

# GREEN AND DIGITAL TRANSFORMATION

# GREEN AND DIGITAL TRANSFORMATION

## List of Challenges

### Energy and Energy Systems

Ensuring Energy Security in the Country  
Implementing Decarbonization - Just Energy Transition  
Reducing Energy Intensity Across All Sectors  
It is important to pay attention to how gender affects access to energy and how energy needs and usage differ based on gender. Additionally, focus should be placed on women's participation in the industry of renewable energy sources.

### Environment

Compromised Quality of Environmental Media  
Unacceptable State of Waste  
Low Percentage of Protected Areas  
Unpreparedness for Climate Change (Vulnerability)  
Insufficient Institutional Capacities at National and Local Levels  
Low Environmental Awareness Among the Public and Decision-Makers  
Lack of Financial Resources for Implementation  
**The gender perspective should be incorporated into considerations of climate change and its consequences. Women and men may have different responses to climate change and different adaptation strategies. Equal access to information and environmental protection resources should be ensured.**

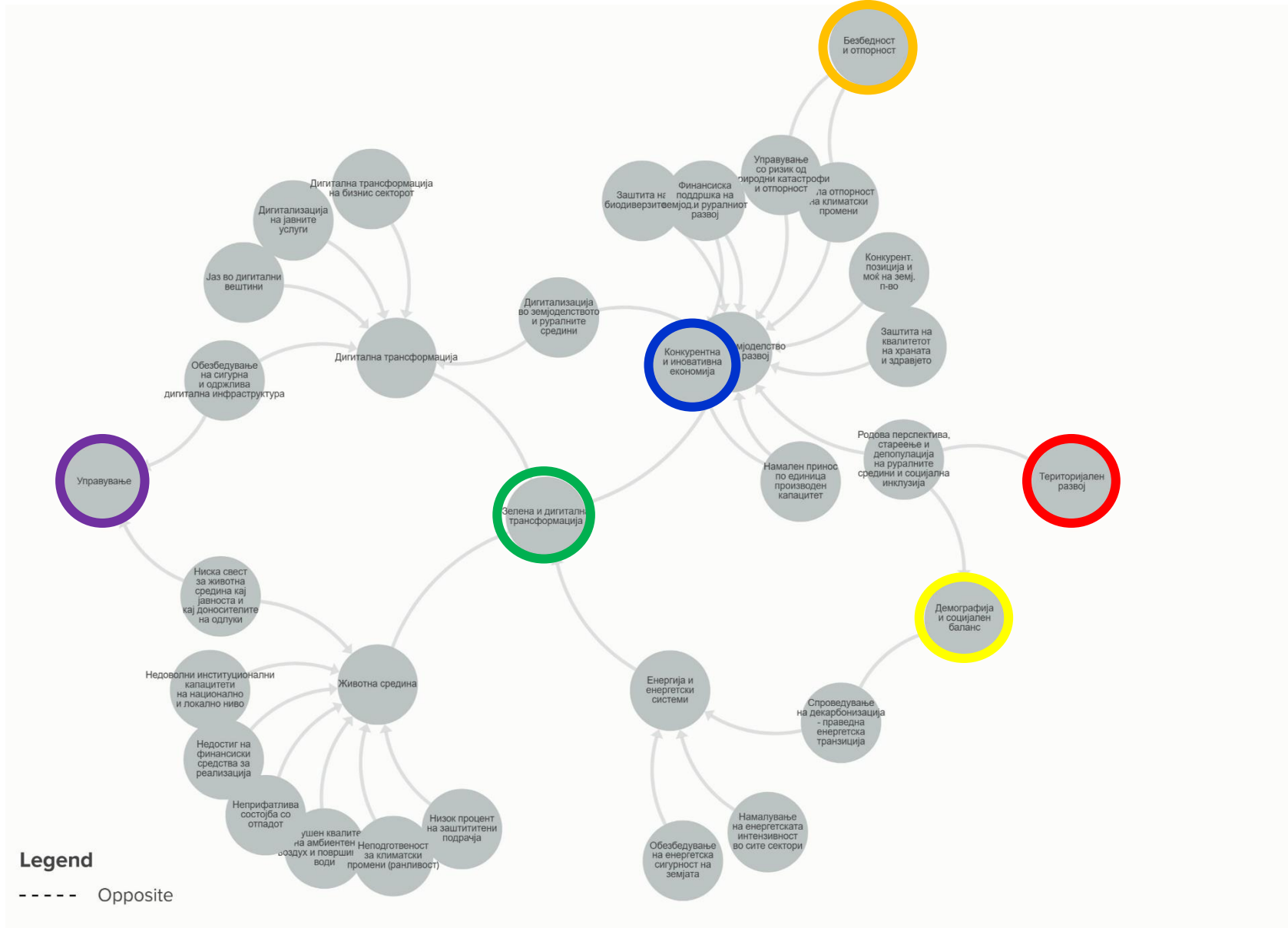
### Sustainable Agriculture and Rural Development

Reduced Yield per Unit of Production Capacity (Low Productivity)  
Digitization in Agriculture and Rural Environments  
Limited Climate Resilience, Irrational Use of Natural Resources and Land Degradation  
Disaster Risk Management and Resilience (Security and Resilience)  
Biodiversity Conservation  
Gender Perspective, Aging, and Depopulation in Rural Areas and Social Inclusion  
Financial Support for Agriculture and Rural Development  
Competitive Position and Power of Agricultural Production and Market Regulation with Agricultural Products  
Protection of Food Quality and Health  
In agricultural communities, women often play a crucial role, but their work and contributions may go unnoticed or be inadequately rewarded. Awareness should be raised regarding the significance of women in the agricultural production chain, and equal **distribution of resources and opportunities** should be promoted.

### Digital Transformation

Ensuring a Secure and Sustainable Digital Infrastructure  
Digital Skills Gap  
Digitization of Public Services  
Digital Transformation in the Business Sector

Access to digital skills and training should be provided for women and men, especially in communities that may not have easy access to technology. Digital services should be designed to meet the needs and interests of all genders.



## MISSION OF THE STRATEGIC AREA "GREEN AND DIGITAL TRANSFORMATION"

To build a green, digital, sustainable and resilient economy with stable, secure, and efficient energy and digital infrastructure, simultaneously ensuring inclusive economic development and environmental protection, making sure that the different needs, perspectives, and contributions of women and men are recognized and integrated, and successfully addressing the challenges of climate change, depletion of natural resources and environmental degradation.

