FINLAND

SUSTAINABLE MANAGEMENT OF LAND

Presenter

Central Union of Agricultural Producers and Forest Owners - MTK

Description

Extreme weather events – drought, heat and heavy rains – more than before plus shorter Winters and snow cover are affecting Finland.

MTK's Climate Programme has four pillars:

- Emissions down;
- Sequestration up;
- Replaced by renewables;
- Adaptation as a key.

The programme recalls the essential role of productive plant growth and photosynthesis in sequestering carbon dioxide from the atmosphere. It recalls research and information to reveal the capacity of active farming and forest management in sequestering and storing carbon and in substituting for fossil materials and energy. The programme shows how farmers and forest owners are key players, contributing to tackle climate challenges:

- On farmland, crop rotation by perennial grasses sequestrate carbon and improves soil structure to adapt. This means that after heavy rains puddles disappear quickly and soil holds heavy machinery, also after the grass period. Soil is also easier to till and retain moisture when soil organic matter increases;
- Green cover by growing crops and reduced tillage reduce emissions which means mitigation, likewise manure spreading by placement below soil surface;
- In forest, trees need to be thinned to make them grow and small trees need to be taken care of to be able to grow and sequester carbon which means mitigation;
- Overall, the sustainable management of land which maintain green cover and renew the growth after harvest on farmland and forest is a practice for mitigation, and also crucial part of adaptation as roots heal soil to adapt.

Results

The productivity of soils remains, and the resilience to produce during less favourable seasons is strengthened, because of increased soil organic matter on farmland. In forests, the active management reduces risks of insects or fires.

Climate smartness

It is worth highlighting that this initiative has clearly defined aspects within the CSA approach because the four pillars of the MTK's Climate program are completely aligned with CSA. The promoted practices on the project aim for sustainable production, emissions reduction, carbon sequestration, and increasing the resilience of agricultural systems to different climatic events.

It is recommended to include building capacity processes that allow strengthening how farmers understand and use climate information so that they make better-informed decisions considering their context-specific conditions and CSA practices available to implement.

FRANCE

CARBON-AGRI

Presenter

The French livestock institute (IDELE), the interprofession of meat and milk (Interbev and CNIEL) and farmers associations (CNE).

Description

Since 2013, ruminant breeding sectors have been engaged in the fight against climate change.
Today more than 12,000 cattle farms are involved in low carbon initiatives. Many technical levers for reducing GHG emissions and increasing carbon storage are offered to farmers to reduce the carbon footprint of milk and meat produced.
In order to certify these emission reductions and this additional carbon storage, the French livestock institute (IDELE), the interprofession of meat and milk (Interbev and CNIEL) and farmers associations (CNE) developed the "CARBON AGRI" methodology, which is labeled by the new "Low Carbon Label" created by the French Ministry of Ecology.
France Carbon-Agri association, created by breeders' representatives, facilitates the implementation of agricultural projects to reduce GHG emissions in France. The objective is to involve and support farmers and their technical partners in their low carbon initiatives and create the link with the actors – communities, companies – who want to support financially and transparently innovative projects for the climate.
Many economic players (Paris City Hall, BNP Paribas, La Poste, J.O. Paris 2024, Metropole of Nancy, etc.) testified their desire to achieve carbon neutrality and support the low carbon transition. The Label "Bas-Carbone" provides a certified framework for the development of local voluntary compensation projects.
This is a low carbon voluntary policy creating a training phenomenon involving all stakeholders. An innovative compensation perspective, this label will remove the obstacles to change.

Results

On September 30, 2019, the Ministry of Ecological and Solidarity Transition approved the CARBON AGRI methodology. This certification makes operational the certification of low carbon projects implemented on farms. In this context, France CARBON AGRI association was created to ensure project engineering and thus provide support to regional or national project sponsors. The first call for projects is now open, the project holders and / or farmers can come forward with the association or the Institute of Livestock.

