. Moreover, motivational tools do not always work as planned, and their impact is delayed or limited by a number of inhibiting factors. These are discussed in more detail in the next chapter.

Inhibiting factors

The pressure of unrestrained economic growth, intensive agriculture, industrialisation and human activity without knowing the consequences have led to a state of our environment in recent decades that requires effective and powerful interventions. However, the overall goal in our world is still for many people unrestrained growth and consumption. Today, consumption is seen as the engine of economic growth, but the consequences of this have serious environmental impacts. Yet today, consumption in the welfare society provides a sense of comfort to which the individual living in it naturally clings.

According to Zsóka et al., "consumption contributes to the formation of our identity, our sense of identity, it defines our status in society, it is a means of differentiation. It plays a major role in maintaining social cohesion, in social and gender selection, in shaping the boundaries between sacred and profane, and carries both personal and collective meanings".

Consumption today is no longer a means of subsistence, but a means of comfort, wealth or self-expression. We have long since moved beyond the satisfaction of basic needs, and consumption has often become a form of entertainment.

On the basis of these findings, it can be argued that one of the obstacles to environmentally conscious behaviour may be intensive advertising that encourages consumption, and through it the whole culture of consumer society.

Thus, despite the wide range of motivational and incentive methods mentioned above, the dissemination and practice of environmentally responsible behaviour is not always successful. There are several reasons for this phenomenon other than consumer society. One of these is the situation where individuals face some kind of problem when following environmentally responsible purchasing behaviour. We know that purchasing (and other) decisions often require knowledge that the average consumer does not have and does not have the time or inclination to look up professional information. In addition, there is no universally valid logic or pattern of good, green behaviour. In such situations, even consumers who consider themselves to be environmentally aware can become uncertain and even make wrong choices. And those who are not committed to protecting the environment may simply not engage in problematic decision-making processes.

Some surveys suggest that another barrier to the spread of greener behaviour may be a lack of consumer trust in companies and their supposedly green products. This implies that trust is a key factor in shaping environmental attitudes and behaviour (too). It is important to underline that consumers' distrust is also reinforced when they perceive that the state or organisations are not environmentally conscious enough. In the long term, the aim is therefore for the government (also) to set a good example in terms of environmental awareness and for companies to operate according to truly green values. It would also be important that companies that create the appearance of environmental awareness for purely commercial reasons are properly sanctioned for misleading consumers.

It is also common for consumers not to choose the most environmentally friendly products because the time and energy invested in selecting them is part of the cost of consumption. It is therefore important that the benefits of green products are greater than those of conventional products. This is best achieved through targeted taxes and rebates. In practice, this means that sales of environmentally friendly products should be subsidised by discounts and lower taxes, while products with a negative environmental impact should be taxed more heavily.

It is well known that, in general, consumers make a rational choice, i.e. they seek to maximise utility by choosing the most favourable of the available alternatives. However,

consumers cannot always be considered as rational, as their knowledge of the available information and alternatives is not always complete. This is called information imperfection or asymmetry. Based on this theory, it can be argued that consumers demand a wider choice of environmentally friendly products. It is also important that consumers receive detailed and understandable information about green products, including their environmental benefits. This will increase the level of information and facilitate decision-making.

However, some researchers argue that the rational choice model is incorrect because consumers are not able to assess the exact impact of their actions. In fact, consumers prefer to shift environmental responsibility to businesses and government. It is pointless for individuals to have a high level of environmental involvement if they look to government for solutions. The overall objective is therefore that consumers themselves want a cleaner and more liveable environment and are willing to pay for it (e.g. through lifestyle changes, taxation).

Unfortunately, many consumers not only pass the buck, but also do not feel that they have a significant role to play in achieving environmental goals and therefore do not feel a responsibility to behave in an environmentally responsible way. The phenomenon of how important consumers feel their own role in protecting the environment is called perceived consumer efficiency. This level needs to be raised if consumer involvement and active engagement is to be achieved.

As already mentioned, consumers often lack accurate information about the real impact of their behaviour on the environment. This can lead to a situation where some actions are often over-valued and others under-valued. This suggests that expertise plays a very important role in green consumer choices. This can be interpreted as meaning that without information, a certain amount of learning and investment of energy, it is not possible to make the right decisions for those who follow green principles. For example, if consumers feel that it is right to buy organic (eco) products even if they are imported from the other side of the world, they are merely deluding themselves. These misconceptions must be replaced and corrected by professional knowledge.

Many people believe that improving production efficiency is enough to achieve sustainability, but many experts believe that it is not enough and that negative consumption patterns must also be changed. It has been shown that higher efficiency can lead to overconsumption. A good example of this is when the money saved on energy-saving equipment is spent on newer, more efficient machines or when efficient machines are used much more. In the end, the overall environmental burden only increases. This phenomenon is called the rebound effect.

In summary, some experts believe that individuals know they need to act, they know the risks, but avoid taking action for various reasons. Others believe that people's knowledge of environmental problems is very low and needs to be improved. Furthermore, it should not be overlooked that environmentally conscious behaviour needs to be supported by artificial means (e.g. taxes, services) in order to steer consumers' decisions in the right direction.

Ethical issues

When we talk about environmental awareness, we cannot ignore the fact that people in developing countries want to live at the same standard of living as people in developed countries. However, this goal would place an additional heavy burden on the environment. People in developed countries already have an ecological footprint larger than the Earth's carrying capacity. The main reason for this is the consumption patterns associated with higher living standards. We also know that the Earth reached its limits in 1986 and we have been overusing our resources ever since. Moreover, despite all efforts, the ecological footprint in developed countries now seems to be increasing. This ecological deficit will only increase if the inhabitants of developing countries also live the wasteful lives they aspire to. As the world's population continues to grow, so too will the impact on the inhabitants of developing countries, which will collectively further increase the environmental burden

The question arises whether developed countries have the right to restrict the inhabitants of developing countries. And there are also ethical questions about whether the inhabitants of developing countries have the right to reach levels that further strain the

earth's carrying capacity. It is also clear that while many people on earth are struggling to make ends meet and live from one day to the next, they cannot be motivated to give up the desire to consume more.

It is important to note, however, that some experts believe that people in developing countries feel more responsible for their own environmental impacts than people in developed countries. They are also more likely to take real action to protect the environment.

Of course, it is also true that the current lower ecological footprint in a developing country or region is possible because people living there can afford to consume less on a much lower income. This does not have the same ecological footprint as the lifestyle of developed countries.

It is important to see, however, that coercive and environmentally conscious behaviour are not equivalent. The removal of coercion can lead to a preference for a lifestyle with a negative environmental impact and a lower environmental impact. Therefore, it is of paramount importance to educate consumers in developing countries who do not overburden the earth even out of necessity. Developed countries have a duty to help the less developed economies to spread clean, environmentally friendly technologies and to socialise their inhabitants in a sustainable way.

However, it is also important to know that it is a scientifically proven fact that the top few per cent of society in terms of per capita income is responsible for the vast majority of consumption.

Consumption patterns are important drivers of food systems as well. We are already seeing signs of change. More and more consumers are becoming aware of their consumption habits. However, it is important not to focus only on the diets of a small group of people, but to ensure that healthy and culturally appropriate foods are available to all. It is unacceptable that those who cannot afford 'healthy' food are forced to buy insufficient or highly processed food. Everyone has the right to healthy and sustainable food and we must stand up for that right. Consumers, including the most vulnerable and younger generations, need our support in the form of education and accurate,

transparent information. They also need incentives to change their consumption habits. We also need to encourage and support change by taking a holistic approach to the food production system, encouraging the production and distribution of healthy and affordable food. Social protection measures are also needed to ensure that those in the most deprived situations can choose to buy healthy food themselves.

2. Empathty

Introduction

Our life management, which includes family, school and collegial relationships, requires a wide range of skills. One group of skills are measurable, demonstrable skills, such as 'hard skills', all of which we have on paper, for example, qualifications, competences learned and professional experience. This knowledge and experience are the individual's own personal, personal skills.

All these skills are developed in a particular community, which means that you have to fit in, you have to know how to behave. These are all social skills (soft skills) that we cannot put on paper, they are not immediately visible. Soft skills are a set of skills that are interpersonal (interpersonal = between individuals, personal) skills - the skill of relating to other people, how we communicate with others, how we interact with them. People are social beings, our relationships with ourselves and others determine our quality of life. And relationships are based on emotions, not on lexical knowledge and logic. By emotional intelligence we mean the ability of an individual to recognise, understand and manage emotions, both his or her own and those of others. These skills include empathy.

Empathy is one of the most important skills, a cornerstone of healthy human relationships and a driver of effective teamwork. It leads to greater personal and professional success and allows you to be happier.

2.1. The concept of empathy

The word empathy is of Greek origin, meaning strong emotion, passion, and originally meant understanding and empathising with works of art. Buda (1998) explains this on the

basis of Lipps (1903) in such a way that the attention of the art lover gradually becomes distanced from himself, self-reflection is displaced from the consciousness, instead the self merges with the object of the art experience, the picture or the sculpture, almost living into it.

The ancient Greek term has been given a new meaning by modern English terminology. In 1897, Edward B. Titchener, professor of psychology at Cornell University, while translating a work by the German psychologist Theodor Lipps, used the word empathy to render the term Einfühlung (empathy), and it became a scientific term (Buda, 1998).

The modern concept of empathy was developed by psychology, the psychology of the soul. It is the English term used by Alfred Adler in an English-language work published in the 1930s. Adler quotes from a text from the last century: "To empathize is to see with the eyes of another, to hear with the ears of another and to feel with the heart of another" (Buda, 1998).