### Strategic goals

#### 1. Energy Security and Sustainable Energy Development

##### Priorities

- High participation and diversification of renewable energy sources in the energy mix
- Energy-efficient economy
- Stable energy infrastructure
- Just energy transition
- Sustainable mobility and transport

#### 2. Resilience and Adaptability to Climate Change

##### Priorities

- Improvement of existing and construction of new infrastructure for rational use of resources (e.g., rational use of water)
- Building infrastructure to cope with the impacts of climate change
- Sustainable spatial planning

#### 3. Digitally Advanced Society

##### Priorities

- Secure and sustainable digital infrastructure and network society
- Access to digital technologies
- High level of digital literacy and digital skills

Digitized public and private sectors  
Data and communication security

#### **4. Sustainable Agriculture and Accelerated Rural Development**

##### **Priorities**

Advancement and diversification of primary agricultural production  
Sustainable food production (food security and safety)  
Modern rural development

##### *Alternative Proposal:*

*Production of sufficient quantities of safe and quality food (increased domestic production and reduced import dependence)*  
*Modern and advanced rural environment*  
*Sustainable and prosperous agricultural enterprises*  
*Capacities and knowledge for the application of state-of-the-art production technologies*  
*Sustainable land and natural resources management*

#### **5. Functional Circular Economy**

##### **Priorities**

Zero waste  
Secondary raw materials over primary resources

#### **6. Preserved Ecosystems and Healthy Environment**

##### **Priorities**

One-third of the territory of protected areas  
Zero percent of the population exposed to exceeded limit values  
Zero discharge of untreated waters  
High environmental awareness

## Energy and Energy Systems

CHALLENGES	CAUSES	EFFECTS	SOCIETAL CHANGES - SYSTEMIC APPROACH
<p><b>Ensuring Energy Security in the Country</b></p>	<p>Insufficient Installed Capacity for Production of Electricity:</p> <ul style="list-style-type: none"> <li>- Decades-old production capacities with outdated and inefficient technology, prone to frequent outages</li> <li>- Prolonged lack of investments in new capacities with significant installed power</li> <li>- Low implementation and frequent repurposing of funds</li> <li>- Lack of diversification in natural gas supply and underutilization</li> <li>- Delays in planning, development and implementation of projects for building new gas pipelines that will enable access to new sources of supply</li> <li>- Dependence on a single supply point (high transit and geopolitical risk)</li> <li>- Underdeveloped infrastructure</li> <li>- Poorly and insufficiently developed transportation and ICT infrastructure as prerequisites for investing and developing new energy production capacities</li> <li>- Lack of investments in the development and expansion of the transmission and distribution grid for electric energy</li> </ul>	<ul style="list-style-type: none"> <li>- Ensuring uninterrupted energy supply at significantly higher costs (disrupting the concept of "energy security" that implies continuous energy supply at acceptable/reasonable costs)</li> <li>- A significant share of electricity imported from abroad</li> <li>- Non-competitive natural gas prices compared to other energy sources and a low number of connections, especially in the category of households</li> <li>- High dependence on electricity for heating, leading to strain on the power system and a risk</li> </ul>	<ul style="list-style-type: none"> <li>- Placing energy high on the list of priorities of the national economy</li> <li>- Creating sustainable policies that consider proven technologies and solutions from other countries</li> <li>- Political will to take risks and invest in projects with long-term effects</li> <li>- Applying a merit-based system for hiring, promoting and selecting management personnel in the energy sector (companies, relevant institutions, regulatory bodies, etc.)</li> <li>- Raising public awareness about the importance of transparency and accountability in managing the energy sector</li> <li>- Strengthening energy security of local self-governments through innovative local energy planning - producing energy locally by using the advantages of the local climate (e.g., agrosolar farms for sustainable food and energy production on the same land)</li> <li>- Promoting innovation and digitalization in the energy sector through educational reforms (new curricula and study programs in line with new technologies)</li> <li>- Adopting modern regulations to enable breakthroughs in energy storage technologies (e.g., following the example of some countries in the region, one of the conditions for obtaining permission for the installation of a photovoltaic power plant should be the installation of an energy storage battery system).</li> <li>- Providing training and scholarship programs with a focus on women to facilitate their entry and advancement in this sector</li> </ul>



	<ul style="list-style-type: none"> <li>- Insufficient regional interconnectedness - interconnections</li> <li>- Weakly developed district heating network, limited only to Skopje</li> <li>- Slow progress in digitizing energy systems</li> <li>- Lack of energy storage capacities</li> <li>- Limited human potential for the establishment and maintenance of distribution grids, especially low participation of women in this sector</li> </ul>	<ul style="list-style-type: none"> <li>of defects and outages in water supply</li> <li>- Vulnerability to cyber threats</li> <li>- Challenges in connecting new capacity from renewable energy sources to the grid</li> </ul>	<ul style="list-style-type: none"> <li>- More intensive and focused regional cooperation, knowledge and technology transfer, infrastructure connectivity, integration of energy markets, etc.</li> <li>- Studying the effects of sustainable policies on women, men, and vulnerable groups of citizens and correcting any unequal impact</li> <li>- Legal recognition and acknowledgement of critical infrastructure within the regulatory framework</li> <li>- Ensuring stable interconnectors for gas supply</li> <li>- Small modular nuclear reactors</li> <li>- Adaptive gas pipeline network for distribution of both gas and hydrogen.</li> </ul>
<p><b>Implementing Decarbonization - Just Energy Transition</b></p>	<ul style="list-style-type: none"> <li>- High dependency of the entire economy on fossil fuels</li> <li>- Danger of jeopardizing energy security</li> <li>- Absence of a national Strategy for Low-Carbon Development (and/or Strategy for the Implementation of Hydrogen as Fuel)</li> <li>- Absence of a national Strategy for phasing out coal and transforming local economies</li> <li>- Absence of political will – buying social peace instead of implementing radical measures for closing certain capacities</li> <li>- Absence of carbon levy or carbon tax</li> <li>- Subsidizing the production of electricity from coal</li> <li>- Underutilization of gas as a transitional fuel (bridge fuel) in the past two decades</li> </ul>	<ul style="list-style-type: none"> <li>- Air, soil and water pollution</li> <li>- Poor quality of life and lower life expectancy due to the consequences of pollution</li> <li>- Indirect costs (externalities), i.e., costs for the entire society due to compromised public health</li> <li>- Additional costs for environmental protection (the approach of pollute and then remediate, instead of prevent)</li> </ul>	<ul style="list-style-type: none"> <li>- Direct allocation of institutional and political responsibility to a new Ministry of Energy and Climate (integrated approach)</li> <li>- Reduction in the number of agencies, offices, funds and other institutions with overlapping competencies in the energy sector</li> <li>- Change in the policymaking process in transition conditions (focus on adaptability, combination of policies for optimal outcomes, risk analysis, social support, gender aspects, international coordination, greater involvement of the academic community, etc.)</li> <li>- Strengthening energy democracy (government support for the formation of energy cooperatives, creating equal opportunities for all potential investors, reducing political influence on decision-making, taking into consideration the capabilities and needs of women, men and vulnerable groups of citizens etc.)</li> <li>- Investment in knowledge and skills through the educational process, in line with the new technologies of energy transition (appropriate curricula and study programs developed in collaboration with chambers of commerce)</li> <li>- Promotion of women in careers related to the gas industry and providing training and education for them</li> </ul>



	<ul style="list-style-type: none"> <li>- Low awareness among all stakeholders regarding the importance of energy transition</li> <li>- Lack of awareness about gender aspects of a just energy transition</li> <li>- Resistance to change and acceptance of new technologies, as well as a lack of adequate workforce</li> <li>- Lack of coordination - absence of a multisectoral and multi-institutional approach</li> </ul>	<ul style="list-style-type: none"> <li>- Carbon-intensive and non-competitive national economy</li> <li>- Stifled and limited development trapped in old and inefficient technologies that cause pollution</li> </ul>	<ul style="list-style-type: none"> <li>- Transformation of local economies traditionally reliant on the coal industry and retraining the workforce</li> <li>- Introduction of a carbon tax/carbon levy</li> <li>- Ban on solid fuel combustion in urban areas</li> <li>- Encouragement of green and circular economy development through tax relief, subsidies and other benefits</li> <li>- Subsidies for households with lower incomes to use environmentally friendly heating solutions for their homes (e.g., subsidizing energy-efficient facades, free connection to a district heating system, etc.)</li> <li>- Special (favorable) subsidies for implementing multiple renewable energy technologies (e.g., photovoltaic panels + heat pumps and/or battery systems)</li> <li>- Careful creation and review of the effects of preferential tariffs for renewable energy sources, as well as their duration (cost should not exceed benefits)</li> <li>- Promotion of fair systems for setting tariffs and taxes that do not pose an additional burden for women and vulnerable groups of citizens, especially those with low incomes</li> <li>- Discouraging the emigration of young educated professionals by providing significant government support for starting businesses that focus on developing new technologies and creating added value</li> <li>- Prohibition on using agricultural crops (e.g., corn, etc.) in biopower plants for energy production. Only waste biomass should be used for such purposes.</li> </ul>
<p><b>Reducing Energy Intensity Across All Sectors</b></p>	<ul style="list-style-type: none"> <li>- Non-enforcement of the Law on Energy Efficiency</li> <li>- Environment that does not stimulate rational energy consumption (e.g., during a crisis, the government provides subsidized electric energy without</li> </ul>	<ul style="list-style-type: none"> <li>- Non-competitive economy (higher costs to provide the same product or service compared to the EU average)</li> </ul>	<ul style="list-style-type: none"> <li>- Changing the method and conditions for granting energy efficiency subsidies, with precisely defined expected results and verification of their achievement, taking into consideration gender aspects</li> <li>- Campaigns to raise awareness and projects that provide visibility of consumption with the application of new technologies (real-time data) - targets should include both</li> </ul>

	<p>requiring results in improving energy efficiency from the entities)</p> <ul style="list-style-type: none"> <li>- Insufficient investment in industrial process automation</li> <li>- Weak capacities of companies at the operational management level</li> <li>- Implementation of energy management systems in a small number of companies</li> <li>- Non-existence of a dedicated Energy Efficiency Fund</li> <li>- Energy efficiency reports are prepared during the construction of new buildings; however, energy characteristics are rarely verified after completion of the construction</li> <li>- Local self-governments either lack energy efficiency programs or generally have low quality programs</li> <li>- Unpreparedness to invest in energy efficiency measures due to other priorities</li> </ul>	<ul style="list-style-type: none"> <li>- Higher exposure to price shocks in energy markets</li> <li>- Unnecessary operational costs that reduce available funds for new investments and development of companies</li> <li>- Working with outdated and energy-inefficient technology that generates lower productivity</li> <li>- Unnecessarily high greenhouse gas emissions and pollution</li> <li>- Energy poverty</li> </ul>	<p>industrial capacities and households, with a special focus on the needs of women, men, and vulnerable groups of citizens</p> <ul style="list-style-type: none"> <li>- Providing favorable lending for investments in improving energy efficiency, taking into account the loan opportunities for women, men, and vulnerable groups of citizens</li> <li>- Exemption from utility fees for constructing energy-efficient buildings of the highest energy class</li> <li>- Obtaining approvals and permissions through fast-track procedures for investments in energy-efficient production capacities and/or production lines, as well as energy-efficient facilities</li> </ul>
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## Environment

CHALLENGES	CAUSES	EFFECTS	SOCIETAL CHANGES - SYSTEMIC APPROACH
<p><b>Compromised Quality of Environmental Media</b></p>	<ul style="list-style-type: none"> <li>- Non-enforcement of legislation and uncritical transposition of European supranational legislation without considering a realistic transition period</li> <li>- Insufficient capacity in regulatory bodies</li> <li>- Lack of environmental awareness among competent authorities, industries and the population</li> <li>- Insufficient financial resources for implementing protective measures</li> </ul>	<ul style="list-style-type: none"> <li>- Compromised ambient air quality (exceeding average annual concentrations of PM10, 87% of the population exposed to exceeding PM10 concentrations)</li> <li>- Chronic obstructive pulmonary disease, tracheal cancer, bronchial and lung cancer, aggravated asthma and lower respiratory tract infections</li> <li>- Increased costs for medical services in the healthcare system</li> <li>- Absenteeism from work and reduced work productivity</li> <li>- Compromised quality of surface water (only 27.6/33% of water treated)</li> <li>- Transmission of various diseases</li> <li>- Risk of poor-quality agricultural products irrigated with such water</li> <li>- Reduced agricultural yield</li> </ul>	<ul style="list-style-type: none"> <li>- Professionalization of the public administration, especially the inspection services</li> <li>- Raising high-level environmental awareness among all stakeholders, including women, men and vulnerable groups of citizens</li> <li>- 0% of the population exposed to exceeding limit values of pollutants</li> <li>- 0 exceedances of limit values on an annual basis</li> <li>- Ecology education</li> </ul> <p>Short-term and medium-term goals:</p> <ul style="list-style-type: none"> <li>- Professional public administration</li> <li>- High public awareness of the environment among all stakeholders</li> <li>- Zero emissions in water</li> </ul>
<p><b>Unacceptable State of Waste</b></p>	<ul style="list-style-type: none"> <li>- Non-enforcement of legislation</li> <li>- Lack of capacity in regulatory authorities</li> <li>- Lack of environmental awareness among regulators, industries and the population</li> </ul>	<ul style="list-style-type: none"> <li>- Unacceptable state of waste (incomplete coverage of municipal waste collection services, low waste sorting and recycling, continuous trend of increasing waste generation per capita, lack of sanitary landfills)</li> <li>- Poor hygiene and diseases associated with it</li> </ul>	<p>Short-term and medium-term goals:</p> <ul style="list-style-type: none"> <li>- Professional public administration</li> <li>- High public awareness of the environment among all stakeholders, including women, men and vulnerable individuals</li> </ul>