Climate smartness

The political support and the particular commitment of the leaders of this initiative have helped its scaling, as a result of a public-private partnership.
In addition to that in CARBON AGRI description , it is mentioned that, in order to promote mitigation with the creation of low carbon labels, the project has created the opportunity for some farmers to have access to new markets and improve their income. For all the above, CARBON AGRI is line up with CSA pillars by reducing emissions and increase producers' income.
It is recommended to generate a portfolio of practices that helps to reduce GHG emissions, increase productivity and improve the adaptive capacity of the cattle system to climate variability events.

FRANCE

PRODUCING WINE IN CLIMATE CHANGE

Presenter

Samuel Masse - Young farmer, CEJA

Description

In Southern Europe, the main effects of climate change observed are the intensification and increase in the duration of intense episodes such as drought or heavy precipitations resulting in floods.
The most recent example dates back to June 21st, 2019, with a heat wave that destroyed 30% of the farm production at a temperature of 46°C.
However, most of the effects are less spectacular and more insidious. For the past 5 years, on Samuel Masse's farm, they have seen a significant drop in agricultural yields, with plants that are increasingly affected by episodes of dryness. They have also been able to observe the impacts on the fauna and more particularly the insects and the birds with a strong decrease of the populations and the migrators who arrive and leave earlier.
To adapt to the effects of climate change, the young farmer has set up (on half the vineyard) a network of drip to irrigate the vines and moderate the effects of intense water stress. In parallel, to avoid erosion during heavy rains, they have rebuilt the old stone walls bordering the plots. Another positive effect of these walls is that they are excellent hotel insect.
To go in this direction, they have planted hedgerows on the edges of the plots and trees to welcome the birds but also to help the bats who are essential allies to regulate the population of insects. With the climatic warming they have decided to plant varietals of vine naturally resistant to the effect of dryness coming from Spain.

Results

Regarding irrigation, the main difficulty refers to the cost and especially the implementation that required a lot of work. Moreover, being in organic agriculture, they had to suspend the pipes to be able to work the soil between the vines.
The irrigation allowed to secure the income by having more regular harvests.
However, the positive effect is the regularity of the yield of grapes but also a better quality in the maturity of the grapes because too intense water stress blocks the sugars and therefore their ripening.
Other developments (dry stone walls, hedges, etc.) allowed to reduce pesticide use by having a better regulation of the insect population such as Cochylis and Eudemis (moth).

Climate smartness

Practices on irrigation, implementation of live/dead fences to reduce erosion and the use of vines varieties with drought tolerance are considered CSA practices, which contribute mainly to adaptation and productivity pillars with mitigation co-benefits in some cases. It is worth highlighting that live fences have adaptation co-benefits concerning insects, which reduces the chances of crop losses. Moreover, practices that involve tree-planting help significantly to increase carbon sequestration, therefore, contributes to mitigation.
The initiative might benefit from including other practices, which can be identified by farmers if building capacity processes are put in place. For example, strengthening capacity on understanding climate information is important the climate information flow strengthens with farmers, ensuring that in the future they can make better-informed decisions considering their socioeconomic and environmental conditions.
It is highly recommended to seek solutions that are cost-effective, as it increases the chances that the practices will be implemented by farmers over time. Therefore, it would be useful to implement practices that have already been assessed regarding their cost-effectiveness prior to promoting them to farmers and sharing with them both the synergies and trade-offs when implementing each practice.

GERMANY

SLURRY AND MANURE BIOGAS

Presenter

Deutscher Bauernverband (DBV) - German Farmers' Association

Description

The last years brought severe weather challenges for German agriculture, including the spread of invasive insects (for instance, drosophila suzukii in 2015) and an increase of late-frost events (2017) that caused damages in the fruit and wine sector, extreme weather events such as heavy rainfalls during harvest and sowing season (2018) that hindered agricultural practices, and heat-waves such as in 2018 and 2019 including the extreme drought in 2018 that reduced grain harvests in some areas by 70% and led to feed (grass) shortages for livestock. For the future, climate adapted plant breeds will be essential as well as irrigation infrastructure and access to irrigation water.

Farmers already adapt to climate change by applying more conservation agricultural techniques such as reduced tillage to keep water in the soil, diversifying farm income and using insurances.

DBV has set the target to increase the proportion of manure used in biogas plants from the current 20% to 60% by 2030. Overall, DBV aims at reducing greenhouse gas emissions in agriculture by 30% by 2030 on a 1990 baseline. This equals another 10 percentage points on a 2018 baseline.

The increase in slurry fermentation from about 20% to 60% is expected to save methane emissions in agriculture by around 3 million tonnes of CO2 equivalent. Furthermore, the biogas produced in the biogas plant replaces fossil fuels in various sectors (electricity, heating, fuel), thereby saving greenhouse gas emissions outside agriculture. Biogas from all feedstock sources saved 15 million tonnes CO2 equivalent by replacing fossil energy. In addition to the positive effects on the climate, liquid manure utilization in biogas plants has a number of other positive effects, such as lower odour emissions from digestate compared to manure, better nutrient availability for plants and fewer germs and weed seeds.

The energy recovery of manure in biogas plants creates additional added value in rural areas through the construction and operation of the plants and represents an additional source of income and income diversification for agricultural enterprises.

Results

- Reducing greenhouse gas emissions in agriculture by 30% by 2030;
- Increasing the proportion of manure used in biogas plants from the current 20% to 60% by 2030.

Climate smartness

It would be useful to take advantage of the energy generated through the biogas plants to increase performance of other CSA practices such as irrigation mechanisms, water pumping systems, among others.

GHANA

MARKET ORIENTED COCONUT PRODUCTION

Presenter

Nzema Jomoro Coconut Farmers' Association

Description

Climate change has resulted in heavy, repeated and long periods of rain, which initially lead to an increased coconut harvest in the rainy season, that then results as a surplus. This leads to marketing challenges and reduced prices, with low incomes for farmers. Meanwhile, in the dry season, there is a reduced coconut production, with higher prices.
To overcome these challenges, the members of the association determined to go with the dynamics of demand and supply by storing coconuts during the period of surplus, in order to get more income and profit during the dry season, when there is high demand for coconut and resulting price increases. This has enabled group members to coordinate to cart their produce collectively into urban areas with more increased profits.

Results

This practice implemented by coconut producers has resulted in reduced waste and generated stable level of income in the year-round.

Climate smartness

The leadership of this initiative is in charge of a national farmers' association (COFAG), this may help its scaling and guarantees benefits for many.
The described practice is completely framed within the CSA approach, which is based on the pillars of adaptation, mitigation and productivity, since by controlling the quantities offered to the market, the producers reduced the climate impacts on their incomes, improving their adaptive capacity. In addition, they have reduced their GHG emissions by reducing the waste generated in the production and sale process.
The practice can be improved if the waste is used to generate energy or biofertilizers (further reducing its emissions). Furthermore, if coconut transformation is included, producers can generate added value to the product and thus generate greater income to the association.

GRENADA

ORGANIC FARMING DEMONSTRATIONS

Presenter

The Grenada Organic Agriculture Movement (GOAM)

Description

Too much water, too little water, rainfall intensity, too high temperatures and pest and diseases continue to be the most noticeable impacts on the farming system in Grenada. What is missing is hard data to ascertain whether or not these anomalies or occurrences are due to climate change or some other phenomenon.

Thanks to funding from Global Environment Facility (GEF) and the Integrated Climate Change Adaptation Strategies (ICAS), GOAM implemented demonstrations of best practices to combat climate change. These demonstrations included:

- Composting;
- Biochar production;
- Mulching;
- Establishment of wind breaks;
- Organic pesticides;
- Making of compost tea;
- Vermiculture;
- Use of swales to manage water flow.

GOAM collaborated with other farmers' organizations to demonstrate other practices, for instance crop rotation and the use of repellents and attractants to control pest.

Results

The timeframe of the projects did not allow to fully measure the impact of these practices on the farming system. However, post project monitoring of some of the sites is showing interesting results. There is more knowledge now in providing workable solutions to farmers who request information of organic practices that can be used in an organic farming system.

