The Asia-Europe Environment Forum (ENVforum) Annual Conference 2021 focused on Circular Food Systems as possible solutions to reverse climate change. One of the sessions of the Conference was “Agriculture and food”. This session focused on challenges and solutions for implementing the principles of a circular economy in agriculture, in the context of climate change. In particular, experts and other participants of the session explored pathways for transitioning towards regenerative agriculture and agroecology as potential transformative approaches to food systems. Besides the need for transitioning to circular food systems, the urgent need for addressing increasing trends in Antimicrobial Resistance (AMR) was outlined and discussed.

Overall, the outcome of the session will contribute to gathering and translating scientific evidence in a useful format to policymakers. The session was designed as an open space for the active engagement and dialogue of participants in co-creating and discussing some of the main challenges and solutions for agriculture and food.

KEY MESSAGES:

- Conventional agriculture and food production practices are not in line with the principles of a circular economy, contribute to climate change, resource depletion, and biodiversity loss, among other impacts.

- The overuse and misuse of antimicrobials, including for food production, is leading to an increasing trend in antimicrobial resistance (AMR), which poses serious threats to human, animal and environmental health.

- Regenerative agriculture and agroecology present opportunities for aligning agriculture and food production to the circular economy and other principles, reducing the negative impact of food systems while increasing resilience to climate change.

- Addressing AMR, as part of a shift to regenerative agriculture, will bring about increased societal well-being, reduced health costs, and increasing flows of ecosystem services.

- Phasing-out subsidies to agricultural practices that damage people’s health, contribute to climate change, and negatively impact biodiversity is essential.

- A One Health approach that recognizes dependencies of human, animal and environmental health should be maintained for guiding definition and implementation of coherent policies and monitoring tools.

AGRICULTURE AND FOOD IN ASIA AND EUROPE

Globally, the food system generates about 35 per cent of greenhouse gas (GHG) emissions from human activities, with production of animal-based food responsible for double the emissions of plant-based food production. South and Southeast Asia emit the largest share of GHG from food production (about 23 per cent, mostly driven by plant-based food), while having the lowest GHG emissions from food production per capita (Xu et al., 2021) (Fig. 1). Rice production is the highest contributor to global GHG emissions from plant-based food, followed by wheat. Beef production is the highest contributor to global GHG emissions from animal-based food, and across all food commodities (Xu et al., 2021) (Fig. 2).

GHG emissions from the production of food.

"Agriculture alone is responsible for a quarter of global GHG emissions, 70% of biodiversity loss and 80% of deforestation"
Food connects climate change, biodiversity and human health, and agriculture is a major part of producing food. Conventional and large-scale production of food is characterised by unsustainable agricultural practices dependent on increasing use of fertilizers and pesticides, and responsible for soil degradation, water pollution, and biodiversity loss, among other negative environmental and social impacts. The overuse and misuse of antimicrobials in food production is leading to increasing resistance of bacteria causing common diseases. This increasing growth in antimicrobial resistance (AMR), is of very serious concern for health, including human, animal and environmental health, and hence, a concern for food production. By 2050, it is estimated that AMR (often referred to as “the climate change of health”) will be responsible for over 10 million deaths annually (more than from cancer), and for about an 8% reduction in livestock production (World Bank, 2017).

Overall, agricultural practices and food production are not in line with the goals of a circular economy to reduce, reuse, and recycle resources. This calls for a global scale reform of food systems for contributing to climate mitigation and sustainable development, helping to achieve the Sustainable Development Goals (SDGs).

Mounting scientific and empirical evidence points to regenerative agriculture and agroecology as alternative ways for producing food while also mitigating climate change and preserving soil fertility, water, and biodiversity, while also benefitting social and economic sustainability.

Regenerative agriculture integrates the goals of a circular economy to food production. It uses soil conservation and health as entry points to regenerate and contribute to multiple ecosystem services. Central to regenerating ecosystem services from soil, is the quantity and quality of soil organic matter. Soil organic matter (SOM) is the principal energy source in soil and its turnover drives soil function and, properly managed, contributes to carbon sequestration in soil. Regenerative farmers use practices that prioritise and maximise return of organic matter to the soil. Increasing SOM contributes to a healthy soil and increases crop resilience.