CHALLENGES	CAUSES	EFFECTS	SOCIETAL CHANGES - SYSTEMIC APPROACH
	<ul style="list-style-type: none"> <li>- Lack of financial resources</li> </ul>	<ul style="list-style-type: none"> <li>- Impact on the climate (through greenhouse gas emissions)</li> <li>- Risk of water, air and soil solution</li> <li>- Uncontrolled exploitation of natural resources</li> </ul>	<ul style="list-style-type: none"> <li>- Zero waste (recycling) and active involvement of women, men, and vulnerable individuals in recycling processes</li> <li>- Utilization of waste as a resource for heat and electricity production (using the part of waste that cannot be recycled or reused in other ways)</li> </ul>
<b>Low Percentage of Protected Areas</b>	<ul style="list-style-type: none"> <li>- Insufficient financial resources</li> <li>- Lack of capacity in regulatory authorities</li> <li>- Lack of environmental awareness among regulators, industries and the population</li> <li>- Non-enforcement of legislation</li> </ul>	<ul style="list-style-type: none"> <li>- Low percentage of protected areas: 12.5% (13.9%) of the total territory</li> <li>- Loss or fragmentation of entire habitats (e.g., reeds in the Struga part of Lake Ohrid)</li> <li>- Loss of animal and plant species</li> </ul>	<p>Short-term and medium-term goals:</p> <ul style="list-style-type: none"> <li>- Professional public administration</li> <li>- High public awareness of the environment among all stakeholders</li> <li>- One third of the territory under protection</li> <li>- Self-sustainable financial model for protection and management</li> </ul>
<b>Unpreparedness for Climate Change (Vulnerability)</b>	<ul style="list-style-type: none"> <li>- Absence of water infrastructure (floods and irrigation)</li> <li>- Lack of information and analytical data on the vulnerability of various groups of citizens to climate change</li> </ul>	<ul style="list-style-type: none"> <li>- Floods and water scarcity</li> <li>- Loss of fertile land</li> <li>- Lack of climate-resilient infrastructure</li> </ul>	<p>Short-term and medium-term goals:</p> <ul style="list-style-type: none"> <li>- Professional public administration</li> <li>- High public awareness of the environment among all stakeholders</li> <li>- Special programs to provide support and ensure</li> </ul>

CHALLENGES	CAUSES	EFFECTS	SOCIETAL CHANGES - SYSTEMIC APPROACH
			<p>resistance/resilience to climate change for various groups of citizens, including women, men, and vulnerable groups of citizens</p>
<p><b>Insufficient Institutional Capacities at National and Local Levels</b></p>	<ul style="list-style-type: none"> <li>- Absence of a professional state administration</li> <li>- Partisan administration with unqualified and inexperienced personnel</li> <li>- Lack of continuous training</li> <li>- Lack of incentives for competent personnel, leading to their departure</li> </ul>	<ul style="list-style-type: none"> <li>- Non-enforcement of environmental legislation</li> <li>- Weak or insufficient environmental measures</li> <li>- Failure to implement environmental measures and obligations</li> <li>- Absence or insufficient accountability for the enforcement of environmental legislation, measures and obligations</li> </ul>	<p>Short-term and medium-term goals:</p> <ul style="list-style-type: none"> <li>- Professional public administration</li> <li>- High public awareness of the environment among all stakeholders</li> <li>- Special public prosecutors and judicial bodies specialized in environmental crime (following the example of developed countries)</li> </ul>
<p><b>Low Environmental Awareness Among the Public and Decision-Makers</b></p>	<ul style="list-style-type: none"> <li>- Absence (very low representation) of environmental topics in all levels of educational processes</li> <li>- Absence/insufficient representation of environmental topics in the media</li> <li>- Limited public participation, including women and vulnerable groups of citizens, in strategic decision-making and planning</li> <li>- Attributing very low significance to the environment by decision-makers</li> </ul>	<ul style="list-style-type: none"> <li>- Absence or insufficient pressure on decision-makers to enforce environmental legislation, measures and obligations</li> <li>- Absence or insufficient transparency in implementing environmental measures and obligations</li> <li>- Absence or insufficient accountability for the enforcement of environmental legislation, measures and obligations</li> </ul>	<p>Short-term and medium-term goals:</p> <ul style="list-style-type: none"> <li>- Professional public administration</li> <li>- High public awareness of the environment among all stakeholders, including women and vulnerable groups of citizens</li> </ul>

CHALLENGES	CAUSES	EFFECTS	SOCIETAL CHANGES - SYSTEMIC APPROACH
<b>Lack of Financial Resources for Implementation</b>	<ul style="list-style-type: none"> <li>- Low environmental awareness among the public and decision-makers</li> <li>- Attributing very low significance to the environment by decision-makers</li> <li>- Lack of financial instruments for implementing environmental legislation (fundamental principle - polluter pays)</li> </ul>	<ul style="list-style-type: none"> <li>- Non-enforcement of environmental legislation and measures</li> <li>- Compromised quality of the environment</li> <li>- Lack of continuity in enforcing environmental legislation, measures and obligations</li> </ul>	<p>Short-term and medium-term goals:</p> <ul style="list-style-type: none"> <li>- Professionalization of public administration</li> <li>- High public awareness of the environment among all stakeholders</li> <li>- Mobilization of larger funds in the Environmental Fund with the introduction of a gender perspective in the management of the fund</li> <li>- Full implementation of the "polluter pays" principle</li> </ul>