In his psychoanalytic work, Freud considered empathy to be important for understanding the patient. According to him, at the heart of the process is the way in which attention, which has become detached from itself and forgotten itself, is given a new framework and content by seeking to fill in the subjective world of the other person's experience, the boundaries of experience. The capacity for empathy, which is at its core the flexible adaptation to the other's affairs, resonates with the psychological events of any other personality. In this way, the empathic personality does not dissolve in the other, but is able to evoke the other's emotional and cognitive states (Buda, 1998).

In the 1950s, when psychologist Carl Rogers developed his theory of personality using the methodology of the person-centred approach, the concept of empathy played an important role. In the development of psychoanalysis, empathy emerged as a significant concept in the 1970s and 1980s, since the effectiveness of therapy depends to a large extent on the empathy of the therapist.

The concept of empathy has been defined in many different ways, and we quote Béla Buda's definition:

Empathy is the capacity of the personality to empathize with the other person's state of mind in direct communication with the other person. The main means of understanding and intuition is the evocation of the emotions and various tensions of the other person through empathy. This can also be expressed in terms of the personality projecting itself into the other. The experience of the other person's state of mind can be expressed on an emotional-inductive level. Empathy becomes empathy when the experience is consciously processed and the context of the other person is named and interpreted for oneself.

2.2. Classification of empathy

We can distinguish three types of empathy.

1. Cognitive empathy

This type is the intellectual, mental understanding of someone else's feelings. It is the ability to help us to better understand the other person's point of view without feeling or experiencing them ourselves. For example, if a colleague loses their job, you can recognise the emotions they may be feeling. You can also understand how their emotions may be influencing their behaviour - but that doesn't mean you're experiencing anxiety. We can understand what he's thinking, we can articulate what he's feeling, but we don't experience the same emotions.

Cognitive empathy can be useful in negotiation, conflict resolution or persuasion.

2. Emotional (affective) empathy

People with affective empathy are able to empathise with other people's feelings, to feel what is happening to them. Although this is not always the case, it can include physical feelings that are consistent with such emotion. For example, if you see someone in great sadness after the loss of a loved one, you may also feel sad and experience chest or stomach pain while sensing this emotion in the other person.

Emotional empathy can be useful in any supportive situation, when giving feedback, change management.

3. Cooperative, social empathy

This type of empathy is about caring, about being helpful. We understand and empathise with the other person's situation and understand what they expect from us and are able to respond accordingly. That is, we care for them in the way they need to be cared for. We take concrete steps to help them in the way they want us to help them. That is why it is important to really listen to others and to respond to real needs when we want to help!

Social empathy can play a prominent role in leadership, in appraisal discussions and in strategic planning.

4. Motor empathy, mirror reflection

This is a process that is born in the subconscious and which causes us to automatically copy other people's expressions. In other words, it is not related to processing the emotions and feelings of others, but rather to the tendency to copy forms of non-verbal communication or another person's motor reflexes.

The definition may seem a bit complicated, but the reality is much simpler. It is mirror reflexion: we can pick up on another's mood, involuntarily reciprocate a smile, but it can also be observed, for example, when we yawn after seeing someone yawn. There is no emotional component (not even intellectual), we simply automatically imitate certain facial expressions of another person, as if we were a mirror.

But why does this happen?

The answer to this question lies in the way our mirror neurons work. Mirror neurons are the brain neurons that can control a process, such as an action or a sensation, and that are activated when we observe the same process in another person. Mirror neurons help us to understand the mood of others, to perceive their behaviour outside our awareness: without them there is no emotional understanding and empathy. The process of mirroring is simultaneous, involuntary and without any thought.

A good example of this can be seen in this video: https://www.youtube.com/watch?v=E-iWZvdzeGM&ab_channel=FunnyVideos

2.3. Empathy or sympathy

The two terms are often confused and used synonymously. Synonym: a word with a related meaning that has the same or similar meaning as another word. When interpreting the word sympathy, it should be borne in mind that much of the material is written in English. In English, the term sympathy is not the same as in Hungarian. Sympathy in English means sympathy, while in Hungarian it means (a) instinctive attraction to another person; (b) sympathetic approval or support.

When someone is experiencing some kind of difficulty, the people around them are in some way emotionally connected to the problem, the emotional response can be empathy or sympathy.

In sympathy, we feel sorry for the other person, but keep our emotional distance. Comments made with sympathy tend to belittle the other person's feelings, urging them to hide their pain and bad feelings. When interpreting the word sympathy, it should be borne in mind that much of the material is written in English. In English, the term sympathy is not the same as in Hungarian. Sympathy in English means sympathy, while in Hungarian it means (a) instinctive attraction to another person; (b) sympathetic approval or support.

With empathy, we understand the other person's feelings and problems, see the world from their point of view and can help the other person cope with their problems. Empathy also requires us to stay away from judgement, all we need to do is to recognise and connect with the other person's emotions and interpret and understand the other person's experiences and feelings from their perspective. In this way, we show that the other person is not alone in their problem.

Theresa Wiseman, a clinician, and researcher, has outlined four things that are necessary for empathy, for an empathic response:

- The ability to see the world as the other person sees it
- A non-judgmental attitude
- Understanding the feelings of others

- Ability to communicate what we understand from the other's feelings.

Example:

"In recent months, my relationship with my boss has deteriorated. It's as if he's trying to make my job impossible. It's like he's trying to force me to work for him. I've been with this company for ten years, we've built up a lot together, and now this situation is making me feel completely insecure. Should I resign? "

1. Yes, I've been there myself, when my boss refused to sit down with me, then I stammered on for weeks, and then even colleagues plagued me with all sorts of problems. Those were difficult times for me.
2. How nice that you enjoyed at least 10 years in that job!
3. Sure, quit! Why do you bother with this question? You find a new job and that's it.
4. You're in a precarious position, even thinking about quitting, when this company could mean a lot to you personally. It must be difficult. The way I see it, it's not advisable.

Only the fourth of the answers is an empathic answer.

It is worth watching this animated video which highlights the difference between empathy and sympathy: https://youtu.be/1Evwgu369Jw.

"As the animated video illustrated, empathy is a conscious choice to immerse oneself in the painful emotions and feelings of another person. But this empathy does not in itself equal empathy. But if it is followed by a conscious processing and interpretation; if we take the trouble to understand the other person's experiences and feelings in context; if we put the other person's interests first and do not judge them, then we can talk about empathy, about genuine concern." - Helena Szilágyi

2.4. Empathy in our everyday life

Our daily well-being depends on many factors. From a life skills perspective, it is essential to develop skills that can help us thrive in the community. Such skills include tuning in to other people. The more we are able to tune in to other people, the more effectively we

can lead our own lives. This is no wonder, since empathy is in some ways about transcending the ego, about going a little beyond ourselves and recognising what connects us to others.

Ego (Latin): self, self-image all that which a person identifies with himself or herself, including the boundaries of his or her body.

Empathy in pedagogy

Quote: 'If you want your child's self-confidence to grow, please don't humiliate him, don't call him ignorant, stupid, unlucky, clumsy, or compare him to others at his expense. Rather, tell him that at his age you struggled with the same things he struggled with, stand by him, strengthen him in what he is good at! The message of modern psychology and pedagogy is to exude confidence! Look the child in the eye and say: I know you can do this! I know you can do this! Do you know what a magic phrase that is? Imagine someone saying it to you with complete confidence and love! It's such a healer of the heart and such a filling power that it's very worth using in adult relationships." Prof. Dr. Emőke Bagdy

https://neteducatio.hu/hogyan-segithetsz-pedagoguskent/)

The most important and indispensable tool of the teacher is empathy. Empathy enables the teacher to use the possibilities of emotional influence, to develop the non-verbal communication skills of the learners. If the teacher cannot "read" the mimicry of his/her students, the characteristic changes in their voice, or misinterprets these signals, confusion and tension can arise in the relationship. Often, the teacher will draw the wrong conclusion or discover hostile intentions from the student's facial expressions! Students should also know the codes of the teacher's expressions, because most children complain that they can't read anything in the teacher's expressionless face when they are being asked. This is a particular problem for the anxious student!

The basis of honest and authentic teacher-student communication is saying what we mean, consistency between our words and actions, between our verbal and metacommunicative communications, and the capacity for human warmth and compassion. We are not afraid of self-disclosure; we do not want to show emotions other

than what is inside us. If one can accept one's own feelings, one can relate to others. Self-acceptance, empathy leads to tolerance, to non-violent communication.

The empathetic leader

Research has shown that our empathy is higher in private, family relationships. Psychologist Gábor Szendi explains this with Darwinian evolution, i.e. that people who are closely related - with similar genes - help each other to survive, the closer the relative, the more altruistic one person is to the other. When it comes to empathy, we tend to divide the workplace and the private sphere.

Darwinian evolution:

A world view according to which living things in nature compete with each other for survival, with the most productive individuals passing on their genes through natural selection.

In the modern world, however, working together is a prerequisite; everyone does their daily work and learning in some kind of community. It is becoming increasingly important for companies to employ managers who can manage the people in their workplace well, who can build a good team. In addition to the leadership skills they have learned, the empathy of the manager towards his or her subordinates is therefore increasingly important. It is not about agreeing with the way others see things, but rather about being willing and able to accept what others are going through. if a leader takes the time to understand the needs of subordinates and employees, he or she can support them to face challenges and overcome obstacles and, as a result, become a useful member of the work organisation. In this way, a manager can build trust and strengthen the relationship with the employee, thereby strengthening the work organisation and supporting the development of better cooperation.

Advice for empathetic, compassionate leadership:

1. Take a step back mentally and emotionally.

To avoid the trap of being too "empathetic", take a step back to see the situation and the person more clearly. Only with this strategy can we help. It may feel like an unfriendly step, but we need to create the emotional distance to help with the problems that arise.