Climate smartness

The practices promoted in the project contribute significantly to the three CSA pillars as they focus on mitigation, and adaptation to climate change, as well as crop's profitability. Most of the practices promoted in the project are identified highlighted in Sova et. al. (2018) report as one of the most important CSA options globally.

It is worth mentioning that all the practices contribute to climate change adaptation in the first place, however, some such as wind breaks and Biochar production, have significant contribution to the mitigation pillar.

The project may benefit of including additional practices tailored to the specific needs and conditions of the farmers, which can be done through a deeper understanding of weather and climate behaviour, linkages with agricultural production and mechanisms to use forecasts to better plan and manage crops and overall agricultural activities. This can be done through participatory methodologies for building capacity on climate for farmers' decision-making processes.

For more information about CSA, in the study of World Bank, CIAT and CATIE (2014), it is possible to identify several practices for Grenada evaluated around 6 key criteria: Water, Carbon, Nitrogen, Energy, Climate, and Knowledge / Info.

INDONESIA - SULAWESI ISLAND

IMPROVING COCOA BEAN YIELD AND QUALITY

Presenter

Former International Plant Nutrition Institute (IPNI) in collaboration with local sustainability program Cocoa Care

Description

Cocoa is a key crop for many Indonesian smallholder farmers, who own more than 90% of the country's plantations. In recent years, however, a combination of ageing trees, pests, diseases, poor soil health and nutrient depletion has seen cocoa bean yields fall from around 750kg/ha in the 1980s to below 400 kg/ha over the last two decades.

Despite producing 65% of Indonesia's output, smallholders in Sulawesi have poor knowledge of cocoa farming and limited access to farm inputs such as fertilizers and finance. Many of them are in a downward spiral of poverty, with some ready to give up growing cocoa entirely despite increasing global demand.

In 2013, a project was launched to train smallholder cocoa farmers in Sulawesi and demonstrate the benefits of proper nutrient management and develop local fertilizer recommendations.

Farmers and their families were trained in 4R Nutrient Stewardship management practices – applying the Right nutrient source, at the Right rate, at the Right time, in the Right place – alongside other best management practices (BMP) for cocoa farms, such as pest management and pruning.

In addition, they received farm tools, fertilizer, compost and high-quality cocoa tree seedlings and family members were taught business management. Participating farmers were also assigned Cocoa Carers - well-trained and experienced local cocoa farmers with model farms of their own to demonstrate BMP and yield potential.

Results

The project showed that BMP and balanced fertilization increased both the yield and quality of cocoa, ensuring a sustainable income for cocoa farming families. BMP created improvements within three months, while adding 4R managed fertilizers produced average yields of over 1,000 kg/ha, over twice the regional average of 500 kg/ha.

With most cocoa traditionally harvested in Sulawesi between June and August, limited cash income usually restricts farmers' ability to invest in inputs for the rest of the year. Participating farmers, however, could produce crops regularly throughout the year, ensuring a continuous cash flow to reinvest and spend on food.

By producing high yields of superior quality, commercially viable cocoa beans, the project helps smallholder farmers, their families and the surrounding rural area benefit economically.

Working closely with local smallholder farmers and encouraging knowledge transfer, the project ensures that the wider agricultural community can also benefit from improved practices.

By teaching farmers responsible 4R nutrient management and best practices for soil health, the project helped protect the environment by ensuring that nutrient losses are minimized, and soil is healthy, increasing its ability to store water and carbon.