#### 4. Sustainable Agriculture and Rural Development

CHALLENGES	CAUSES	EFFECTS	SOCIETAL CHANGES - SYSTEMIC APPROACH
<b>Reduced Yield per Unit of Production Capacity (Low Productivity)</b>	<ul style="list-style-type: none"> <li>- Fragmented production and small production capacities</li> <li>- Lack of qualified and seasonal workforce</li> <li>- Low level of education, neglect of the profession and expertise</li> <li>- Low level of knowledge and knowledge transfer and innovation</li> <li>- Small number of women who own agricultural arable land</li> </ul>	<ul style="list-style-type: none"> <li>- A large portion of agricultural land has owners who do not cultivate it</li> <li>- Unidentified heirs</li> <li>- Relatively weak knowledge and practical experience, low labor productivity, lack of strategic approach, lack of innovation and modernization, improper technology and negative environmental impact, market risks and weak adaptability to market changes and shocks</li> <li>- Improper execution of technological-technical operations (soil cultivation, plant protection, fertilization,</li> </ul>	<ul style="list-style-type: none"> <li>- Changes in the tax policy for agricultural land (increased taxes for uncultivated land)</li> <li>- Mandatory minimum parcel size aiming to motivate cultivation, leasing, or selling of uncultivated land</li> <li>- Encouraging inheritance/succession arrangements and registration of ownership with the introduction of a gender perspective</li> <li>- Additional promotion and support for the process of consolidating agricultural land</li> </ul>

CHALLENGES	CAUSES	EFFECTS	SOCIETAL CHANGES - SYSTEMIC APPROACH
		<p>storage and preservation of products, etc.)</p> <ul style="list-style-type: none"> <li>- Small number of women who are registered as agricultural activity holders</li> </ul>	<ul style="list-style-type: none"> <li>- Support for collective pooling of production resources (clusters, associations, cooperatives), including among women</li> <li>- Achieving a level of 1.5% share of the research and development costs in the overall national budget</li> </ul>
<b>Digitization in Agriculture and Rural Environments</b>	<ul style="list-style-type: none"> <li>- The digitization process is still in the phase of development</li> <li>- The second part involves intra and inter-sectoral electronic data exchange among different institutions, which is inadequately developed and seems to be going very slow</li> <li>- E-services for citizens and businesses, such as registration in various registries (e.g., the registry of wine producers, digital agricultural commodity exchanges)</li> <li>- Insufficient understanding and awareness of the possibilities and potential of digitization among men, women and vulnerable groups of citizens</li> </ul>	<ul style="list-style-type: none"> <li>- Lack of a large number of key data necessary for detailed and comprehensive analyses, as well as proper strategic planning and management</li> <li>- Complicates and delays the process of gathering the necessary documents and information, leading to increased costs</li> <li>- The process of registration, obtaining permissions, etc., becomes more complex and delayed, simultaneously unable to meet the greater needs of men, women and vulnerable groups of citizens</li> </ul>	<ul style="list-style-type: none"> <li>- Intensive support to complete the digitization of institutions - stakeholders in the agro-food sector</li> <li>- Intensive support for intra and inter-sectoral connectivity and digitization tailored to the needs and capabilities of men, women and vulnerable groups of citizens</li> <li>- Education and support for various digitization possibilities and artificial intelligence in terms of addressing threats such as extreme weather events, disruptions in market conditions and developing and utilizing digital tools for marketing, sales and services.</li> <li>- Implementation of AKIS (Agricultural Knowledge Information System)</li> </ul>
<b>Limited Climate Resilience, Irrational Use of Natural Resources and Land Degradation</b>	<ul style="list-style-type: none"> <li>- Certain parts of the country have infertile soils, arid and dry areas, limited access to water, etc.</li> <li>- Inadequate and outdated infrastructure</li> <li>- Vague laws and bylaws, lack of rulebooks, weak capacity and activity of inspection services, and insufficient awareness and involvement of the public and non-governmental sector</li> </ul>	<ul style="list-style-type: none"> <li>- Decreased yields and diversification opportunities of crops</li> <li>- Decrease in the potential of available natural resources</li> <li>- Inability to fully utilize the available capacities and opportunities offered by renewable energy sources (poor condition of irrigation systems, lack of access roads, lack of energy sources and high costs).</li> </ul>	<ul style="list-style-type: none"> <li>- Introducing new agroecological measures and indicators</li> <li>- Delineation of nitrate-sensitive zones (The Nitrate Directive)</li> <li>- Investments in capital infrastructure projects, especially the utilization of renewable energy sources</li> <li>- Completing and refining legal regulations, accompanied by practical solutions that can be implemented</li> </ul>



CHALLENGES	CAUSES	EFFECTS	SOCIETAL CHANGES - SYSTEMIC APPROACH
	<ul style="list-style-type: none"> <li>- Lack of systemic solutions regarding the establishment and organization of agricultural landfills and methods for organized disposal and management of waste and other hazardous substances</li> <li>- Insufficient awareness and responsibility of agricultural producers</li> </ul>	<ul style="list-style-type: none"> <li>- Irrational use and loss of natural resources, environmental disruption and pollution</li> </ul>	<ul style="list-style-type: none"> <li>- Strengthening the capacities of inspection services and increasing awareness among producers and the public</li> <li>- Developing local/municipal systemic solutions for disposal of waste and harmful substances</li> <li>- Strengthening awareness among men, women and vulnerable groups of citizens, informing and conducting trainings on the impact of agriculture on the environment, natural resources and climate change</li> </ul>
<b>Disaster Risk Management and Resilience (Security and Resilience)</b>	<ul style="list-style-type: none"> <li>- The MISA interoperability platform enables electronic data and document exchange, but most relevant institutions in the agricultural sector are not part of it</li> <li>- Low level of involvement and readiness of scientific research institutions in monitoring, analyzing and predicting risks and potential catastrophic events, accompanied by a lack of innovation and the benefits of the new IT technologies in "smart" agriculture, based on utilizing smart hardware, the Internet of Things, big databases and artificial intelligence</li> <li>- Lack of analyses on the impacts of natural disasters on various groups of citizens, including women, men, and vulnerable groups</li> <li>- Agricultural production is still not attractive for insurance companies; they do not invest in developing their own capacities for agricultural insurance. Additionally, there is a limited supply and development of insurance</li> </ul>	<ul style="list-style-type: none"> <li>- Insufficient communication and untimely response to risks and disasters</li> <li>- Lack of prevention, early warning and coping with the assessed situation, resulting in significant damages; responses are often reactive and focus on damage assessment and compensation</li> <li>- Low level of resilience of agricultural holdings to natural disasters</li> <li>- Relatively small number of insurance policies as a means of coping with risks</li> <li>- Vulnerability to natural disasters among different groups of citizens, including women, men, and vulnerable groups of citizens</li> </ul>	<ul style="list-style-type: none"> <li>- Inclusion of all relevant institutions in the agro-food sector in the MISA platform</li> <li>- Sectoral analysis and plan for functioning during crises</li> <li>- Preparation of a plan for sufficiency and emergency in providing food for various groups of citizens, including women, men, and vulnerable individuals</li> <li>- Establishment of a reserve fund for crises in the agricultural sector that takes into account the diverse needs of men and women in the sector</li> <li>- Involvement of the scientific research community and increased investment in innovations and IT technologies, especially for early warning</li> <li>- Investments in prevention measures against adverse events and natural disasters related to the climate</li> <li>- Introduction of mandatory conditions that agricultural holdings must meet in terms of prevention, including existing and widespread solutions (rational irrigation)</li> </ul>