2. Ask what he needs

When you ask this simple question, "What do you need?", you are already taking the initiative to find a solution. You give the person a chance to think about what they really need, and it is a great help to the person in distress to feel that their problem is being felt and listened to.

3. Remember that you don't always have to act!

Managers are usually good at solving problems as they arise. However, in such cases, it is often just a matter of listening to people so that they know they can tell you their problems at any time. Listening is often the most effective means of getting help.

4. Guide the person to their problem, provide them with a coach!

This advice is about people finding their own solutions to their problems in the first place. Instead of an immediate solution, they need to be coached and mentored. Maybe show them the way to find their own answers. A coach or, where appropriate, a manager with a coaching approach, can help them to do this.

5. Act consciously, listen to yourself too!

Leaders must find ways to create an atmosphere in which people can rely on them, find comfort and solace in their presence. But it is also very important that they can remain themselves. It is therefore worth practising 'self-care': taking breaks, getting enough sleep and food, cultivating meaningful relationships and practising mindfulness.

Coach, coaching:

A coach is someone who provides guidance to a client on their goals and helps them reach their full potential. A coach is a person who gives advice to a client on how to achieve their maximum potential.

Mentor:

A mentor is someone who shares their knowledge, skills and/or experience, to help another to develop and grow.

In a professional context, a mentor is someone who is available to advise a colleague. A mentor accompanies a staff member in his or her professional development and acts as a role model.

Brainstorming together - group method

Carl Rogers' "person-centred approach" methodology is well suited for use in education, but also proves successful in workshops on a variety of issues. It has proven to have a lot to do with building resilience and development capacity in individuals and organisations.

The work is carried out in small and large groups, without the subject leaders giving any prescriptions or rules for the content or the working method. The participants ask questions, answer questions, argue, first directed towards the subject leaders and then gradually addressing each other. The moderators let the discussion unfold on its own, starting from different threads, often with the result that it wanders back and forth, but then tends to converge around a point. Often, these ideas swell into a larger and more powerful stream and become increasingly intense and emotional. The theme leaders did not determine the steps of the debate, but they did catalyse (as they put it, 'facilitate') it to a considerable extent by occasionally speaking. Sometimes the debate was about an individual, sometimes about society, sometimes about the functioning of institutions. This kind of brainstorming allows people to open up, to think freely, to speak, to express themselves. This kind of discussion increases trust, often bringing to the surface ideas that had not been expressed or formulated before.

Rogers says that if we can create an atmosphere of non-judgement, acceptance and authenticity, people will open up, change and development will begin, or as they say in English, "growing". And this allows the group, regardless of its composition, to start thinking together, understanding each other, a process of deep, new thinking, even new thinking.

her is called projection and is rather the opposite of empathy.

2.5. Empathy and environmental awareness = ecopsychology

Becoming environmentally aware is a long process, the first step of which is to acquire environmental knowledge and awareness, in particular to ensure that people are aware of the state of the Earth in global terms, but also of their own environment and its environmental problems at local level. The next important step is to create an emotional attitude, i.e., to react sensitively to adverse environmental changes, which develops a disposition to act and reaches the ultimate goal of taking active action to preserve and protect the environment, to adopt environmentally friendly, thrifty behaviour and lifestyles. This includes the realisation that the solution cannot be expected "from above", but that everyone must act to protect the environment, because the solution depends on each individual, i.e., on us.

In our modern age, many of us are very much detached from nature, living in villages and cities, learning from books and through various media, acquiring knowledge and skills. All these are built, constructed, artificial conditions, conditions, and all result in our inability to deal with the threats to the balance of the planet, the living world. Yet our lives exist in partnership with and are influenced by nature. The important goal is to rediscover the beauty of nature, to feel the joy and excitement of discovery and to develop a sense of compassion, compassion, wonder and love. Let our learning be based on experiential learning, let us return to nature!

The (re)development of an emotional relationship with nature is facilitated by ecopsychology, which examines the relationship between man and nature through the lenses of ecology and psychology, and thus (re)develops the emotional relationship between man and nature. An important characteristic and starting point is the systems approach, according to which humans are deeply and inextricably integrated into natural systems, as we are part of the global circulation of matter and energy flows, and our biorhythms are determined by natural changes.

Empathy is the way to develop environmentally conscious behaviour. As we learned earlier, empathy is a relationship between people, a way of experiencing the emotions of

others. The same empathy can be developed with nature, through empathy we can (re)connect with nature. As long as we think and see ourselves as completely separate from the natural environment, we see it and treat it as an "external group". Direct contact with other living beings as individuals provides an opportunity to experience empathy, to experience the similarity inherent in uniqueness.

How can you practice empathy with nature?

- Recall a special place in nature and the experience that made it special for you!
- What makes you feel connected to the whole world?
- What was the most transformative experience you had? What was your trigger?

About climate change

We all know that our planet is in bad shape, we hear daily news of unusual weather patterns, we notice the effects of global warming, we feel the changes in wildlife. We are aware of the process (except for those who choose denial), but because the mass of frightening information that assails us threatens our self-image, we are unable to emotionally absorb it, we deflect, we become defensive. We live a double life, we know there's trouble but we can't deal with it. This emotional baggage gives rise to what is known as climate stress, which is becoming more and more common.

Researchers and environmental organisations - including Zselyke Moholy - say: "The speciality of the symptom is that it is not necessarily a 'cure', because it is not a delusion, the threat is real. Rather than trying to drain people of this tension, we seek to transform its energy into concrete action."

..... maybe that's enough then?

2.6. Developing empathy skills

Human society is based on cooperation, mutuality, and altruism. These concepts overlap to some extent, but they have in common that people tend to cooperate with or help others in the absence of direct reward.

Altruism is an interaction between individuals within a community, whereby an individual helps a fellow individual even at the expense of himself. The prevalence of the behaviour is roughly proportional to genetic similarity and is most often manifested between individuals in the same family.

How do we know if someone needs help? Or, in the case of cooperation, how do we know, even half verbally, who to approach, how to coordinate the work? In the course of evolution, empathy and the ability to read minds have evolved as a direct trigger for these behaviours. The two phenomena are related but not identical. Empathy is the capacity to experience the feelings and thoughts of others, in parallel with observing our own feelings and thoughts, and to respond to them in an appropriate emotional-behavioural way. Empathy helps us to recognise that others are in distress and need help.

In the absence of empathy or with low levels of empathy, a person lives in constant disconnection and misunderstanding with his or her fellow human beings. Such people are often inconsiderate because they cannot sense subtle differences, say or do hurtful things, and then, even shortly afterwards, pretend that nothing happened because they really did not realise the seriousness of their words or actions. Often they do not get the joke, they do not understand the expectations of the relationship or the situation.

In our modern and results-oriented society, we are taught and conditioned to use our problem-solving skills rather than our empathy. Society rewards problem solvers who provide tangible solutions rather than those who provide emotional care. This reward system conditions people to exhibit solution behaviour as opposed to empathic behaviour.

According to psychologist Keith Oakley, the ability to see and experience events through the eyes of others allows us to imagine how we would behave in a similar situation.

If you develop empathy, you can:

- you will better understand the needs of the people around you
- see more clearly the image you create of yourself in others through your words and actions

- understand the unspoken layers of communication
- better understand the needs of your clients and colleagues
- have fewer problems to deal with in personal conflicts at home and at work
- predict more accurately the actions and reactions of people you come into contact with
- learn how to motivate the people around you
- convince others of your position more effectively
- perceive the world with greater resolution by seeing it not only through your own eyes but also through the eyes of others
- you will be better able to cope with the negative attitudes of others because you will understand their motivations and fears
- you will be a better leader, a better follower and a better friend
- you are more likely to treat the people you care about the way they want to be treated

According to Elizabeth A. Segal, experiencing empathy requires a combination of three components, which requires using your head, not your heart. These are:

1. Detachment Awareness

You should not take on what others are feeling, i.e., you should not get so involved that you confuse it with your own feelings.

2. Emotion control

You must remain calm and balanced while assessing the situation. You must not let your emotions run wild.

3. Interpreting circumstances

Understanding the circumstances is important to broaden your perspective and to better understand what the individual is experiencing.

What characterises an empathic person?

1. Curious about strangers

People with high empathy are curious about strangers. They retain their childhood curiosity - which society is so cleverly trying to eradicate from us - and talk to the person sitting next to them on the bus. They find others more interesting than themselves, but they don't question them.

As a result of curiosity, we encounter people, lives and worldviews that are outside our usual social environment and thus increase our empathy. Developing curiosity does not mean talking about the weather but trying to understand the other person's worldview. We meet interesting strangers every day. The postwoman with the tattoo, the new colleague who always has lunch alone. Curiosity advocates urge us to gather a little courage and start a conversation with a stranger every week!

2. Focus on similarities rather than prejudices

We all have prejudices, we all use labels, e.g., Muslim fundamentalist, caring mother. People with high empathy look for what they are similar to others in, not what they are different in, so they break down preconceptions and prejudices about others.

The following story about racial conflict illustrates this. Claiborne Paul Ellis was born in 1927 to a poor white family in Darham, Southern California. He was a manual labourer, struggled for feed. Following in his father's footsteps, blaming African Americans for his hardships, he joined the Ku Klux Klan and over the years grew into the leader of the local KKK gang. In 1971, as a prominent local citizen, he was invited to a community meeting aimed at resolving racial strife in the schools. He and a black activist he despised, Ann Atwater, were appointed to head one of the committees. Their work together overturned her previous prejudices about African Americans. He realised that they faced the same difficulties as he did. He began to see blacks as people, to shake hands with them. "It was like being born again," he said in a later recollection. On the last night of the meeting, he stood up and tore up his Klan membership card in front of the thousands of people present. Ellis later became a member of a 70% black organisation and remained friends with Ann for the rest of her life. There are few better examples of how empathy can override hatred and change the way we think.

