Environmental Sustainability as a Protected Collective Interest in International and EU Law

Collected essays

Edited by
GIUSEPPE PALMISANO

EDITORIALE SCIENTIFICA

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THE ENVIRONMENTAL AND INTERGENERATIONAL DIMENSIONS OF FOOD SUSTAINABILITY IN THE PRACTICE OF THE UNITED NATIONS AND ITS SPECIALIZED AGENCIES

Silvia Manservisi*

Summary: 1. The Holistic Concept of Sustainable Development and Ecological Integrity as the Essence of Sustainability also in the Agrifood Sector. – 2. The Key Role of Sustainable Agriculture and Sustainable Food Systems among the Sustainable Development Goals of the *2030 Agenda*. – 3. The COP28 UAE Declaration on Sustainable Agriculture, Resilient Food Systems, and Climate Action and the Key Role of Sustainable Agriculture and Sustainable Food Systems in Climate Resilience. – 4. The FAO Roadmap for Enhancing Sustainability in Geographical Indication Systems. – 5. Concluding Remarks, with Particular Reference to the FAO's Contribution to Bringing Sustainable Agrifood Systems to the Forefront of Climate Action at COP 30.

1. *The Holistic Concept of Sustainable Development and Ecological Integrity as the Essence of Sustainability also in the Agrifood Sector*

The environmental and intergenerational dimensions of the sustainability of agriculture and food systems have received widespread attention within the practice of the United Nations and its specialized agencies. These dimensions were articulated very clearly both before and after the adoption of the *2030 Agenda*,[1] which established 17 Sustainable Development Goals and 169 targets to be achieved by 2030. With a much broader scope, the *2030 Agenda*, replaced the Millennium Development

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[1] Resolution adopted by the General Assembly on 25 September 2015, A/RES/70/1, 21 October 2015 *Transforming our world: the 2030 Agenda for Sustainable Development*.

Goals,[2] which comprised eight goals and applied differently to developed and developing countries. By contrast, the Sustainable Development Goals are universal and are grounded in the integration of the three dimensions of sustainable development: environmental, social and economic.[3]

These goals must be considered in close correlation with the holistic concept of sustainable development, which has a multidimensional scope, as incisively highlighted in legal scholarship.[4]

Food sustainability is closely linked to the concept of sustainable agriculture since the entire food system essentially depends on agriculture, which provides both products immediately us-

[2] *United Nations General Assembly Resolution* 55/2, 18 September 2000 (Doc. A/RES/55/2).

[3] T. Scovazzi, "I principi", in T. Scovazzi, S. Nespor (eds), *Corso di diritto internazionale*, vol. IV, *La protezione dell'ambiente*, (Giuffrè Lefebvre, Milano, 2024), p. 186.

Some authors (A. Fodella, "Il vertice di Johannesburg sullo sviluppo sostenibile", in *Rivista giuridica dell'ambiente*, XVIII (2003), p. 391; S. Marchisio, "Il diritto internazionale ambientale da Rio a Johannesburg", in E.R. Acuna (ed), *Profili di diritto ambientale da Rio De Janeiro a Johannesburg* (Torino, Giappichelli, 2004), p. 31; R. Dinuzzi, "La cooperazione internazionale in materia di risorse idriche da Johannesburg a Kyoto", in E.R. Acuna (ed), *Profili di diritto ambientale*, cit., p. 53) has incisively highlighted that the from final documents of the United Nations World Summit on Sustainable Development (WSSD) held in Johannesburg from 26 August to 4 September 2002, both in paragraph 2 of Chapter I of the *Plan of Implementation* and in point 5 of the *Johannesburg Declaration on Sustainable Development*, a "multidimensional" concept of sustainable development emerges, which includes not only economic development and environmental protection, but also a third component, "social development", which becomes the third of the "interdependent pillars" of the concept of sustainable development: the importance of strengthening the three pillars of sustainable development, which are equally important and interdependent, is therefore affirmed.

[4] F. Munari, "La tutela internazionale dell'ambiente", in S.M. Carbone, R. Luzzatto, A. Santa Maria (eds), *Istituzioni di diritto internazionale*, 2ª ed. (Torino, Giappichelli 2003), p. 423; S. Marchisio, "Il diritto internazionale ambientale da Rio a Johannesburg", cit., p. 31; R. Dinuzzi, La cooperazione internazionale in materia di risorse idriche da Johannesburg a Kyoto, cit. p. 53; K. Bosselmann, *The Principle of Sustainability: Transforming Law and Governance* (Farham, Ashgate, 2008); T. Scovazzi, "I principi", cit., p. 184 ff.; S. Nespor, *La storia*, in T. Scovazzi, S. Nespor (eds), *Corso di diritto internazionale*, vol. IV, cit., p. 66.

able as food and raw materials for industrial or agricultural processing.[5] Agricultural producers are the "centripetal force" of the agrifood supply chain, and represent the central element of the production process, allowing the products supplied for cultivation and breeding to be transformed into finished products for the food market.[6]

Even prior to the adoption of the *2030 Agenda*, the FAO Council, in 1989,[7] in the absence of a globally recognized and endorsed definition, formulated its own definition of sustainable agriculture and rural development (SARD). SARD was defined as

> The management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such sustainable development (in the agriculture, forestry and fisheries sectors) conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable.

In line with this definition, the Policy Analysis and Networks Branch of the Division for Sustainable Development of the United Nations Department of Economic and Social Affairs emphasized, in 2009,[8] the central role of sustainable agriculture in achieving sustainable development. It described sustainable agriculture as "the capacity of agriculture over time to contribute to overall welfare by providing sufficient food and other goods and services in ways that are economically efficient and profitable, socially responsible, and environmentally sound". The same analysis further underlined that

[5] L. Costato, *Alimenti e diritto alimentare nell'Unione europea*, in L. