

## II. MODULE

# **Social drivers and vulnerabilities**



## Module 2. Social drivers and vulnerabilities

### Climate change and the vulnerability of socio-economic dynamics

In the recent years, we have witnessed the growing need for measures to face the complex challenge of climate change. As our planet's climate continues to change, so does the need for research into the complex interplay between climate variability, land-based livelihood practices, and socio-economic dynamics.

The social consequences of climate change are multifaceted. They touch different dimensions of life, from health and livelihood to demographic factors such as age and gender. With climate change, people face increasing challenges in terms of extreme weather changes, the health effects they bring, lack of food, water and security, migration, forced displacement, loss of cultural identity and other risks.

The social dimensions of human adaptation to agro-climatic change as its social, economic and behavioral aspects are the critical starting point for studying and successfully dealing with the effects of climate change.

*Vulnerability is defined as the ability of an individual, household or community to prevent, mitigate and recover from natural hazards, with poor or near-poor households being more vulnerable to natural hazards.*

The greater vulnerability of more or less poor households to natural disasters stems primarily from the fact that vulnerable households have relatively few assets and lack access to the necessary capital (Alwang, 2000). Community disaster resilience is closely related to risk in areas affected by natural disasters. A community with better resources, better disaster management, information communication, has less.

Climate change limits livelihood opportunities for women, children and those vulnerable groups without adequate access to employment and public services, increasing their insecurity and worsening their livelihoods.

Farmers' exposure to climate change significantly relates to their need for financial access as an adaptation strategy. The results show that changes in climate and extreme climate events such as land erosion, air pollution, natural disasters, lead to higher insurance costs, especially for health insurance.

Vulnerability as a socio-economic form depends on the socio-economic conditions in which people live, namely:

- ❖ employment and working conditions, level of education, health, gender, age;
- ❖ access and control over resources/assets such as food, water, shelter, energy, information, social networks, agricultural tools, land, technology, infrastructure, financial capital, etc.;
- ❖ access to social protection, public services and institutions;
- ❖ rights in the legal sense, human rights, governance, policies;
- ❖ cultural and historical factors etc.

The focus on analysis of the social aspects and consequences of climate change on agriculture covers the social drivers of climate change, gender, age and income level.

### Assessment of the social dimensions of agriculture

The social dimensions of agricultural practices and policies have an important place due to several important aspects for farmers:

**Human well-being:** Agriculture is not just about food production, it profoundly affects the well-being of millions of people. Social impact assessment helps ensure that agricultural activities improve human lives by promoting food security, livelihoods and overall quality of life.

**Equity and Inclusion:** Agriculture is a key source of income and employment for the population, especially in rural areas. By assessing social impact, we can identify disparities and work towards equitable and inclusive agricultural systems that benefit everyone, regardless of gender, age or socio-economic status.

**Food security:** The social dimension of agriculture is closely related to food security. Assessments help us understand how agricultural practices and policies affect food availability, access and use. This knowledge is of crucial importance in preventing the occurrence of hunger and malnutrition.

**Rural Development:** Agriculture often serves as the backbone of rural economies. Social impact assessment supports rural development efforts by identifying areas where investment can drive economic growth, infrastructure development and better living conditions.

### **Dealing with climate changes**

**Climate resilience:** Agriculture is vulnerable to climate change, and social impact assessment can guide the process of creating agricultural adaptation strategies. Understanding how climate-related factors affect farmers and communities is essential to building resilient and sustainable agricultural practices.

**Gender equality:** Agriculture is a sector where gender differences are often pronounced. Social impact assessment allows us to address gender-specific challenges and promote women's empowerment in agriculture.

**Community Well-being:** Agriculture does not operate in isolation, but interacts with communities and ecosystems. Assessments help us consider the wider societal context, preserving community well-being and environmental sustainability.

**Policy effectiveness:** Social impact assessment for relevant institutions that enact agricultural policies and programs with specific objectives, enables evidence-based policy making by assessing whether these policies are achieving their intended results and making the necessary adjustments. Informed decision making: Farmers, policy makers and stakeholders make decisions every day that affect agricultural practices. Social impact assessment provides them with data-driven insights to make informed choices that benefit both individuals and society.

**Sustainable Development:** Agriculture is a central pillar of sustainable development. Social impact assessments contribute to the achievement of sustainable development goals by promoting ecologically, economically sustainable and socially inclusive agricultural systems.

Assessing the social impact of climate change in agriculture is not academic research aimed at scientific goals, but is a critical tool to ensure that agriculture contributes positively to the well-being of communities, fosters sustainability and helps address global challenges, with particular emphasis on food security, climate change mitigation measures and adaptation.