3. Gain experience

Is rock climbing or hang gliding an extreme sport? Empathy building based on experience should be tried. This is the most challenging but probably the most rewarding way to increase empathy. There's an old American saying - "Walk a mile in someone else's moccasins before you criticize." People with high empathy skills follow this and gain direct experience of others' lives.

We can all make such an experiment. If you are a believer, try attending mass of another religion. Let's spend the next summer volunteering in a remote village in a developing country. Take it from the philosopher John Dewey - All real knowledge is gained through experience.

4. An empathetic interlocutor has two qualities.

One is the mastery of genuine listening. Marshall Rosenberg, the father of non-violent communication, says - The most important thing is to be able to be truly present, to understand in the moment what is going on in the other person, what they are feeling, what they need.

But listening is never enough. Another important skill is to be able to be vulnerable. We must be able to take off the mask and show our feelings to the other person, because this is essential for a close empathic connection. Empathy is a two-way street based on mutual understanding, where we share our core beliefs and experiences.

5. Inspires others

We mostly think of empathy as something that happens at the individual level. But it can also be a mass phenomenon that can lead to fundamental social change.

Think of slavery in the 18th and 19th centuries. Journalist Adam Hochschild reminds us. The abolitionists did not believe in the teachings of holy books, but in human empathy. They did everything they could to make people understand the suffering slaves endured on the plantations, on the galley ships. It was empathy born out of a shared sense of oppression among industrial workers that gave birth to the International Trade Federation. The enormous social solidarity seen in the Asian tsunami of 2004 was also born out of empathy for the victims, inspired by the shocking videos.

Empathy can best spread if its seeds are planted in childhood. The Canadian Roots of Empathy programme is one of the most successful pioneers in this field. Half a million children have already participated. Its unique curriculum focuses on teaching emotional intelligence from infancy. As a result, there has been a significant reduction in playground violence and improved school performance.

Beyond education, the big challenge is how to harness the power of empathy through social media for large-scale social change. How can Twitter persuade us to address the problems of distant strangers (e.g. African farmers fighting drought) or the future generation who will bear the consequences of our current environmentally insensitive lifestyles? This requires that these sites not only disseminate information but also empathetic connection.

6. You have ambitious dreams

People with high empathic skills empathise not only with those with whom we generally empathise, but also with those with whom we disagree, or even oppose in some area. If someone is campaigning against global warming, it is worth putting yourself in the shoes of an oil company executive to understand their thinking and motivations. This will help you to develop a more effective persuasion strategy to push them towards recyclable energy sources.

Empathising with your opponent is also a way to build social tolerance. This is what Gandhi advocated in the Muslim-Hindu conflict that led to India's independence in 1947 - I am a Muslim. And Hindu, and Christian and Jew.

Organisations should also strive for empathetic thinking. The father of 'social entrepreneurship', Bill Drayton, says that in an age of rapid technological advances, the way to survive in business is to master empathy. This contributes to leadership success and helps teamwork.

2.7. How do you improve yourself?

Read more

Read as many novels as possible. People who read novels regularly have been shown to have better empathy skills than non-readers. Novels help us empathise with others and understand their feelings.

Kindness

Let's be kind! Kindness in itself enhances empathy. Being kind to someone makes us involuntarily feel more empathy for them and our feelings towards them become more positive. Kindness also helps us to feel more comfortable in our own skin and more accepting of ourselves while being kind to others.

Understand: from your point of view, everyone is absolutely right

It is worth starting from this very simple truth. If we look from here, we can quickly work out what considerations are probably driving the other person's thoughts and what feelings those thoughts are generating in them. It's worth a try.

Exercises:

- Observe the expressions, looks, gestures, movements of those around you, don't just focus on what you are saying.
- Wait until the other person has finished speaking, don't form an opinion before the other person has finished, and especially don't start your own by interrupting them. Let us be aware that if we interrupt someone, we are certainly not listening to them.
- Always wait a few seconds before answering. And if possible, ask back to understand even better how the other person is feeling, what motivates them. This also buys time to respond in a more thoughtful way (e.g., less hurtful or less defiant).

The following questionnaire can help you identify where your empathy is high and where you need to improve. For each of these areas, decide how good you are at it, how average you are at it, or how weak you are at it.

EMPATHY QUESTIONNAIRE

1. You don't interrupt people.

2. You ask others how they feel.

3. You handle other people's anger or negative feelings well.

4. You don't mind silence.

5. You recognise when others are uncomfortable.

6. You ask the other person to express their feelings.

7. You accept the other person's feelings.

8. You notice and understand the other's body language.

9. You can easily make close emotional and physical contact.

Where you have rated yourself as average or poor, set a priority ranking - choose 3 specific things that you will practise in the next 3 weeks. After each passing day, think about whether you have improved in that area. After 3 weeks, complete this questionnaire again to see the positive change! If there are again points where you have not marked a 'good' rating, you can continue practising!

3. References

A környezeti kötődés meghatározása és kapcsolata a környezeti attitűddel, mérési megfontolások „Marketing megújulás” - Marketing Oktatók Klubja 20. Konferenciája előadásai - - http://acta.bibl.u-szeged.hu/57666/1/marketing_megujulas_311-320.pdf

Ágnes Hofmeister-Tóth, “Fenntartható fogyasztás? A fenntartható fogyasztás gazdasági kérdései szöveggyűjtemény,” ed. Mária Csutora (Budapesti Corvinus Egyetem, 2011), accessed December 15, 2014, https://www.google.hu/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwimsKn0g9zMAhVMVxQKHXLFD3oQFggmMAA&url=http%3A%2F%2Funipub.lib.uni-

corvinus.hu%2F464%2F1%2FFenntarthatofogyasztasszoveg.pdf&usg=AFQjCNGY0OnHbAMVy1iSwprstxWoQCDcEg&cad=rja.

Akenji, L. (2014): Consumer scapegoatism and limits to green consumerism. Journal of Cleaner Production, 63, 13–23. http://doi.org/10.1016/j.jclepro.2013.05.022

Buda Béla (1993): Empátia. A beleélés lélektana. Ego School, Budapest
Carlsson-Kanyama, A. (1998): Climate change and dietary choices — how can emissions of greenhouse gases from food consumption be reduced? Food Policy, 23(3–4), 277–293. http://doi.org/10.1016/S0306-9192(98)00037-2

Carson, R. (2007): Silent spring-Néma tavasz. Páty. Katalizátor Könyvkiadó.
Chen, T. B., & Chai, L. T. (2010): Attitude towards the Environment and Green Products:Consumers' Perspective. Management Science and Engineering, 4(2), 27–39.
http://doi.org/10.3968/j.mse.1913035X20100402.002

Crippa, M., Solazzo, E., Guizzardi, D. et al. Food systems are responsible for a third of global anthropogenic GHG emissions. Nat Food 2, 198–209 (2021). https://doi.org/10.1038/s43016-021-00225-9

Csutora, M. (2012a): Environmental awareness does not lead to smaller carbon footprints. Eltis. Letöltés: 2015. december 6., Forrás:
https://www.google.hu/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0ahUKEwiAvuuPgtzMAhXIVxQKHTD2CUMQFggjMAE&url=http%3A%2F%2Fec.europa.eu%2Fenvironment%2Fintegration%2Fresearch%2Fnewsalert%2Fpdf%2F292na6rss_en.pdf&usg=AFQjCNFWlgZNgw_S5bcgK5AKp_Z9U0I-jQ&cad=rja

Csutora, M. (2012b): One More Awareness Gap? The Behaviour–Impact Gap Problem. Journal of Consumer Policy, 35(1), 145–163.

Csutora, M., & Kerekes, S. (2012): Fenntartható fogyasztás? Trendek és lehetőségek Magyarországon. OTKA 68647 kutatás eredményei. ResearchGate. Elérés forrás:
https://www.researchgate.net/publication/295705638_Fenntarthato_fogyasztas_Trendek_es_lehetosegek_Magyarorszagon_OTKA_68647_kutatas_eredmenyei

Csutora, M., & Zsóka, Á. (2011): Kevésből sokat, avagy az energiahatékonyságok programok eredményességének növelése, 29. In: Bulla Miklós-Tamás Pál: Sebezhetőség, társadalami adaptáció. A rezilincia esélyei, MTA Szociológiai Intézet, 2011, pp. 135-164.

Csutora, M., Tabi, A., & Vetőné Mózner, Z. (2011): A magyar háztartások ökológiai lábnyomának vizsgálata. In Fenntartható fogyasztás? A fenntartható fogyasztás gazdasági kérdései. (o. 77–89): Budapest: Budapesti Corvinus Egyetem. Elérés forrás: http://unipub.lib.uni-corvinus.hu/471/

Elizabeth A. Segal: Social Empathy: The Art of Understanding Others - Hardcover – October 16, 2018

Farkas Szilveszter – Szigeti Cecília [2011]: Alternative indicators of sustainability and social responsibility. Вісник Кнутд, Kiev, p. 193-197

Gleim, M. R., Smith, J. S., Andrews, D., & Cronin Jr., J. J. (2013): Against the Green: A Multi-method Examination of the Barriers to Green Consumption. Journal of Retailing, 89(1), 44–61.
http://doi.org/10.1016/j.jretai.2012.10.001

Green, S. B., & Salkind, N. J. (2010): Using SPSS for Windows and Macintosh: Analyzing and Understanding Data (6th kiad.). Upper Saddle River, NJ, USA: Prentice Hall Press.

Gulyás, E., Farsang, A., & Ujhelyi, K. (2007): A fenntartható fogyasztás kihívásai és lehetőségei Magyarországon: közlekedés, élelmiszerfogyasztás, háztartás., Fenntartható fogyasztás Magyarországon Konferenciakötet, 157–158.