CHALLENGES	CAUSES	EFFECTS	SOCIETAL CHANGES - SYSTEMIC APPROACH
	<p>packages tailored to the needs and demands of agricultural producers</p>		<p>systems, hail protection networks, frost protection sprinklers and mandatory maintenance of water supply and drainage networks)</p> <ul style="list-style-type: none"> <li>- Strengthening and supporting agricultural production insurance</li> </ul>
<p><b>Biodiversity Conservation</b></p>	<ul style="list-style-type: none"> <li>- The protection of biodiversity is relatively addressed and incorporated into certain legal solutions, but practical implementation and development of systemic solutions are still at an unsatisfactory level</li> <li>- There are relatively more measures for protecting agrobiodiversity in livestock production, which is not the case in plant production</li> </ul>	<ul style="list-style-type: none"> <li>- Destruction of agro-biodiversity and loss of local varieties and breeds, as well as biodiversity in general</li> <li>- Alarming state and loss of traditional varieties</li> </ul>	<ul style="list-style-type: none"> <li>- Strengthening and supporting capacities (gene banks, breeding farms, etc.) in the conservation and restoration of agro-biodiversity in line with real needs (with a priority on plant production)</li> <li>- Networking and involvement of the agricultural population in the development and protection of biodiversity</li> </ul>
<p><b>Gender Perspective, Aging and Depopulation in Rural Areas, Social Inclusion, and Human Rights-Based Approach</b></p>	<ul style="list-style-type: none"> <li>- Gender inequality is particularly pronounced in rural areas (gender division of labor, limited access to production factors, weak information systems, gender stereotypes regarding women's roles in the family, access to education, social protection, ownership of key resources, creditworthiness, etc.</li> <li>- Women's participation in the management of agricultural holdings is at a very low level (10% - State Statistical Office (SSO), 2017), while according to data from the Unique Register of Agricultural Holdings, 21.7% of registered agricultural holdings are managed by women</li> <li>- Young people have limited resources and opportunities (agricultural land, mechanization and equipment) and at</li> </ul>	<ul style="list-style-type: none"> <li>- Limited availability of public services (care for children and the elderly, healthcare, as well as traditional values (patriarchal structure, customs, cultural and traditional societal norms), contribute to the poor socio-economic situation of rural women</li> <li>- Low employment and participation rates of women and young people in the management of agricultural holdings</li> <li>- Support measures contribute to increasing the participation of women and young people in the management of agricultural businesses, at least in terms of meeting administrative conditions</li> </ul>	<ul style="list-style-type: none"> <li>- Prioritization of women, youth and socially vulnerable categories, as well as simplification of criteria (especially concerning property ownership)</li> <li>- Following the example of the measure "Support for active and additional activities of female members," the scope can be expanded to cover the youth and socially vulnerable categories, especially skilled individuals (young agricultural engineers)</li> <li>- Financial support for young farmers should be much more intensive</li> <li>- Strengthening support (leasing of equipment and mechanization, access to finance for starting businesses and self-employment, etc.)</li> </ul>

CHALLENGES	CAUSES	EFFECTS	SOCIETAL CHANGES - SYSTEMIC APPROACH
	<p>the same time, are not financially capable or creditworthy etc.</p> <ul style="list-style-type: none"> <li>- The rural population is largely excluded from the consultative process when creating rural development strategies and policymaking</li> <li>- Lack of information and data segregated by relevant social groups</li> </ul>	<ul style="list-style-type: none"> <li>- Migration and emigration of young people, especially young girls</li> <li>- Detailed analyses are not possible</li> </ul>	<ul style="list-style-type: none"> <li>- Building entrepreneurial and business skills, qualifications for these marginalized groups</li> <li>- The participation of agricultural producers and the local population is necessary in rural development policy-making</li> <li>- Gender-segregated data in various statistical sources</li> </ul>
<p><b>Financial Support for Agriculture and Rural Development</b></p> <p><i>Institutions and Institutional Support and Good Governance</i></p>	<ul style="list-style-type: none"> <li>- Direct payments serve as the basis for the sustainability of agricultural production</li> <li>- The measures cover a wide range, but there are numerous sub-measures</li> <li>- Holdings that need support from IPARD funds often lack access to information and cannot meet the requirements (property law relations, missing urban plans, building permits and legalization)</li> <li>- Detailed analysis and data on the effectiveness of these measures are lacking</li> <li>- There is a weak system for monitoring, analyzing and evaluating the impact of measures, accompanied by a very low level of accountability</li> </ul>	<ul style="list-style-type: none"> <li>- Decrease in production capacity and productivity per unit capacity</li> <li>- Unlike production-related measures, direct payments are dominant in the EU's Common Agricultural Policy (CAP), where support is not linked to the type of production and eco-measures</li> <li>- IPARD funds, intended for rural development, are underutilized</li> <li>- There are numerous measures that are difficult to monitor and analyze</li> <li>- Low responsiveness of the Ministry of Agriculture, Forestry, and Water Economy (MAFWE) to the requests of stakeholders</li> <li>- There is no data on how open MAFWE is to consensus with the NGO sector and other stakeholders during adoption of laws</li> </ul>	<ul style="list-style-type: none"> <li>- Clear separation and creation of measures for the agro-food complex and a separate approach for small/hobby producers and holdings</li> <li>- Redistribution of direct support through the gradual introduction of non-production-related payments (basic and additional income support, eco-schemes)</li> <li>- Simplifying support</li> <li>- Education and informing of the population about the measures</li> <li>- Strengthening the system for monitoring, analysis and evaluation of the impact of support, accompanied by improving accountability</li> </ul>
<p><b>Competitive Position and Power of Agricultural Production and Market Regulation with Agricultural Products</b></p>	<ul style="list-style-type: none"> <li>- All the previously mentioned challenges have an impact on the competitive position and power of agricultural production</li> <li>- The infrastructure and connectivity with international markets are weak</li> </ul>	<ul style="list-style-type: none"> <li>- In general, the agro-food sector, has a weak or insignificant competitive position</li> <li>- The competitive advantage can only be observed in terms of purchase prices for primary products</li> </ul>	<ul style="list-style-type: none"> <li>- Designing support necessary for the agro-food industry complex which is export-oriented</li> <li>- Easier access to domestic markets for small/hobby producers, especially registered food operators (niche market,</li> </ul>