### **Social dimensions of the climate changes**

Proper social protection contributes to the resistance of rural farmers to the negative pressure of climate change. Social protection allows vulnerable rural households to be protected from the impact of climate shocks by promoting social protection initiatives, because climate change, agriculture and poverty are closely intertwined.

Promoting climate-smart agriculture in correlation with policies and programs for social protection and decent rural employment can solve important issues of climate vulnerability, rural poverty and degradation of modest agricultural assets.

In 2017, 70 percent of the world's extremely poor live in rural areas, 64 percent work in agriculture, and most of them rely on subsistence agriculture as their main source of income.

Globally, poverty rates are three times higher in rural areas than in urban areas, and agricultural workers are four times poorer than workers in other sectors (World Bank, 2016).

Agricultural production relies heavily on these small, often poor farmers. In developing countries, these farmers produce most of the food. In Asia and Africa, for example, 80 percent of food production comes from smallholder agricultural farms (IAASTD, 2016).

The impacts of climate change on agriculture are far greater on the poor, because they are more exposed to hazards. Over 90 percent of the world's poor live in risky climate conditions (Global Humanitarian Assistance, 2015).

These communities have less capacity to manage risk and cope with crises, and as a result, their assets and livelihoods, as well as their entire socioeconomic environment, are more strongly affected by climate shocks (Rentschler, 2013; Hallegatte et al. , 2016).

As a result of the consequences of adverse climate impacts, small farmers may be forced to resort to unsustainable, environmentally damaging agriculture that quickly depletes their long-term assets. It is believed that due to climate change, by 2030, an additional 35 to 122 million people could fall into the category of "poor" (Hallegatte, et al., 2016).

### **Impact of climate change on social problems**

#### **Standard of living**

There are more than 200 countries in the world. All countries are very different from each other, with different geographical location, territory, natural environment, climate, population, economy and standard of living. All those countries are affected differently by climate change. They also differ in their capacity to cope with the new climate changes.

Countries are often divided into two large groups according to their level of development: the so-called "developed countries" and "developing countries".

Developed countries are relatively rich countries with favorable living conditions and strong economies, in which industry, services and the financial sector play a major role. People living in these countries have access to good health care and education, fulfilling job opportunities and relatively high incomes. The group of developed countries usually includes the United States, Canada, Australia, New Zealand, European countries, Japan, Singapore, Hong Kong and Israel. Some Eastern European countries, including Russia, with so-called "transition economies" represent a subgroup within the group of developed countries.

Developing countries are still dependent on traditional industries: farming, livestock and mining. They have a lower standard of living, a less developed health system, fewer social programs for the population and fewer opportunities for education and employment.

The group of developing countries is extremely diverse. Here are China, India, South Korea, Turkey, Brazil, Argentina, Mexico and some others, which are quickly catching up with developed countries thanks to the rapid growth of industrial production. Many of the things we use every day – clothes, shoes, dishes, furniture, appliances, toys – are made in these countries, especially China. China is now second only to the United States in the volume of goods and services it produces each year.

On the other hand, there are 47 countries, which are considered the least developed in the world. These include small island states, mountainous landlocked countries, as well as countries with overpopulated territories and unfavorable climatic conditions. These countries are very poor, their economies are weak, and their people and way of life are very vulnerable to natural disasters. Most of them are in Africa and Asia, and the poorest of them are Burundi, Congo, Liberia, Sierra Leone, Malawi, Ethiopia, Tanzania, Bangladesh and Zambia, where people lack food, clean drinking water, hospitals and schools.

The governments of these countries cannot pay welfare benefits or pensions to their citizens, so families there try to have as many children as possible to help their parents run the household, work in the fields and support them in old age.

Also poor sanitation, lack of food and clean water, and lack of clinics and hospitals means that many children die before they grow up, so having many children is a way to ensure that at least some of them survive. About 800 million people (11% of the world's population) now live in the world's poorest countries, but these countries contribute less than 1% to the global economy.

## **Social inequality**

In October 2011, the world population reached 7 billion. The vast majority of the world's people - 5.9 billion, or 84% of the total - live in developing countries and only 16% or 1.1 billion people (the so-called "golden billion") live in developed countries. At the same time, 16% of people living in rich countries consume the lion's share of world production.

So the contribution of people living in developed countries to global greenhouse gas emissions (their so-called "carbon footprint") is much greater than that of people in developing countries, because creating the daily output consumed by people in rich countries requires a huge amount of resources and energy.

For example, it takes 3.5 times more resources to sustain the life of the average American than to sustain the life of the average inhabitant of Earth, and the average American uses 9 times as much as the average Indian. So the golden billion bears more responsibility for the consequences of climate change.