Hamilton, C. (2010): Consumerism, self-creation and prospects for a new ecological consciousness. Journal of Cleaner Production, 18(6), 571–575. http://doi.org/10.1016/j.jclepro.2009.09.013
Hofmeister-Tóth, Á. (2008): Fogyasztói magatartás alapjai. Budapest: Aula Kiadó. ISBN: 978-963-9478-94-7

Hofmeister-Tóth, Á. (2011): Fenntartható fogyasztás? A fenntartható fogyasztás gazdasági kérdései szöveggyűjtemény. (M. Csutora, Szerk.). Budapesti Corvinus Egyetem. Elérés forrás: https://www.google.hu/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwimsKn0g9zMAhVMVxQKHXLFD3oQFggmMAA&url=http%3A%2F%2Funipub.lib.uni-corvinus.hu%2F464%2F1%2FFenntarthatofogyasztasszoveg.pdf&usg=AFQjCNGY0OnHbAMVy1iSwprstxWoQCDcEg&cad=rja

Hofmeister-Tóth, Á., Kelemen, K., & Piskóti, M. (2011): A fenntartható fogyasztás jellemzői és trendjei Magyarországon és a régióban. In Fenntartható fogyasztás? A fenntartható fogyasztás gazdasági kérdései (Budapest, o. 53–76). Budapesti Corvinus Egyetem. Elérés forrás: http://unipub.lib.uni-corvinus.hu/464/1/Fenntarthatofogyasztasszoveg.pdf

https://behaviour.hu/betegseg-e-az-empatia-hianya/
https://blog.kolboid.eu/empatia-miert-jo-fejlesztesi-modszerek-technikak/
https://businesscoach.hu/legyel-empatikus-vezess-egyutterzessel/
https://folyoiratok.oh.gov.hu/uj-pedagogiai-szemle/az-erzelmi-intelligencia-szerepe-a-neveloi-munkaban
https://hu.economy-pedia.com/11036799-gross-national-happiness-gnf
https://innerpathways.eu/blog/nature-connection-transformation-hu/
https://karrier-boldogsag.hu/empatia-ket-gyakorlat-a-fejleszteshez/
https://karrier-boldogsag.hu/otletek-empatiank-fejlesztesere/
https://kissangelika.hu/mi-az-empatia-mi-a-szimpatia/ ..... angolul:
https://twentyonetoys.com/blogs/teaching-empathy/brene-brown-empathy-vs-sympathy
https://mipszi.hu/cikk/200731-miert-nem-teszunk-klimakatasztrofa-ellen
https://movere.hu/empatia-vs-szimpatia/
https://onbizalomszerviz.hu/empatia-kerdoiv-es-gyakorlat/; (Forrás: Stephen Neale, Lisa Spencer-Arnell, Liz Wilson: Érzelmi intelligencia coaching, 2015.
https://pafhungary.hu/blog/67-az-empatikus-ember-hat-erdekes-szokasa.html
https://pszichoforyou.hu/empatikus-embernek-tartod-magad/
https://puskarildiko.hu/empatia-a-vezetesben/
https://roadster.hu/jobban-kapcsolodunk-a-termeszethez-mint-gondolnank/
https://www.ksh.hu/sdg
https://www.mnb.hu/fogyasztovedelem/csaladi-zold-penzugyek/zold-gazdalkodas-otthon/penzugyi-tervezes/hogyan-neveljunk-kornyezettudatos-gyereket
https://www.patikamagazin.hu/onzesbol-alakul-ki-szendi-gabor-az-empatiarol-1/
https://www.patikamagazin.hu/onzesbol-alakul-ki-szendi-gabor-az-empatiarol-2/
https://www.zaol.hu/helyi-kozelet/2019/10/a-klimaszorongast-nem-cel-gyogyitani-pszicho-est-egerszegen-molnos-zselykevel
https://zummizeria.hu/zummisuli-4-nap/

John A. Bower, & Nicola Mateer. (2008): "The white stuff?": An investigation into consumer evaluation of the Scottish celebrity milk marketing campaign. Nutrition & Food Science, 38(2), 164–174. http://doi.org/10.1108/00346650810863046

Kerekes Sándor [2007]: Környezetgazdálkodás, fenntartható fejlődés. Debrecen

Kerekes, S. (1998): A környezetgazdaságtan alapjai. Budapest. Elérés forrás: http://mek.oszk.hu/01400/01452/html/

Kerekes, S. (2002): Méretgazdaságossági és jóléti optimum a környezetvédelmi szolgáltatásokban. Közgazdasági Szemle (Economic Review - monthly of the Hungarian Academy of Sciences), XLIX(11), 972–985.

Kerekes, S. (2011): Boldogság, környezetvédelem és piacgazdaság. In Fenntartható fogyasztás? A fenntartható fogyasztás gazdasági kérdései (o. 4–9). Budapest: Budapesti Corvinus Egyetem. Elérés forrás: http://unipub.lib.uni-corvinus.hu/466/

Láng, I. (2003): A fenntartható fejlődés Johannesburg után (Budapest). Budapest: Agroinform Kiadó. Malhotra, N. K. (2009): Marketingkutatás (angol nyelvű 5. kiadásának első magyar nyelvű, magyar esettanulmányokkal bőv. kiadásának utánnyomása). Budapest: Akadémiai Kiadó.

Marjainé Szerényi, Z., Zsóka, Á., & Széchy, A. (2008): A környezeti nevelés és a környezettudatos fogyasztói magatartás kapcsolata egyetemisták körében elvégzett felmérés alapján I. Elérés forrás: unipub.lib.uni-corvinus.hu/472/1/ZSA_MSZZS_SZA_ff2011.pdf

Marjainé Szerényi, Zsóka, & Széchy, 2008; Zsóka és mtsai., 2011.

Megyeriné Runyó Anna: A környezettudatosság fejlesztésének tényezői és jelenlegi szintje egy hazai középváros (Vác) példáján – szakdolgozat, 2012 Debreceni Egyetem-(https://dea.lib.unideb.hu/server/api/core/bitstreams/13b613cd-84fb-4422-8258-f6598029e75b/content)

Molnos Zselyke - Dr. Fetykó Kinga Gabriela: Az ökopszichológia jelentősége a környezeti nevelésben - Ökopszichológiai Intézet - XIV. Kárpát-medencei Környezettudományi Konferencia Gödöllő, 2018. április 5-7. (https://docplayer.hu/113665447-Az-okopszichologia-jelentosege-a-kornyezeti-nevelesben.html)

Monostori, K. (2007): Környezettudatosság Magyarországon - Attitűd és cselekvés a szelektív hulladékgyőjtésben (o. 181). Budapest.

Nagy, S. (2005): Környezettudatos marketing (o. 180). Miskolc.

Nagy, S. (2012): A társadalmi marketing aktuális kérdéseiről: A környezettudatos magatartás mozgatóerői, 6.(1), 69–83.

Naszvadi, J. A társadalmi felelősségvállalás és a környezeti fenntarthatóság mérőszámai.

Németh, K. (2021). A körforgásos gazdaság alapjai.

Piskóti Marianna A környezeti identitás szerepe a környezettudatos viselkedés kialakulásában – szakdolgozat – 2015 – Corvinus Egyetem (http://phd.lib.uni-corvinus.hu/858/1/Piskoti_Marianna_dhu.pdf)

Pogátsa Zoltán: Pogi Podcast, https://anchor.fm/pogi3

Polonsky, M. J. (1994): An Introduction To Green Marketing. Electronic Green Journal, 1(2). Elérés forrás: http://escholarship.org/uc/item/49n325b7

Rácz, G. (2013): Az értékek változásának és a fenntartható fejlődés trendjének hatása a hazai élelmiszerfogyasztásra. Szent István Egyetem Gödöllő Gazdaság- és Társadalomtudományi Kar Gazdálkodás és Szervezéstudományok Doktori Iskola.

Schafferné Dudás, K. (2008): A környezettudatosság többszintű értelmezése és a környezettudatos fogyasztói magatartás vizsgálata. Elérés forrás: ktk.pte.hu/sites/default/files/.../Schafferne_Dudas_Katalin_tezisfuzet.pdf

Szakály, Z., Szente, V., & Széles, Gy. (2008): Fogyasztói trendek és stratégiák az öko-, a hagyományos- és a funkcionális élelmiszerek piacán. In Hatékonyság a mezőgazdaságban (o. 357). Budapest: Agroinform Kiadó.

Székely, M. (2011): A fogyasztói magatartás alapjai. In Fenntartható fogyasztás? A fenntartható fogyasztás gazdasági kérdései (o. 29.-52). Budapest: Budapesti Corvinus Egyetem. Elérés forrás: http://unipub.lib.uni-corvinus.hu/464/1/Fenntarthatofogyasztasszoveg.pdf

Szlávik, J. (2013): Fenntartható gazdálkodás. Budapest: Wolters Kluwer CompLex Kiadó.

Szőllős Sándor: Empátia: félreértések és kihívások, Életünk 56. évf. 12. sz. (2018.)

Szűcs, B., & Pónusz, M. (2020). A fenntarthatóság fogalmának története, különös tekintettel a környezeti nevelésre és az innovációra= History of the Concept of Sustainability, with Special Focus on Environmental Education and Innovation. POLGÁRI SZEMLE: GAZDASÁGI ÉS TÁRSADALMI FOLYÓIRAT, 16(4-6), 393-403.

Tamás, F. A fenntarthatóság mérése. Knoll Imre–Lakatos Péter (szerk.): Közszolgálat és fenntarthatóság. Budapest, Nemzeti Közszolgálati Egyetem, 2014b, 25-47.