CHALLENGES	CAUSES	EFFECTS	SOCIETAL CHANGES - SYSTEMIC APPROACH
	<ul style="list-style-type: none"> <li>- In general, there have been some efforts to prepare the analyses for regulating the agricultural product markets based on the principles of the Common Market Organization (CMO) in the EU</li> <li>- There is a lack of data and comprehensive market analyses for targeted international markets, risk analyses, necessary standards and conditions. There is also a shortage of data and research about these markets, and there is an absence of intermediaries, promoters and broker representatives. Additionally, there is a complete lack of systems for monitoring, analysis and early warning for potential market disruptions and shocks.</li> <li>- The legal regulations have been liberalized, and the category of "food operator" has been introduced in a significant part of agricultural production, enabling small and hobby producers to sell their products from home</li> </ul>	<ul style="list-style-type: none"> <li>- The country is import-dependent, resulting in a deficit in the trade balance</li> <li>- High transport costs</li> <li>- The process of market regulation according to the Common Market Organization (CMO) is still in its early stages/in its beginnings</li> <li>- Due to the lack of information, there is a lack of a strategic approach to entering new international markets</li> <li>- Entering and conquering international markets entail significant costs</li> <li>- Large shocks in international markets have a strong negative impact on the sector in the country and measures are often focused on mitigating the negative effects that have already occurred</li> <li>- There is a significant interest and an increase in the number of registered agricultural producers as food operators</li> </ul>	<ul style="list-style-type: none"> <li>guerrilla strategy, production of traditional, organic, eco-friendly products)</li> <li>- Restructuring and modernizing the agro-food sector</li> <li>- Continuous access to knowledge and investing in human capital, as well as strengthening links in the food chain</li> <li>- Strategic approach to improve positioning and reduce transportation costs</li> <li>- Facilitating market entry into international markets (attracting international intermediaries, promoters and broker representatives, accessing international databases and financing market analyses for targeted international markets etc.).</li> <li>- Involving the expert community and creating a system for monitoring, analysis and early warning for potential market disruptions and shocks</li> <li>- Promoting, strengthening and providing greater financial support to registered food operators, particularly in ensuring food safety and food quality</li> </ul>
<p><b>Protection of Food Quality and Health</b></p>	<ul style="list-style-type: none"> <li>- In general, a greater portion of the laws related to food safety and quality protection have been adopted and are being enforced</li> <li>- Weak transparency and interaction of the Food and Veterinary Agency and the State Market Inspectorate with the public</li> <li>- Limited number of accredited laboratories</li> </ul>	<ul style="list-style-type: none"> <li>- However, there is a small number of registered organic producers and the exact number of producers adhering to integrated, sustainable, ecological or other quality standards is unknown</li> <li>- Creating distrust in the control system and the overall quality of our products</li> <li>- Often, super analyses have to be conducted in other countries</li> </ul>	<ul style="list-style-type: none"> <li>- Support and encouragement for registering and implementing technology that ensures high-quality and safe food</li> <li>- Increasing transparency and greater interaction, information and education of the public regarding food safety and quality issues</li> <li>- Strengthening laboratories and inspection services for food safety</li> </ul>

## Digital Transformation

CHALLENGES	CAUSES	EFFECTS	SOCIETAL CHANGES – SYSTEMIC APPROACH
<p><b>Ensuring a Secure and Sustainable Digital Infrastructure</b></p>	<ul style="list-style-type: none"> <li>- Insufficient investments in digitalization infrastructure</li> <li>- Inadequate ongoing maintenance (especially at the local level)</li> <li>- Lack of awareness about the significance of digitization infrastructure</li> <li>- Insufficient technical expertise</li> <li>- Regulatory barriers and bureaucratic processes</li> <li>- Lack of a central hub for decision-making on digitization</li> <li>- Lack of a backup center</li> <li>- Non-standard digital solutions that are difficult to integrate</li> </ul>	<ul style="list-style-type: none"> <li>- Fragmented and insufficiently robust and secure digital transformation infrastructure</li> <li>- Insufficient investments by the public and private sectors in digitization infrastructure <b>(lack of public-private partnerships)</b></li> <li>- Inability to provide unrestricted access to available and fast internet services</li> <li>- Digital inequality</li> <li>- Hindering economic growth and development</li> <li>- Negative impact on education</li> <li>- Limitations on social and civic involvement</li> <li>- Hindering technological innovations and digital transformation</li> <li>- Ethical considerations</li> <li>- Increased risk of cyber threats and attacks</li> </ul>	<ul style="list-style-type: none"> <li>- The comprehensive presence of digital technologies brings unprecedented levels of connectivity in society</li> <li>- Standardized and integrated digital platforms tailored to the capabilities and needs of women, men and vulnerable groups of citizens</li> <li>- Access to high-speed internet is ubiquitous, with 5G networks (or other standards) providing seamless communication, information sharing and access to online services. They also enable the Internet of Things (IoT).</li> <li>- The Internet of Things (IoT) is an integral part of daily life, with interconnected devices, smart homes and smart cities</li> <li>- People are interconnected through smart devices, creating a network society where information flows seamlessly</li> <li>- Social media and virtual communities play a vital role in connecting individuals, promoting collaboration and enabling global communication</li> <li>- Functional central institution enabling the development and integration of digital platforms and human capital (Digitalization Agency)</li> <li>- Addressing complex issues (ethical considerations) related to artificial intelligence, automation, algorithmic bias and the impact of digital technologies on the development of society</li> <li>- Advanced frameworks for cybersecurity, awareness of international cooperation in combating cyber threats</li> </ul>