The gap between the quality of life of the world's rich and poor is huge. The average income in the richest 20 countries is 37 times higher than that in the poorest 20. The income of the 500 richest people in the world exceeds the total income of the 416 million poorest people on the planet. Worst of all, the very high birth rate in developing countries means that their population growth rate is 3.5 times higher than that of developed countries.

The population of many of the poorest countries in Africa and Asia could double in less than 40 years. Thus, the number of the poorest people on the planet is increasing.

It would be a mistake to think that poverty is limited to the least developed countries. Rich countries have both backward regions and poor people. In the United States, for example, the number of poor was estimated at 46 million people in 2010, or about 15% of the total population.

In Germany, almost one in seven people, or a total of 11.5 million, live at or below the poverty line. Often, the poorest people in developed countries are people who come from developing countries for better work, as well as people who live in rural areas and declining industrial cities, where mines and factories close because they are unprofitable.

Inequalities in living conditions—the unequal distribution of income and opportunity among people on our planet—represent some of the most pressing social problems in the world today. As the United Nations Development Program's 2013 Human Development Report rightly notes: "Every person has the right to live a fulfilling life according to his or her own values and aspirations.

No one should be condemned to a short life or a life of misery because they happen to be of the 'wrong' class or country, of the 'wrong' ethnic group or race, or of the 'wrong' gender."

***Unfortunately, climate change only increases the problem of social inequality and makes the task of overcoming poverty more difficult.***

## **Economy and social categories**

The way of life and the economy of the local population largely depends on the natural conditions and the climate, so any change leads to big problems for the economy and society. People in poor countries and regions depend mainly on agriculture for their livelihood, so any drought, flood or hurricane can immediately deprive these people of their only source of income.

Climate change in poor countries has a particularly strong impact on women, who are mainly responsible for raising children, caring for the sick and elderly, feeding their families, growing crops or providing drinking water.

Even in high-income countries, young children, the elderly and people with disabilities may be at particular risk because their health is highly dependent on weather conditions.

## **Climate migration**

Climate change causes tens of millions of people to migrate to avoid the consequences of storms, droughts and floods. According to estimates, by 2010 there were more than 40 million people in the

world who moved from their homes due to reasons related to climate change. According to forecasts, their number may reach 200-250 million by 2050.

In a densely populated agricultural area, with the predicted increase in the water level in these rivers by 2 m, it will lead to flooding of a large area of arable land. Local people who work in these fields will be forced to look for new places to live and work.

Frequent droughts or floods, with particularly serious consequences for agriculture, will force many people from rural areas to move to cities in search of work. Such migration leads to the creation of entire settlements of poor migrants - poor neighborhoods and areas with poor sanitary conditions and a high crime rate.

### **New conflicts**

Climate change can cause serious conflicts between people, especially around questions of land rights, lack of access to water and climate migration.

Particularly exposed to the risk of conflicts related to climate change are regions threatened by long-term droughts, lack of water, rising sea levels, salinization of crops and damage to agricultural crops, lack of access to energy and other factors that can cause political and social crisis, as well as increased migration flows.

### **International cooperation for providing social assistance**

Special programs are needed to help the most vulnerable social groups with the aim of reducing the social risks arising from climate change. These should include:

- ❖ training and professional reorientation of people living in rural areas, giving them an alternative profession in agriculture;
- ❖ projects for resettlement of inhabitants to endangered regions;
- ❖ opening new jobs in poor areas;
- ❖ research for the development of new varieties of agricultural crops that are more resistant to drought and
- ❖ technique and possibilities for early warning for natural disasters.

However, all these measures require money that poor countries and poor people do not have. Various funds and financial instruments have already been created to help developing countries overcome social problems associated with the negative effects of climate change. The main donors are the governments of developed countries, large companies and international organizations, before the United Nations.

Programs and instruments are needed to target and distribute these funds for a painless recovery and easier management of the effects of climate change.

### **Gender as a social dimension under the influence of climate change**

#### **The meaning of gender in agriculture**

We cannot put an end to hunger and poverty without strengthening the equal representation of men and women in the agricultural and food systems. Today, agriculture and food systems face an unprecedented series of challenges. The global population is growing in conditions of new and permanent crises - economic, energy, ecological, food and social.

These crises include conflicts, natural disasters, price volatility, market insecurity, mass migration, health crises and much more, all of which are exacerbated by climate change, the depletion of natural resources, rapid urbanization, changes in food patterns and food systems for life.