Törőcsik, M. (2010): A tudatos fogyasztást és az egészséget preferáló új fogyasztói trendcsoport. A LOHAS csoport megjelenése Magyarországon. Pécsi Tudományegyetem Közgazdaságtudományi Kar. Elérés forrás: http://www.dr-torocsik.hu/publikaciok.html#tanulmanyok

Tukker, A., Emmert, S., Charter, M., Vezzoli, C., Sto, E., Munch Andersen, M., … Lahlou, S. (2008): Fostering change to sustainable consumption and production: an evidence based view. Journal of Cleaner Production, 16(11), 1218–1225. http://doi.org/10.1016/j.jclepro.2007.08.015

Varga Á. (2012): A marketingkommunikáció új eszközeinek alkalmazási lehetőségei a tej- és tejtermékek piacán. Élelmiszer, táplálkozás és marketing, 7(1.). Elérés forrás: http://www.journal.ke.hu/etm/index.php/etm/article/view/136

Young, W., Hwang, K., McDonald, S., & Oates, C. J. (2010): Sustainable consumption: green consumer behaviour when purchasing products. Sustainable Development, 18(1), 20–31. http://doi.org/10.1002/sd.394

Zsóka, Á., Marjainé Szerényi, Z., & Széchy, A. (2011): A környezeti nevelés szerepe a fenntartható fogyasztás és életmód kialakításában. In Fenntartható fogyasztás? A fenntartható fogyasztás gazdasági kérdései. (o. 90–109). Budapest: Budapesti Corvinus Egyetem. Elérés forrás: http://unipub.lib.uni-corvinus.hu/472/

DEGREBE

Development of Green Skills for Better Employability

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Module 5 Mobility issues, Design thinking

A Design Thinking is an approach and methodology which is: non-linear, iterative 5-stage process that provides a solution-based approach to solving problems. It is originally applied in the work of designers and today, twenty-first-century organizations fuse it in a wide range of industries. They find it a valuable means to problem-solve for the users of their products and services. With design thinking, teams have the freedom to generate ground-breaking solutions. It can be applied to nurture and encourage creativity of the team and to develop innovative solutions (products and services).

"The individual choices people make about their mobility behavior have profound impacts on their own lives, as well as society as a whole." According to MIT Media Labs.

Mobility choices are especially important and play critical role in the efforts to reduce the carbon footprint and the emissions in the direction of sustainability and climate change. This is one of the main factors and the choice that citizens and organizations make with regard to the mode of urban transportation is crucial. Motorized transportation leads to negative external impacts such as carbon emissions and air pollution, whereas active modes such as walking and cycling improve the physical and mental health of the travellers. Urban planning can influence these mobility choices and their societal impacts by organizing spatial land uses in such a way as to encourage short trips using active modes. Adaptability is one of the key qualities in today's world that we all need to learn and work on. The current times bring new challenges and obstacles that have never been there before to this extent, and it is up to us how we

deal with them. We have the climate crisis, the economic crisis, the war in Ukraine, rising inflation, the housing crisis, and other stressors on all sides that we must learn to work with and adapt to an ever- changing society. That is why it is important that we pay due attention to adaptability and integrate it into our teaching.

1. DESIGN THINKING

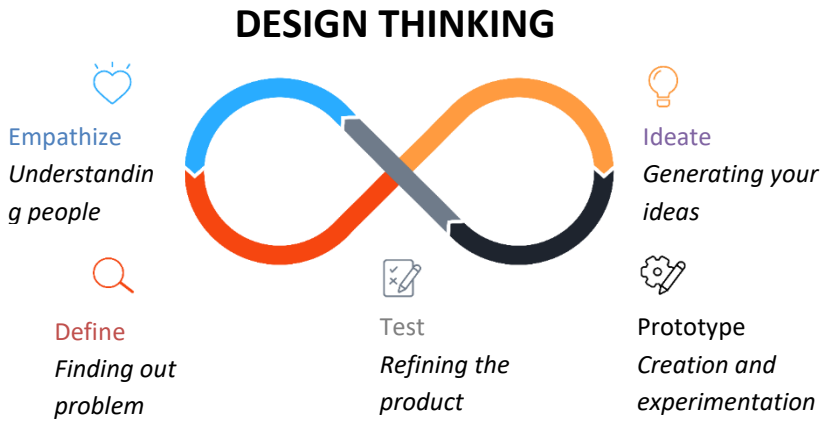
1.1. What is Design Thinking

Design Thinking is an iterative process in which we seek to:

- Understand the user
- Challenge assumptions
- Redefine problems

It is the attempt and challenge to identify alternative strategies and solutions that might not be instantly apparent with our initial level of understanding challenge assumptions.

At the same time, Design Thinking provides a solution-based approach to solving problems. It is a way of thinking and working as well as a collection of hands-on methods.



In its core, it is not just a process or approach to be applied. It nurtures creativity and allows teamwork, collaboration, generating and developing solutions and different options to be tested.

Ultimately, it provides a new way to think, with a lot of practical and leanring-by-doing methods to help organisations and individuals develop and apply new mindset. It is very often applied in new companies (startups) and bigger organisations to drive innovation

In essence, design thinking:

- Revolves around a deep interest to understand the people for whom we design products and services.
- Helps us observe and develop empathy with the target users.
- Enhances our ability to question: in design thinking you question the problem, the assumptions and the implications.
- Proves extremely useful when you tackle problems that are ill-defined or unknown.
- Involves ongoing experimentation through sketches, prototypes, testing and trials of new concepts and ideas.

Although IDEO's (Design firm) CEO Tim Brown is considered to be the father of Design Thinking, Don Norman is the grandfather of the human-centered design and he explains how the approach and flexibility of design thinking can actually help tackle the leading and most pressing global challenges.

Don Norman, who also coined the very term User Experience, explains what Design Thinking is and what's so special about it.

"*the more I pondered the nature of design and reflected on my recent encounters with engineers, business people and others who blindly solved the problems they thought they were facing without question or further study, I realized that these people could benefit from a good dose of design thinking*.[...], Don Norman

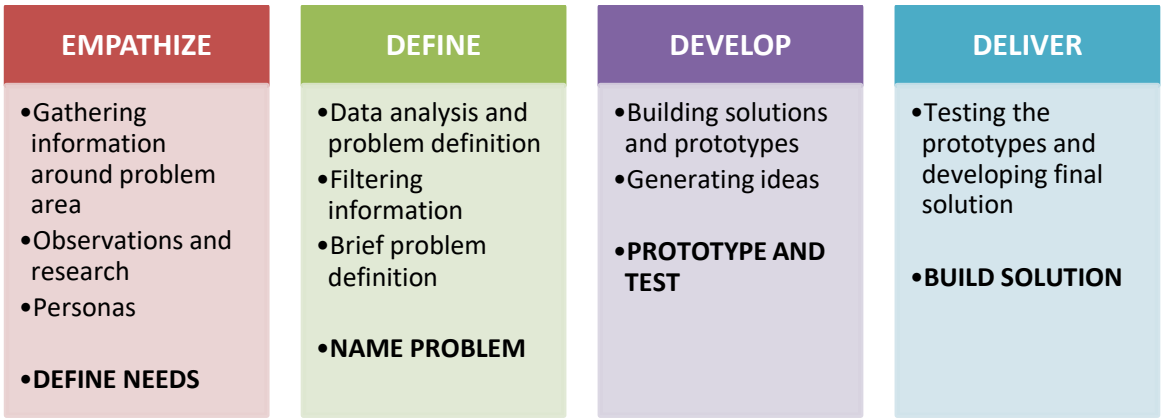
As user experience is more and more important being a competitive advantage for many companies it is applied as a means to simplify and "humanize" the processes and products. Ultimately it should drive innovation. And it is a sequence of iterative

approximations in the area of MIGHT be. The whole process involves iteration, trial-and-error and experimentation mindset and nature of the work.

Some authors are less optimistic when considering the amount of iteration required:

Thus, this widespread adoption of design thinking will drive the creation of alternative products and services for both business and society.

It is very well structured and self-explanatory and guided methodology with five main stages and plan for real work and action:



1.2. Stage 1: Empathize—Research Your Users' Needs

The main activities at this stage relate to develop and apply Empathy of individuals and the teams – i.e., an empathetic understanding of the problem to be solved. This can be done by series of interviews with the target groups/users, user research, observations, Empathy maps and the ultimate goal is to build the main profile – the Persona. Empathy is central to the human-centered design process such as design thinking. It allows to set aside the assumptions about the world and gain real insight into users and their needs.

“Deep understanding of the problems and realities of the people you are designing for”

Observe

- How users interact with their environment.
- Capture quotes, behaviors and other notes that reflect their experience.
- Notice what they think, feel, need.

Engage

- Interviews scheduled or ad-hoc.
- Learn how to ask the right questions.

Immerse

- Find ways “to get into the user’s shoes”.
- Best way to understand the users’ needs.

Empathize Tools:

- Best way to understand the users’ needs.
- Assume a beginner’s mindset
- Ask What-How-Why
- Ask the 5 whys
- Empathy map
- Conduct interviews with empathy
- Build empathy with analogies
- Use photo and video user-based studies
- Use personal photo and video journals
- Engage with extreme users
- Story share-and-capture
- Bodystorm
- Create journey maps

1.3 Stage 2: Define—State Users' Needs and Problems

At this stage information that is gathered is transformed into insights and the observations are analyzed to define the main problems that are identified. These definitions are called problem statements. Personas help keep the efforts human-centered before proceeding to ideation.

- Synthesise your observations about your users from the Empathize stage.
- Definition of a **meaningful** and **actionable problem statement**, which the design thinker will focus on solving.