CHALLENGES	CAUSES	EFFECTS	SOCIETAL CHANGES – SYSTEMIC APPROACH
<b>Digital Skills Gap</b>	<ul style="list-style-type: none"> <li>- Rapid pace of technological advancement</li> <li>- Limited access to digital infrastructure</li> <li>- Socioeconomic factors</li> <li>- Age, generational, and gender differences</li> <li>- Lack of awareness of the importance of digital skills</li> <li>- Need for continuous learning and upskilling</li> <li>- Lack of content for digital culture, ethics and literacy</li> </ul>	<ul style="list-style-type: none"> <li>- Negative economic implications</li> <li>- Mismatch in employment</li> <li>- Inequality and social exclusion</li> <li>- Reduced productivity and innovation</li> <li>- Technology gap</li> <li>- Innovation gap</li> </ul>	<ul style="list-style-type: none"> <li>- Digital skills are a fundamental requirement in all industries and individuals possess a wide range of technical competencies</li> <li>- The workforce is skilled in using digital tools, analyzing data, employing new technologies and adapting to technological advancements</li> <li>- Men, women and vulnerable groups of citizens use digital tools for communication, education, entertainment, healthcare and various other aspects of their lives</li> <li>- All segments of society have access to digital technologies and the necessary skills for their utilization</li> <li>- Digital skills facilitate efficient decision-making, data-driven policies and improve transparency among the public sector employees</li> <li>- Individuals with digital competencies use technology to form startups, develop innovative solutions and disrupt traditional industries. The culture of lifelong learning and improvement is deeply rooted in society</li> </ul>
<b>Digitization of Processes (Operations) in the Public Sector and Services (E-Governance)</b>	<ul style="list-style-type: none"> <li>- Need to increase operational efficiency and reduce costs</li> <li>- Citizens' expectations for higher quality of services</li> <li>- Improving access to public services for women, men and vulnerable groups of citizens</li> </ul>	<ul style="list-style-type: none"> <li>- Insufficient quality of service delivery</li> <li>- Inadequate cost savings and resource optimization</li> <li>- Low citizen engagement</li> <li>- Low transparency and accountability in public services</li> <li>- Insufficiently available and inclusive services tailored to the needs of women, men and vulnerable groups of citizens</li> </ul>	<ul style="list-style-type: none"> <li>- Implemented adaptive comprehensive e-governance systems, integrating various digital platforms and tools to provide smart public services</li> <li>- Citizens can seamlessly access information from the public sector and a wide range of services, submit applications and communicate with public officials through online portals and mobile applications.</li> </ul>

CHALLENGES	CAUSES	EFFECTS	SOCIETAL CHANGES – SYSTEMIC APPROACH
	<ul style="list-style-type: none"> <li>- The need of central and local authorities to collect, validate and analyze data for informed decision-making (data-driven decisions)</li> <li>- Need and demand for greater transparency and accountability in public services</li> <li>- Reviewing international best practices and standards in digitization efforts</li> <li>- Inadequate planning and analysis of the required infrastructure</li> <li>- Maintenance and security of systems</li> <li>- Lack of quality digital registries, interoperability and basic standards for transliteration</li> <li>- Irregular monitoring of service satisfaction that does not provide feedback with adequate gender-disaggregated data</li> </ul>	<ul style="list-style-type: none"> <li>- Hindered data-driven decision-making in the public sector</li> <li>- Discouraging innovation and adoption of technological advancements</li> <li>- Inadequate contribution to economic growth and digital transformation at the national level</li> </ul>	<ul style="list-style-type: none"> <li>- Online platforms provide personalized and streamlined experiences, enabling faster, more convenient and free service delivery</li> <li>- User-centric online platforms offer citizens access to government data, expenditure details and service performance metrics, promoting transparency in governance and are tailored to the needs and capabilities of women, men and vulnerable groups of citizens</li> <li>- Process transformation and continuous training to upgrade digital skills (supporting tools)</li> <li>- The public sector implements comprehensive programs to develop digital skills, ensuring citizens from various groups, including women, men and vulnerable groups of citizens are equipped with the necessary competencies to navigate and use digital platforms</li> </ul>
<b>Digital Transformation in the Business Sector</b>	<ul style="list-style-type: none"> <li>- Technological achievements</li> </ul>	<ul style="list-style-type: none"> <li>- Insufficient operational efficiency</li> <li>- Unsatisfactory customer experience</li> <li>- Reduced competitive advantage</li> </ul>	<ul style="list-style-type: none"> <li>- Businesses and individuals are interconnected through various digital channels, fostering</li> </ul>



CHALLENGES	CAUSES	EFFECTS	SOCIAL CHANGES – SYSTEMIC APPROACH
	<ul style="list-style-type: none"> <li>- Evolution of customer expectations in the digital era</li> <li>- Pressure from competitors</li> <li>- Opportunities for improving operational efficiency and cost reduction</li> <li>- Data-driven decision-making</li> <li>- Agility and adaptability to changing market conditions</li> <li>- Better communication and customer management</li> <li>- Insufficient capacities and lack of competitive advantage</li> <li>- Inadequate maintenance of systems</li> </ul>	<ul style="list-style-type: none"> <li>- Inadequate access to a vast amount of data and data-driven decision-making</li> <li>- Insufficient innovation and changes to the business model</li> <li>- Lack of collaboration and communication</li> <li>- Inadequate adaptability and global access</li> </ul>	<p>greater engagement, knowledge sharing and global collaboration</p> <ul style="list-style-type: none"> <li>- Digital technologies and online platforms have created new business models, entrepreneurial opportunities, and employment opportunities.</li> <li>- The digital economy delivers e-commerce, digital services, creates online markets and enables remote work.</li> <li>- The manner in which people work, carry out transactions and participate in economic activities has been transformed</li> <li>- Digital technologies enable businesses to deliver personalized services based on individual preferences, needs and behaviors of women, men and vulnerable groups of citizens</li> <li>- The use of new advanced technologies (Artificial Intelligence, Big Data, Internet of Things, and Cloud Services) opens up new opportunities for innovative business models and solutions.</li> <li>- Creating a culture of social entrepreneurship</li> </ul>

**Good Governance**

- Lack of political will, transparency and accountability for digital transformation.

**Risks associated with investments in photovoltaics**

1. Investment euphoria (Using arable land and transforming it from agricultural to construction land)
2. Capacity for connecting photovoltaics, balancing and storing energy
3. Environmental issues (problematic waste after 15-20 years when solar panels with carcinogenic materials will be amortized).
4. Vulnerable groups of citizens will not be able to provide the necessary individual investments to adapt to the energy transformation