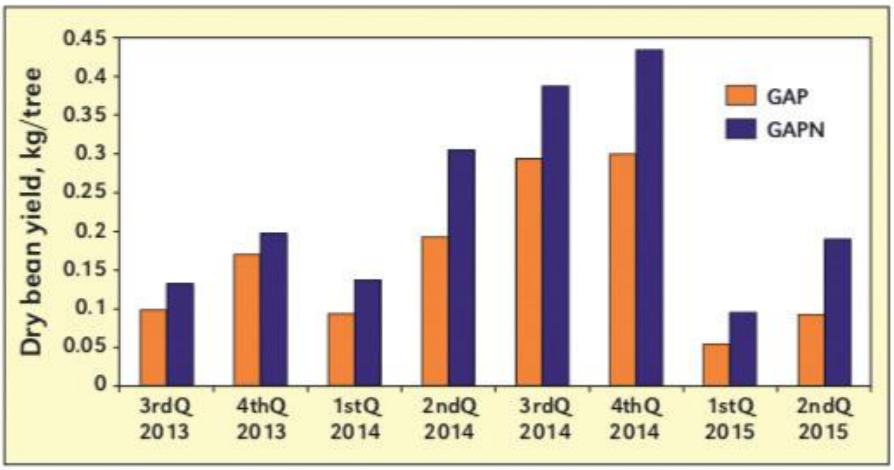
The project has also helped to identify the most appropriate fertilizer formulations and management practices to help Sulawesi cocoa farmers increase their yields..

Climate smartness

First, it is worth highlighting the involvement of experienced farmers and an expert on cocoa management through the implementation of the project, as this can improve the future sustainability of the initiative and it is also an effective strategy to use with the intention for further scaling of the practices.

With respect to the CSA pillars (adaptation, mitigation and production), the optimal application of fertilizers to plants, mainly nitrogen, helps to reduce greenhouse gas emissions, especially nitrous oxide (mitigation). Moreover, by reducing investments in fertilizers, the total income of the producers increases, which also increases the productivity of the cocoa crop.

The project may benefit of building capacity processes to increase farmers' knowledge on climate, its use for crop planning and management. This will definitely increase the ability of farmers to make better-informed decisions on their agricultural activities using weather forecasts and understanding the potential implications in terms of crop losses, as well the measures they may need to take to reduce negative effects.



IRELAND

SUSTAINABILITY IN MCAULIFFE PIG FARMS

Presenter

McAuliffe Pig Farms

Description

Commercial pig production in Ireland is an indoor system. Therefore. it is not directly affected by climate change compared to a tillage or grassland-based production system. However, as 70% of the cost of production is related to feed, the effects of climate change on crops is a worry as this can affect the growing and harvesting of the crop leading to both scarcity and quality issues. Soya is the most common protein source for pig diets and is mainly grown in the USA and South America. The use of soya can contribute to deforestation and increased food miles.

Extreme heat can reduce feed intake in pigs and reduce productivity. Extreme weather conditions can also affect the ability of pig housing to remain energy efficient.

Water use is quite high in commercial pig production and the threat of water scarcity is an ongoing challenge, particularly in areas affected by water shortages. The farm has worked with pig nutritionists to reduce the amount of soya protein in the diet by 20%, which subsequently reduces the pig's ammonia emissions by 15%. Feed is frequently produced in areas removed from pig production, so it is important to look at ways to reduce on reliance on these feeds to continue to reduce greenhouse gas emissions.

On the farm, pig slurry is not seen as waste, but as a valuable fertilizer. Farmers carried out research with clean-tech company Dionergy using their EL300 aerator in the slurry tank. Dionergy's treatment solutions are plug and go installations that sit on and floats on top of the waste in tanks.

Water scarcity is taken into account by collecting all the rainwater from roofs in large underground tanks to reuse for washing purposes. Rooms are washed and disinfected between each batch of pigs.

An additional investment regards the heating of piglets by plastic pads which are in turn heated by air to water heat pumps. These heat pads act as hot water bottles, as hot water is pumped into them. An air to water heat pumps system consist of four major elements that allow the refrigerant to pass from the liquid state to the gas: a compressor, a condenser, an expansion valve and an evaporator;

- A fan passes air over the evaporator, the refrigerant absorbs heat from the outside air. The refrigerant boils and evaporates at a low temperature giving us vapour;
- The vapour passes into the compressor and compression increases the temperature;
- The warm vapour is condensed is the heat exchanger and the rejected heat is passed onto the heating and hot water system;
- The condensed vapour returns to liquid, passes back through expansion valve, reducing pressure and temperature, ready to start cycle again.

All pig buildings have been renovated in recent years to improve insulation which controls temperatures more effectively using high grade insulation. Moreover, the farm uses high-tech ventilation control systems and ECBlue Low Energy Consumption ventilation fans.