THE PRINCIPLES OF REGENERATIVE AGRICULTURE (FIG. 4) INCLUDE:

- Keeping soil covered
- Minimising soil disturbance
- Maximise crop/pasture diversity
- Maintain living roots year-round
- Integrate livestock.

Agriculture alone is responsible for a quarter of global GHG emissions, 70% of biodiversity loss and 80% of deforestation (FAO, UNDP and UNEP, 2021). From 1990 to 2019, regional emissions from agriculture have been increasing in Asia, while decreasing in Europe (FAO, 2021) (Fig. 3), signaling a growing tendency for Europe to outsourcing production in other regions of the world.

**CHALLENGES OF AGRICULTURE AND FOOD PRODUCTION FOR ACHIEVING CIRCULAR FOOD SYSTEMS**

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**SOLUTIONS FROM AGRICULTURE AND FOOD PRODUCTION**

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Following the presentation of regenerative agriculture, agroecology was presented as an integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of food and agricultural systems to enable transformative change. It seeks to optimize the interactions between plants, animals, humans and the environment while taking into consideration the social aspects that need to be addressed for a sustainable and fair food system (FAO, 2018). To help countries operationalize agroecology, FAO, through a synthesis process with many different stakeholders created the 10 Elements of Agroecology. As an analytical tool, the 10 Elements can help countries to operationalise agroecology. By identifying important properties of agroecological systems and approaches, as well as key considerations in developing an enabling environment for agroecology, the 10 Elements are a guide for policymakers, practitioners and stakeholders in planning, managing and evaluating agroecological transitions that cut across the dimensions of sustainability (FAO, 2018).

Experts and participants then identified and discussed short-term and long-term solutions for addressing unsustainable agricultural practices and AMR by mainstreaming regenerative agriculture and agroecology and integrating their commensurable principles in climate strategies and policies.

SHORT-TERM SOLUTIONS

Subsidies to agriculture have been pointed out as one of the main drivers of unsustainable agricultural practices in food production. The UN Report “A multi-billion-dollar opportunity – Repurposing agricultural support to transform food systems” (FAO, UNDP and UNEP, 2021) estimated that about 90% of the $540bn in global subsidies given to farmers every year are “harmful”, as they support “agricultural practices that damage people’s health, fuel the climate crisis, destroy nature and drive inequality by excluding smallholder farmers, many of whom are women” (Damian Carrington, The Guardian 14 Sep 2021). As a short-term solution, experts and participants to the Conference prioritised adjusting subsidies to agriculture based on net contributions to climate change and provision of ecosystem services. This solution has the potential for transforming food systems from contributors to climate change into key leverage points for adaptation and mitigation, as well as for contrasting biodiversity loss and loss of ecosystem services.

On AMR, one promising short-term solution that emerged from the discussions was to create a Commission to design specific national policies on antibiotic stewardship. The experts and participants agreed on the need for a more multisectoral policy dialogue under the One Health approach on this pressing issue. The One Health approach recognises and protects the interlinkages between human and ecological wellbeing. This will allow for designing adaptation and risk management strategies in light of the expected health, food production, and economic impacts from AMR. The concept of antibiotic stewardship implies definition of policies on appropriate usage of antibiotics, environmental protection, and improving awareness on the risks from overuse and misuse of antimicrobials beyond the human health sector.
LONG-TERM SOLUTIONS

In the long-term, experts and participants pointed to gathering more evidence on the performance of alternative food production systems as a fundamental solution. More institutional support will be necessary to support regenerative agriculture and agroecology, which both contribute to circular economy mitigating climate change. Furthermore, it was stressed that beyond the importance of evidence, it will be essential to find ways for conveying this evidence in a form that is useful to drive and support policymaking. This will require the definition of appropriate science-based policy options as well as tools for monitoring their impact.

Due to the complex systems nature of food production and consumption, it was highlighted how research as well as policymaking need to overcome disciplinary and sectoral divisions, towards a trans-disciplinary and problem-oriented approach.

Regarding AMR, the long-term solution with highest potential was the review and reform of regulations around AMR through an equity lens. This implies policies for reducing inappropriate use of antibiotics that take into account different needs in different countries and income levels, while maintaining access for essential use. Addressing AMR as part of the efforts for shifting to regenerative agriculture will further contribute to societal wellbeing.

References


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