Faced with these challenges, it is important to build inclusive, sustainable and resilient agricultural and food systems, so that the agricultural sector can work at full capacity and become more efficient. FAO recognizes that in order to achieve this, we must deal with persistent inequalities that affect the poor

performance of the agricultural sector in many countries. We need to work and strengthen our activities for rural women, men, girls and boys.

Men and women relate to the environment in different ways, and changes in the environment have different effects on their lives. Women play a key role in maintaining communities and managing natural resources, but their contribution is often underestimated and neglected.

Both men and women are involved in agriculture all over the world, although the investments they play change rapidly and differ significantly by region. Gender is shaped by access to productive resources and opportunities, participating in work with many resources, inputs and services - land, profit, labor force, technology, education, extensions and financial services, while, in a broader context, women have less access to them ( Quisumbing et al., 2014).

These kinds of differences in securing resources and new financial possibilities shape the agricultural sector, both in small agricultural systems and in larger commercial systems. Thus, in order to understand agriculture, we must understand gender dynamics in agriculture.

Understanding gender in agriculture begins with understanding the differences between "pole" and "gender," terms that can be confusing because they are often used inconsistently and interchangeably.

***Pole refers to the innate biological categories of male and female and is a fixed category rooted through biological differences.***

***On the other hand, gender refers to the social roles and identities associated with what it means to be male or female in a given society or context.***

Gender roles can be shaped by ideological, religious, ethnic, economic and cultural factors and are a key determinant of the distribution of responsibilities and resources between men and women (Moser, 1989); Gender roles are socially, not biologically determined, they are fluid and subject to change based on changing norms, resources, policies and contexts.

"Gender" and "women" are often—but incorrectly—used interchangeably. Gender refers to the relationship between men and women, not an exclusive focus on women. Much of the literature and practice on agricultural development has focused on men.

Gender is also equated with poverty, caste, ethnicity, age or life cycle stage, and so on.

Analyzing gender in agriculture also means overcoming the meaning of gender as the head of the household. Gender of the head of household is a misleading indicator of gender because it ignores the majority of women worldwide who live in households defined as male-headed, as well as men who live in female-headed households (Doss, 2018).

Thus, it confuses gender issues with those of household structure; a woman is considered the head of the household only if there is no adult male in it, or there is no adult male contributing economically to the household.

It can also be inappropriate when in multigenerational households one person is defined as the head of the family, even though there are different adults who may have different roles and responsibilities.

In agriculture, gender analysis provides insight into how gendered socially constructed roles and responsibilities shape many decisions in agricultural production, processing, market participation, all the way to consumption and welfare outcomes.

## **The gender gap in agriculture and its implications in the context of climate change**

### **Responsibilities**



In developing countries, women are involved in small-scale agriculture, often in temporary or unpaid activities. The visible increase in women's responsibilities in agriculture is the result of the increasing scale of family farming, which is driven by demographic pressures and land fragmentation.

Job growth in other sectors and significant male migration from rural areas is another factor increasing the workload of women. (Slavchevska et al., 2016)

There is increasing evidence that ignoring the large "gender gap" that persists in agricultural productivity and development in most countries carries significant costs (Ali, 2015; Peterman et al., 2014; UNWomen, 2015).

The gender gap in agriculture must be addressed to achieve the transition to climate-smart agriculture

It is estimated that closing the gender gap in agriculture would increase total agricultural production in developing countries by 2.5 to 4 percent and reduce the number of hungry people by 12 to 17 percent globally, equivalent to 100 to 150 million people (FAO, 2011).

Evidence also points to the fact that more equal gender relations in households and communities contribute to increased agricultural and rural development, productivity and nutrition (Farnworth et al., 2013).

Female farmers are as efficient as male farmers, but produce less because they control less land, use fewer inputs, have less access to labor and services. (FAO, 2011).

But when crops traditionally produced by women farmers become commercially profitable, men often take over their production and marketing (Berti et al., 2004; Doss 2001; Momsen 2010).

## **Inequality**

Although women make up 43 percent of the global agricultural workforce, women own, work and manage smaller and less valuable plots of land than men (FAO, 2011). Limited ownership of their own agricultural land severely limits women's access to credit, thus jeopardizing their capacity to adapt to the negative effects of climate change.

Without formal land ownership, they cannot finance climate-smart agricultural innovations. It also means that women have little access to services that could help facilitate investments in acquiring new technologies, improving their natural resource management practices, and adopting more efficient and productive crop and livestock management, all it could help them deal with the degradation of natural resources and build resilience to climate change (World Bank, 2009).

There is compelling evidence that climate change can reinforce or worsen inequalities. However, it is important to recognize that addressing gender inequalities is not just a matter of 'righting the wrong'. It also represents an important opportunity to tap into previously underutilized and underrecognized abilities, knowledge and talents.