Results

The air to water heat pumps mentioned above has led to energy savings of up to 75%. This is the equivalent in oil terms of approximately 18,000 litres per year.
The use of rainwater harvesting system for cleaning and disinfection is just a small part of a biosecurity programme. As the farm runs a high health herd, farmers carry out measures to prevent the entry and spread of disease. All visitors must be 'pig clean' for 72 hours. All visitors including the team working on the farm must shower in each day. Fresh clothes and footwear are provided. Foot dips with disinfectants are used at the entrance of each pig house. Food safety is an important part of sustainable pig meat production and biosecurity practices help reduce food safety scares at farm level. High health standards lead to increased consumer confidence and increased production efficiency.

Climate smartness

The practices promoted in pork production systems are mainly focused on reducing greenhouse gas emissions during the process to improve the adaptation of production systems, which are directly vulnerable due to climate variability.
Certain climatic conditions can stress the animals and reduce their productivity; moreover, pork production is highly dependent on water availability and feed, therefore when these are scarce prices may go up. This project is addressing all pillars of CSA focusing in reducing emissions, increasing productivity and reducing vulnerability of productive systems under a climate change context.
A capacity-building component on understanding and use of climate information may benefit the project goals. Participatory methodologies to strengthen the capacity of farmers in order to plan and manage their production system considering historic and future climate behaviour may empower them to make better-informed decisions on their activities. Weather forecast may provide elements to understand prices variability on relevant inputs for pork production. Moreover, it could guide decision making towards water storage practices.

ITALY

TORRE DELLE CARCIOLE FARM

Presenter

Torre delle Carciole Farm

Description

The farming sector is particularly vulnerable to climate change that has caused extensive damage to agriculture. In Italy, damages caused by the climate change in the last decade amount to 14 billion euros (around 15.4 billion US $) and are due to the alternation of extreme events, from prolonged periods of drought to violent waves of bad weather that have devastated crops, structures and infrastructures. Italy holds the European leadership in terms of number of companies operating in the organic sector, and even this primacy is being put at risk by climate change that affects the typical Made in Italy products and the crops, particularly due to the arrival of alien species that are killing fruit and vegetables.
Torre delle Carciole farm started the cultivation of Phyllostachis Pubescens Edulis bamboo in 2014, in order to have a short rotation timber production for the sale of fine wood to the processing industry. The waste and unsold part is valued as a raw material for the production of electrical and thermal energy with a positive environmental impact. The bamboo in its final uses has a neutral or positive CO2 impact.

Results

CO2 positive energy from Bamboo is a project based on the speed of growth of bamboo and its thermodynamic characteristics. It is ecological and protects the environment. No treatments nor fertilizers are needed, bamboo derivatives have a positive CO2 footprint, absorb 35% more of H20, avoid soil erosion, desertification and purify water. The goal is to have an autonomous cycle from planting to processing and use of the finished product with guaranteed basic profitability. From a general perspective, farmers from all over the world will have to feed an increasing population in forthcoming years, putting in place sustainable production models that are suitable for achieving global adaptation to meet the climate change challenge. Research and innovation can play a key role in helping farmers to improve their sustainability models, so there is a need for incentives and reward mechanisms in this sense. With particular regard to CO2 positive energy from Bamboo project, the main challenges to implement were:

- Minimizing water resources consumption by using innovation. More in detail, to reduce the water footprint it was necessary to invest in innovation with an ad hoc piping system for irrigation and fertigation (drip irrigation systems);
- Investing in chippers with adequate output to obtain a size suitable for Syngas plants;
- Learning to know at an engineering level the operation and maintenance of the syngas to guarantee their operation at least 7,000 hours per year.

Climate smartness

A key element of this project is that since its inception is designed to diversify production within the farm, use by-products for the generation of energy and reduction of greenhouse gas emissions, and implement several practices that allow the bamboo production process highly efficient in the use of water and fertilizers.
Its approach is definitely within the framework of CSA contributing to adaptation, mitigation and productivity pillars.