- A great definition of your problem statement → kick start the ideation process (third stage) in the right direction.
- Unpack your empathy findings into **needs** and **insights** and **scope a meaningful challenge**.
- Define your Point of View – meaningful and actionable problem statement.
    - Preserves emotion and the individual you're designing for.
    - Includes strong language.
    - Uses sensical wording.
    - Includes a strong insight.
    - Generates lots of possibilities.

Define tools

- Define your Point of View – meaningful and actionable problem statement.
- Point of view
- How Might We
- Why-How Ladder
- Powers of Ten

1.4. Stage 3: Ideate—Challenge Assumptions and Create Ideas

This stage involves creativity techniques and tools to generate ideas. The foundation and background of knowledge from the first two phases drives to "think outside the box", look for alternative ways to view the problem and identify innovative solutions to the problem statement that is created. The goal is to generate radical design alternatives.

The goal of ideation is to explore a wide solution space both a large quantity and broad diversity of ideas. From this pool of ideas you can build prototypes to test with users.

Tools to ideate:

- Brainstorm
- Braindump
- Brainwrite

- Brainwalk
- Challenge Assumptions
- SCAMPER
- Mindmap
- Sketch or Sketchstorm
- Storyboard
- Analogies
- Provocation
- Movement
- Bodystorm
- Gamestorming
- Cheatstorm
- Crowdstorm
- Co-Creation Workshops
- Power of Ten
- Prototype
- Creative Pause

1.5. Stage 4: Prototype—Start to Create Solutions

This is the main experimental phase. The aim is to identify the best possible solution for each problem found. It involves activities and tasks that lead to the development of a "raw version" of the main ideas generated, evaluated and selected during the Ideate phase.

It involves:

- A prototype can be anything that takes a physical form -a wall of post-its, a role-playing activity, an object.
- In early stages, keep prototypes inexpensive and low resolution to learn quickly and explore possibilities.
- Prototypes are most successful when people (the design team, users, and others) can experience and interact with them.
- Great way to start a conversation.

- Interactions with prototypes drives deeper empathy and shapes successful solution.

Low fidelity prototyping guidance:

- use basic models or examples
- draw just some main features
- Methods
  - Storyboarding.
  - Sketching
  - Card sorting.
  - 'Wizard of Oz'

A wizard of Oz prototype fakes functionality that you want to test with users, saving you the time and money of creating it.

Prototypes of digital systems, in which the user thinks the response is computer-driven, when in fact it's human-controlled.

Determine what you want to test.

Then figure out how to fake that functionality and still give users an authentic experience.

1.6. Stage 5: Test—Try Your Solutions Out – and Iteration

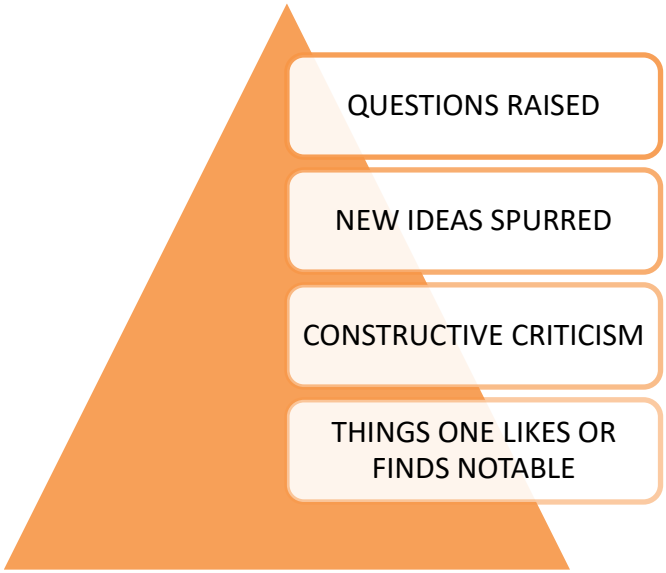
Evaluators rigorously test the prototypes. Although this is the final phase, design thinking is iterative: Teams often use the results to redefine one or more further problems.

Testing is the Chance to gather feedback, refine solutions, and continue to learn about your users. The test mode is an iterative mode in which you place low-resolution prototypes in the appropriate context of the user's life.

It is very important to **prototype as if you know you're right, but test as if you know you're wrong**. When testing you should consider both the postivie and the negative feedback: Avoid overexplaining how the prototype works, or how it is supposed to solve your user's problems. Let the users' experience in using the prototype speak for itself, and observe their reactions. The negative feedback should provide overview and answers to what works and what doesn't work.

Feedback capture matrix is a tool that allows:

- Real-time capture of feedback on presentations and prototypes
- Arranges thoughts and ideas into four categories for easy assessment
- Fill in the matrix as you give or receive feedback.



Testing with users

- Allows you to learn about the solution you created but also about the users (builds empathy).
- Let your **user experience** the prototype.
  - Show don't tell. Put your prototype in the user's hands (or your user in the prototype) and give only the basic context they need to understand what to do.
- Have them talk through their experience.
  - Use prompts. "Tell me what you're thinking as you do this."
  - Actively observe.
- Don't immediately "correct" your user.
- Watch how they use (and misuse) your prototype.

- Follow up with questions.

This is often the most valuable part.

In conclusion, the above-described stages are different modes which contribute to the entire design project, rather than sequential steps. The main goal in this process is to gain the deepest understanding of the users and what their ideal solution/product would be.

2. MOBILITY CHOICES

2.1. Overview of the Global strategies and policies

The Sustainability Development Goals of the United Nations are 17 and they represent the "world's shared plan to end extreme poverty, reduce inequality, and protect the planet by 2030". Adopted by 193 countries in 2015, the SDGs were agreed among the global leaders after tough and long and comprehensive negotiations in UN history. They have united people from various sectors, geographies, and cultures. Achieving the goals by 2030 very strong determination and efforts to learn what works, and the adaptation to new information, context and changing trends.

The Marrakesh Partnership for Global Climate Action was launched in 2016 to

- Encourage and force action on climate change
- Further increase ambition before 2020 and
- In support of the Paris Agreement.

It builds on the 2014 Lima-Paris Action Agenda which brought together large initiatives with the objective to galvanise the contribution of non-state actors.

The partnership has the following focus areas:

- Land use
- Oceans and coastal zones
- Water
- Human settlements
- Transport
- Energy
- Industry

Shared Mobility 2030 Action Agenda

Over 50 public, private and non-profit organisations have released the Shared Mobility 2030 Action Agenda. It is a very ambitious and successful result and initiative aiming to support and enhance shared mobility.

The purpose of the agenda is to hold its members accountable to a to-do list of actions that will accelerate the uptake of shared mobility. The Shared Mobility Action Agenda supports all shared transportation options, including public transportation, ride-hailing, car-sharing, on-demand responsive microtransit, shared bikes and scooters and paratransit.

From another point of view, although shared transport can provide cleaner, more accessible and more equitable transportation options, the United Nations Technology Executive Committee and the Climate Technology Centre and Network report for COP27 said that "the activities and performance of the shared mobility is likely to play a minor role in deep decarbonisation".

2.2. Mobility Choices Goals:

Provision of the cities and the citizens with more mobility options

Transportation choices that are safe, sustainable, convenient and efficient

Support healthier, greener and more active lifestyle

Decrease of the greenhouse gas emissions and support cleaner air.

2.3. Sustainable transportation and mobility

Sustainable transport refers to ways of transportation that are sustainable in terms of their social and environmental impacts.

The role of transport in sustainable development was first recognized at the 1992 United Nation's Earth Summit and reinforced in its outcome document – Agenda 21. During the 2002 World Summit on Sustainable Development, the participants discussed the role of transport in the outcome document - the Johannesburg Plan of Implementation (JPOI). JPOI provided various points for sustainable transport: infrastructure, public transport systems, goods delivery networks, affordability, efficiency and convenience of

transportation, as well as improving urban air quality and health, and reduce greenhouse gas emissions.

Some sustainable mobility choices could be:

- Airplane versus car: A long-distance airplane flight emits more CO2 per mile than a journey by car with one sole passenger on board. Nevertheless, air travel is still one of the most polluting modes of transport.
- Train versus car
- Train versus plane for shorter distances
- Car sharing
- Electric vehicles
- Efficient driving style
- Hydrogen vehilces
- Other options.

RELATED SDGS

GOAL 3 GOOD HEALTH AND WELL BEING

GOAL 9 INDUSTRY INNOVATION AND INFRASTRUCTURE

GOAL 11 SUSTAINABLE CITIES AND COMMUNITIES

According to research and data transport is responsible for 23% of global energy-related greenhouse gas emissions. This means that in order to address climate change sustainable transport is key success factor.

It is a driver for city and urban development, linking people, connecting the communities to the world, enlarging and building new markets and supporting trade.

Thus, sustainable transport drives sustainable development. It is fundamental to the needs of people in their personal and economic lives. Yet, it is respecting the ability of the next generations to meet their needs.

There are also big opportunities provided by sustainable transport: saving lives every year by better road safety and less air pollution, and reduction of carbon emissions by 7 gigatonnes.

The sustainable transport transformation requires a change rather than any serious increase of the infrastructure expenditure.

Transport is considered as a means that allows people to access what they need: education, jobs, markets, social interaction, and other services and amenities for their healthy and fulfilled lives.

This allows more options and mobility choices for the citizens, businesses, organisations, and the cities as a whole.

The Sustainable transport impacts on achieving the SDGs are as follow:

2.4. GLOBAL TRENDS AND CHALLENGES:

- High level and intensity of urbanization and urban-rural integration
- Changes in demography
- Global supply chains and trade routes
- Digital and data connectivity
- Development of more efficient and greener technology and processes

2.5. THE 'AVOID-SHIFT-IMPROVE' APPROACH

The decisions related to the use of inefficient or unnecessary travel or transport can be made and supported by improved and integrated urban planning, smart city management, new smart and urban projects including localized ones, transport demand management, less complex and extended supply chains, and e-communication options (mobile phone use, teleworking).