Ensuring equal access of women and men farmers to land and other productive resources can ensure greater gender equality, better food security and increased climate change adaptation and mitigation. It opens up the possibility of a cost-effective and transformative approach to climate-smart agricultural

development. For this to become a reality, there is a need for a careful re-evaluation of past and current agricultural practices.

Focusing on gender equality is essential to meeting the goals of climate-smart agriculture, as it will serve to increase agricultural productivity and incomes, build resilience to climate change adaptation, and contribute to climate change mitigation.

### **Climate education and advisory**

The ability to access and use information about weather, climate and early warning of disasters is a critical element of adaptation. Improved access of men and women to climate information is another key aspect of the transition to climate-smart agriculture.

In 2011, out of 97 countries, only 5 percent of education, training and counseling services were aimed at women; and only 15 percent of the staff for education, training and counseling were women. In some cultures, women working in agriculture were practically prohibited from engaging in these trainings (FAO, 2011). In some countries, extension service provider staff may have attitudes that reflect a bias against farmers who lack access to credit and have less education. These educators and advisors tend to target resource-rich farmers, and women, who typically have poorer access to resources, are neglected (Elias et al., 2015).

### **Work responsibilities**

The gender gap in agriculture is also reflected in the scope of women's work responsibilities. Women are farmers, workers and entrepreneurs. They also spend considerable time ensuring that other members of their household, including children and the elderly, are adequately fed.

Rural women often manage complex households and implement multiple livelihood strategies. Their activities usually include producing crops, raising animals, processing and preparing food, working for wages in agricultural or other rural enterprises, engaging in trade and marketing, caring for family members, and maintaining their homes.

These domestic activities are time-consuming tasks and limit women's opportunities to participate in and benefit from climate-smart agriculture initiatives. Women's disproportionate responsibility for unpaid work traps them in "time poverty".

They do not have time to participate in agricultural development initiatives and other social, economic and political activities, which deprives them of the full enjoyment of their economic and social rights (Action Aid, 2013).

The workload that women undertake must be lightened to enable them and their families to spend their time upgrading for greater productivity. Between 1980 and 2010, the share of women employed in agriculture increased by about 30 percent (SOFA, 2011).

### **Gender differences and the effects of climate change in Macedonia**

Climate change and its negative impacts do not recognize stereotypes and grounds for discrimination (age, gender, ethnicity, religion and other affiliation), but strongly recognize people's climate resilience, which deeply depends on social and economic status and the gender basis of disparity .

National data show that the agricultural sector is the most important in the Macedonian economy, responsible for 16% of the country's GDP and employment for 36% of the workforce.

Agriculture is an important, but not necessarily paid, activity for women across the country. Official statistics for Macedonia indicate that in 2012 women made up 40% of workers in agricultural enterprises.

The available data on education by different agricultural sectors shows that approximately 30% of agronomists are women (SSO, 2014). The percentage of female members of households who work in individual agricultural holdings and employees in business entities is 43% (SSO, 2007).

The degree and type of participation of women in agriculture varies in different regions. In Vardar and Pelagonija, the majority, i.e. 66.7% and 60% of employed women, work in agriculture and take the surplus to the market, while in the Pologsk region (73.7%) and the northeastern region (66.7%) women are engaged in by farming for their livelihood.

Overall, rural women account for up to 38% of those economically active in agriculture, hunting and forestry (including seasonal workers), with an estimated 20% of economically inactive women actually working on family farms on an unpaid basis (CICP, 2012).

Women are engaged in unpaid agricultural activity more than men, and their tasks are planting, harvesting, processing and packaging. Women in Macedonia are responsible for agricultural activities near the house, for feeding and milking livestock. Macedonian women work in the field with men, while Albanian women mainly work near the home, while men work outside the home. Men take on more difficult tasks, such as digging, watering and harvesting. They also operate the agricultural machinery and sell goods in the market. As in most parts of the world (FAO, 2011), women's tasks in agriculture in the Republic of Macedonia are related to manual work and are rarely supported by information and technology.

Women's participation in agriculture in the country is also characterized by a lack of land ownership, little input into decision-making, and a lack of control over their time and labor.

According to FAO, approximately 16% of the country's land is owned by women, but few women are formally registered as farmers. On average, less than 6% of female households own farmland or a house (CIKP, 2012). Women in rural areas have only primary education, while in urban areas they have at least secondary education.

### **Age as a social dimension under the influence of climate change**

Intergenerational dynamics: Climate change may affect intergenerational dynamics in farming families. Bridging the generation gap and encouraging communication and cooperation between different age groups can facilitate the exchange of knowledge and expertise, enabling farming families to adapt more effectively to climate change. Farmer age has a significant impact on the adoption of climate-smart agricultural practices. .

In some cases, older farmers are less likely to adopt certain practices such as measures to improve soil fertility management and crop diversification. The influence of age on acceptance can be attributed to factors such as experience, level of education and difficulty accepting risk.

Older generations may be resistant to change or hesitant to adopt new technologies and practices, while younger generations may bring new perspectives and ideas to address climate-related challenges. It is important that agricultural policy makers and training services consider the age demographics of farmers.

Climate change affects farmers of all ages, but its impact can vary depending on factors such as location, type of agriculture, socio-economic status and access to resources.

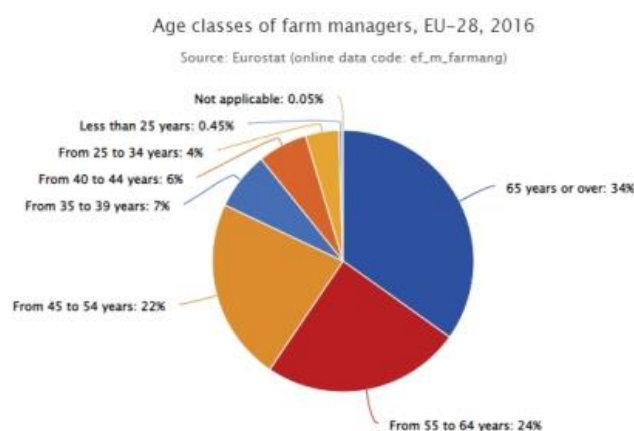
**Young farmers:** Climate change presents unique challenges and opportunities for young farmers just starting their farming careers. While they may be more open to adopting innovative practices and technologies to adapt to changing climate conditions, they may also face barriers such as limited access to land, capital and resources.

In addition, young farmers lack the experience and established networks that older generations rely on to deal with climate-related risks. Climate change may influence the decisions of young people considering a career in agriculture as they weigh the potential risks and uncertainties associated with agriculture against other livelihood options.

However, it can inspire innovation and entrepreneurship among young farmers, who can develop sustainable farming models and explore niche markets that are resilient to climate change.

Only 11% of all farms in the European Union are managed by farmers under the age of 40. Convincing young people to take up farming is a significant challenge. According to the European Commission, due to the aging of the agricultural population, the EU is stepping up its efforts to encourage young people to engage in agriculture. Young farmers are initially provided with grants to start their own business, support to maintain income and benefits in the form of additional training.

The next generations of European farmers supported in this way are considered to improve the future competitiveness of agriculture in the EU as well as the guaranteed food supplies of Europe in the coming years.



Picture 14: Age representation in agriculture in the EU

However, climate change is wreaking havoc on farming communities that are on the front lines of the climate crisis.

According to the 2022 National Coalition of Young Farmers Report, 73% of young farmers have experienced at least one negative climate impact on their farm in the past year, and 88% percent of them believe that the weather changes that are occurring are forcing them to shift their usual farming activities. and are the result of climate change.

Crops are destroyed or damaged by extreme weather events, growing seasons are disrupted, and there are severe economic losses due to droughts and unsafe conditions from uncontrolled wildfires.

Young farmers are poised to directly mitigate the devastating effects of climate change through agricultural policy reforms, greater representation in decision-making that directly or indirectly affects them, quality education about climate and its impacts, and collaborative and transformative partnerships with peer organizations and allies. .

Gender roles shape the experiences of young people because differences in resources mean that young men and women have different conditions to adapt to and succeed as farmers in the face of climate change. Climate threats to agriculture are prompting rural youth to leave agriculture and find work in cities.

***It is essential to develop gender-sensitive policies for young male and female farmers by promoting rural diversification interventions.***

**The general goal** of this measure is to encourage the employment of young male and female farmers by creating new and maintaining existing jobs. This increases the level of economic activity in rural areas, improves the quality of life and reduces rural depopulation, achieves sustainable development of rural areas, thus contributing to a better territorial balance, both economically and socially.

**Specific objectives** of rural diversification are: ·

- ❖ Maintenance of agricultural activities in rural areas by providing certain services;
- ❖ Developing and promoting rural tourism; ·
- ❖ Developing non-agricultural micro and small enterprises that are based on local resources and that are related to improving the quality of life in rural areas;
- ❖ To preserve and develop traditional craft activities; ·
- ❖ To promote entrepreneurship in rural areas.

**Middle-aged farmers:** Middle-aged farmers often carry significant responsibilities, such as managing the day-to-day operations of their farms, providing for their families, and planning for the future.