It is also important shifting travel and transport to improve trip efficiency through most efficient or environmentally-friendly mode or combination of such. Also, capable of meeting the travel/transport needs, and/or shifting to off-peak travel, and

The environmental performance of transport can be improved by technological, operational, regulatory or pricing factors.

In addition, infrastructure improvements can make transport vehicles and equipment more sustainable and provides more energy efficient and less carbon intensive options. The approach does not mean there should be "avoidance," "shifting" or "improvement". Each option should be evaluated and considered to support sustainability. The model is most applicable to the urban conditions and to long distance or international freight transport, where various transport modes and options are available.

In rural areas, where options are often limited, 'shifting' is less relevant, at least in the short-term. Other imperatives like the speed demanded by the users and customers could mean that some freight or shipping operators, for instance, focus more on the 'improve' approach. However, there are cases where freight may be shifted from road to rail or waterways or from conventional delivery trucks to electric vehicles.

Thus, globally we can work toward 'shifting' to a reality where efficient and effective inter-modality is achieved and all modes contribute to a more efficient and sustainable system.

Essentially, as a condition and key success factor there should be: sound policy and governance structures and basic technical and financial capacities at all levels. And thus we can effectively apply "Avoid-Shift-Improve".

While most developed countries have such factors and conditions and the relevant capabilities at least in some form, many other very often less developed countries, do not have the capacity building to create or enhance them.

The Bogota Declaration on Sustainable Transport Objectives is one such milestone that provides an important foundation. In 2011, representatives of the national transport and environment agencies of Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay and Uruguay met in Bogota, Colombia and outlined key priorities and objectives in sustainable transport, adopting a working definition of sustainable transport as "the provision of services and infrastructure for the mobility of people and goods needed for economic and social development, and improved quality of life and competitiveness. These services and transport infrastructure provide secure, reliable, economical, efficient, equitable and affordable access to all, while mitigating the local and global negative impacts on health and the environment, in the short-, medium- and long-term, without compromising the development of future generations."

The Bogota Declaration applied the 'Avoid-Shift-Improve' approach to adapt transport better with the sustainable development principles.

The signatories promoted cross-cutting strategies on enhanced road safety, adaptation of infrastructure, reduce of greenhouse gas emissions, and actions to fight climate change. They also supported the vulnerable users, allocation of more financial resources to sustainable transport modes and alternatives, and efficient governance.

2.6. Making transport more sustainable

The main steps and actions to be taken as suggested by the UN are:

POLICY DEVELOPMENT AND IMPLEMENTATION

- A better and integrated approach to transport policy and regulations
- Building the necessary capacity, especially in developing and less developed countries,
- Improve safety and access to services of transport and mobility
- Stakeholder engagement and public awareness
- Monitoring and evaluation

FINANCING

- Government funding
- Partnership with the private sector
- New measures by business
- Financial support by international financial institutions
- Special climate funds

TECHNOLOGICAL INNOVATION

- Enabling innovative technology for transformation
- Power and energy options
- New type of vehicles
- New integrated systems

In conclusion, there are various means of transportation to be developed and adapted for the purposes of the action plan for sustainable transport and mobility choices.

Sustainable transport is a very important driver of sustainable development and a means by which people can access what they need to fulfil their lives. All actors and stakeholders: governments, business, society, citizens, organisations should make a strong commitment and efforts to transform the transport options in terms of individual travel and freight. It should become more efficient, safe, affordable, accessible, adaptable, and resilient, while reducing carbon and other harmful emissions and environmental impacts.

Opportunities arising from sustainable transport are many and very different. Integrated policy and regulations are crucial to decision making about the transport systems and the necessary infrastructure.

Financing decisions should be based on a systematic and holistic approach. The complex nature of transport investments and their consequences call for innovative funding options.

New technology that supports clean fuels and clean energy is a high priority and of great importance, and it should be considered as an imperative in fighting climate change.

The ‘Avoid-Shift-Improve’ approach is an example for approach and useful framework for assessing the transportation measures and for taking action for sustainable transport.

In general, the mobility choices of the individuals impact the sustainable development and the ultimate impact: reduce of pollution and better quality of air and clearer skies; improved health and well-being of citizens and communities; reduced use of harmful chemicals.

This leads also to healthier communities and whole nations which will improve the global and general well-being.

3. References

1. MoCho: Mobility choices and societal impacts, https://www.media.mit.edu/projects/mobcho/overview/
2. What is Design Thinking and Why Is It So Popular?, https://www.interaction-design.org/literature/article/what-is-design-thinking-and-why-is-it-so-popular
3. Design Thinking Process: Ideate, https://www.interaction-design.org/literature/article/stage-3-in-the-design-thinking-process-ideate
4. Introduction to the Essential Ideation Techniques which are the Heart of Design Thinking, https://www.interaction-design.org/literature/article/introduction-to-the-essential-ideation-techniques-which-are-the-heart-of-design-thinking
5. What Is Ideation In Design Thinking? A Guide To The Most Important Ideation Techniques, https://careerfoundry.com/en/blog/ux-design/what-is-ideation-in-design-thinking/
6. Design Thinking — brainstorming through the ‘Ideation’ phase, https://neemz.medium.com/design-thinking-brainstorming-through-the-ideation-phase-4612b3cf723a
7. Unpacking Design Thinking: Ideate, https://knowwithoutborders.org/unpacking-design-thinking-ideate/
8. Design Thinking’s Exciting Third Phase: IDEATING, https://www.workshopper.com/post/design-thinkings-exciting-third-phase-ideating
9. Ideation in Design Thinking: Importance of Approach, https://www.uxpin.com/studio/blog/design-thinking-ideation/
10. Stage 4 in the Design Thinking Process: Prototype, https://www.interaction-design.org/literature/article/stage-4-in-the-design-thinking-process-prototype
11. A Complete Introduction to Prototyping (Stage 4 of the Design Thinking Process) https://www.workshopper.com/post/design-thinking-phase-4-everything-you-need-to-know-about-prototyping
12. What is Prototype in Design Thinking? Types? 5 Reasons Why Prototyping is must? https://www.yukti.io/why-prototyping-is-an-important-stage-of-design-thinking/
13. Prototype https://innovationbydesign.pressbooks.com/chapter/prototype/
14. Unpacking Design Thinking: Prototype https://knowwithoutborders.org/unpacking-design-thinking-prototype/
15. Design Thinking: Prototype, https://youtu.be/Q4MzT2MEDHA
16. Design Thinking - Paper Prototypes, https://youtu.be/85muhAaySps
17. Rapid Prototyping: Sketching | Google for Startups, https://youtu.be/JMjozqJS44M
18. Mobile Application Design: Paper Prototype Video, https://youtu.be/y20E3qBmHpg
19. Low fidelity prototype testing of the EE app, https://youtu.be/yafaGNFu8Eg
20. IDEO Workshop Part Four: Prototyping, https://youtu.be/Rbjej4A6oRk
21. Design Thinking: Test, https://youtu.be/UVEQCNM6X-A
22. 06 Design Thinking - Testing & Iteration, https://youtu.be/r6T4AZf2xNg
23. Design Thinking "STAGE 5 - TEST" Season 8 Ep 4, https://youtu.be/R6rAEWv6Nyc

24. Innovation 101 E4: Prototyping & Testing - Physical Products, https://youtu.be/2PzT0aAi9Lw
25. Test Ideas, Test Requirements Design | How to Design Tests | Testing Interview Questions and Answers, https://youtu.be/juHNzoRNlIQ
26. Shared Mobility 2030 Action Agenda Published, https://futuretransport-news.com/shared-mobility-2030-action-agenda-published/
27. Sustainable Development Goals (SDGs), https://unfoundation.org/what-we-do/issues/sustainable-development-goals/?gclid=Cj0KCQiAyracBhDoARIsACGFcS5Cm7f0AIMQI6v85NbUaxyKNhyoQdg0zT0Jnd3DfqdEjRE2m42GK5MaAhufEALw_wcB
28. Sustainable transport, https://sustainabledevelopment.un.org/topics/sustainabletransport
29. MOBILIZING for DEVELOPMENT Analysis and Policy Recommendations from the United Nations Secretary-General's High-Level Advisory Group on Sustainable Transport, https://sustainabledevelopment.un.org/content/documents/2375Mobilizing%20Sustainable%20Transport.pdf

https://www.oecd.org/agriculture/key-challenges-agriculture-how-solve/

https://www.worldbank.org/en/news/feature/2021/12/16/5-key-issues-in-agriculture-in-2021

https://www.eea.europa.eu/highlights/climate-change-threatens-future-of

https://www.eea.europa.eu/publications/cc-adaptation-agriculture/at_download/file

https://www.nextdayaccess.com/adaptability-is-key-in-all-life-situations/

https://justinthomasmiller.com/power-adaptability-adapt-anything-life-throws/

https://www.eea.europa.eu/publications/cc-adaptation-agriculture

https://www.frontiersin.org/articles/10.3389/fpsyg.2018.01678/full

https://www.sciencedirect.com/topics/psychology/career-adaptability

https://munispace.muni.cz/library/catalog/book/1855

https://dbterapie.cz/encyklopedie/adaptivni-chovani/

https://www.linkedin.com/pulse/why-its-more-important-than-ever-focus-adaptability-skills-roslansky

https://esoftskills.com/10-soft-skills-you-need-adaptability-and-flexibility-7/

https://learning.shine.com/talenteconomy/career-help/adaptability-skills/

https://ajgalvez.com/personal-en/adaptability-changing-environment/