Climate change can disrupt their livelihoods by affecting crop yields, increasing input costs and creating market uncertainties.

These challenges can strain household finances and increase stress levels as middle-aged farmers navigate the complexities of adapting to changing environmental conditions while ensuring the economic viability of their farms.

In addition, middle-aged farmers may also face health risks associated with climate change, such as heat-related illnesses or exposure to air pollutants from wildfires.

**Older farmers:** The results show that older farmers' knowledge of climate variability and climate change depends on their gender, level of formal education and farming experience.

Older farmers adopt on- and off-farm strategies to cope with climate change and climate variability. The vulnerability of older farmers to climate change requires specific social protection mechanisms, such as a pension scheme.

It should guarantee access to monthly cash transfers that will ease subsistence constraints and ensure well-deserved well-being.

The number of people aged over 60 is projected to increase from 13.6 per cent in 2020 to 24.9 per cent in 2050. By mid-century, one in four people in the region will be aged 60 or over, while people aged 80 or over will represent one-fifth of all seniors.

This shift in the age structure of the population occurs when climate change increases the frequency and intensity of extreme weather events such as heat waves, tropical cyclones, storms and droughts.

Dependence on natural resources and agricultural sectors, weak institutions, lack of social protection and high levels of poverty among the population make the world very vulnerable to the risks associated with climate change.

However, older people are at greater risk of becoming poor and often lack access to adequate resources and services. With the expected life expectancy of women being higher than that of men. They live in poverty for longer, are more likely to lose their partner, have lower levels of education and need to combine agricultural work with childcare.

This also means that adult women are more likely to be employed in the informal sector and are often paid less than men.

While some seniors can cope with the effects of extreme weather and other risks, others cannot. Older farmers are more susceptible to disease and to the negative impact that climate change may have on the supply of food, water and sanitation, health and social care, housing and transport services.

Vulnerability also depends on associated factors, such as gender, ethnicity and disability. Older people with disabilities are at particular risk from the effects of climate change.

Climate-related hazards pose a danger to the elderly, adding additional stress to their ability to cope with the many challenges they already face. For example, floods caused by climate change cause disruption and recovery problems, concern and anxiety for adult farmers from the risk of recurrence.

These threats can cause stress, which together with pre-existing health impairment, can have a significant impact on well-being without effective coping capacity and adequate social support systems.

Older farmers hardly accept the changes brought by technologies, but they still want to leave the agricultural area and production in good condition as a legacy to the new generations. That leaves an

opportunity with the right direction and training to expand the capabilities of the old snake farmers to cope with climate change more easily.

Overall, climate change affects farmers of all ages, presenting both challenges and opportunities for agricultural livelihoods. Solving these challenges requires tailored strategies that take into account the different needs, capacities and experiences of farmers of different age groups, as well as encouraging cooperation and innovation in agricultural communities when designing and implementing climate smart agricultural programs.

### **Agricultural income and climate change**

As air and water temperatures rise globally, the costs of amortizing climate change will increase rapidly. One study suggests that unmitigated global warming could reduce average global incomes by roughly 23% by 2100 and make 77% of countries poorer per capita than they would be without climate change.

The impacts of climate change will disrupt the natural, economic and social systems on which we depend. This disruption will affect global food security, damage infrastructure and jobs, and harm human health.

These impacts are unevenly distributed around the world, with some countries facing much greater risks than others. However, all countries, communities and companies will feel the effects of climate change.

Unfortunately, the impacts of climate change are already here. Global sea levels have risen by 19 cm since the beginning of the twentieth century, increasing the risk of flooding for many coastal cities and communities. Heat waves and droughts are becoming more frequent and intense in many parts of the world, causing damage to human health and more heat-related deaths.

Climate change also affects food security as rainfall and heat patterns change. In Southern Europe and some parts of Africa, Asia and South America, crop yields are declining.

The global food supply is not stable as extreme weather events and habitat degradation disrupt supply chains. This could lead to higher food prices and 183 million more people worldwide to face hunger.

Even just half a degree of warming can make the difference between dangerous climate effects. By limiting global warming to 1.5°C instead of 2°C, for example, 420 million fewer people will be exposed to extreme heat waves and 10 million fewer people will suffer the risk of flooding due to sea level rise.

These risks and impacts are not evenly distributed, so some regions of the planet will feel the effects of climate change more severely than others depending on their location and ability to adapt. However, because both the climate system and our human societies are globally interconnected, the effects of climate change will affect all countries, companies and farming communities in some way.

A 2017 climate change impact research mechanism on farm family finances reveals that climate change has effects on the financial vulnerability of rural households through farmer health, credit availability and agricultural production.

Furthermore, the effect of climate change on the financial vulnerability of households is more pronounced among farmers with a lower level of education.

**Physical capital** consists of infrastructure and materials needed to support livelihoods.

**Human capital** refers to individuals' knowledge, health status, etc., to earn a living.

**Financial capital** refers to the financial resources, which typically include cash, savings, credit, remittances and transfer income, that households or individuals use to achieve their life goals.



**First**, the high dependence of agricultural production on the natural environment makes agriculture often affected by winds, rainfall, hail, persistent drought, and pests and diseases caused by climate change. These factors affect the physical capital of agricultural households.

**Second**, disease risk affects the human capital of agricultural households, leading to increased financial vulnerability of rural households. (7.3% increase in annual mortality in rural areas due to increase in average daily temperature per °C.)

**Third**, climate change may disrupt the operation of rural financial institutions, thereby affecting the financial capital of rural households. It is unclear how climate change affects the financial stability of rural households by affecting the cost of living and thus the financial stability of rural households.

Climate change has significant implications for farming families, especially in terms of their financial income. Here's how climate change affects various financial aspects in farming households:

**Health problems:** in agricultural households due to an increase in medical costs affect economic productivity and thus reduce the income of rural households.

For example, climate change and weather events may increase the presence of vector-borne diseases in livestock, leading to higher healthcare costs for agricultural households.

**Access to credit and loans:** climate-related risks can make agricultural activities appear riskier to banks or financial institutions, which can lead to uncertainty in bank lending, which in turn makes banks more cautious in lending, thus reducing credit supply and market liquidity (Berg and Schrader, 2012; Hosono et al., 2016).

For farmers, this means stricter lending criteria and higher interest rates for agricultural loans. Small farmers, who often lack additional and formal credit history, may find it increasingly difficult to access affordable credit to finance their farming operations.

Uncertainty in bank lending causes rural households affected by such a disaster to face more severe financial constraints, and also further increases bank loan default rates, undermining banks' ability to operate, thus creating a vicious cycle.

The reluctance for such lending by banks is more pronounced in developing countries than in developed countries.

**Crop Insurance Premiums:** This uncertainty in bank lending is caused mainly by post-disaster losses, particularly the loss of uninsured assets. With the increasing frequency and severity of extreme weather events, crop losses are becoming more common.

As a result, farm families may face higher crop insurance premiums to protect their livelihoods. These increased costs can strain household budgets, especially for small farmers with limited financial resources.

**Inflation or recession:** Physical damage caused by sudden climate disasters such as floods, winds, high temperatures, or long-term climate problems such as sea level rise, changes in precipitation, and acidification of sea and drinking water can directly lead to a decline in the value of agricultural property. This decline in value increases the risk of loan defaults for farmers' households and businesses.

In addition, macroeconomic fluctuations such as inflation or recession caused by these natural disasters can indirectly have a significant negative impact on microfinance, that is, borrowers may not be able to meet their debts, which again leads to the suspension of loan repayments and depletion of banks' liquidity.

**Investments in infrastructure:** Rising temperatures or changes in precipitation lead to lower river levels, crop failures, delayed planting seasons, lower incomes and reduced yields, higher costs of seeds,



fertilizers and pesticides, and thus significant impacts on the natural assets and resources on which agriculture depends.

In addition, investments in irrigation infrastructure or drought-resistant crop varieties may be necessary, further increasing costs.

**Income volatility:** Changes in weather events can cause variability in crop yields, leading to income volatility for farming families.

This volatility makes financial planning and budgeting more challenging, as farmers can hardly predict their future income. In times of poor harvests or crop destruction, households may face a financial problem, affecting their ability to meet basic needs and invest in future agricultural activities.

Investments in climate adaptation: To mitigate the impacts of climate change, farming families may need to invest in adaptation strategies such as improved water and irrigation management systems, practices to improve soil quality, and crop diversification.

While these investments can improve resilience to climate-related risks in the long term, they often require upfront capital, which will further impact household finances.

**Market volatility:** Climate change may disrupt global agricultural markets through changes in supply and demand dynamics, price volatility and trade distortions. Farming families may experience fluctuations in commodity prices, which will affect their income levels and profitability. Market volatility can make it challenging for farmers to make important decisions regarding crop selection, marketing strategies and long-term investments.

Overall, climate change poses significant financial challenges for farming families, including increased input costs, higher insurance premiums, limited access to credit, income volatility, need for climate adaptation investments, market volatility and potential health care costs.

Addressing these challenges requires coordinated efforts by policy makers, financial institutions and agricultural stakeholders to support farmers in building resilience to climate-related risks and ensuring the sustainability of agricultural livelihoods.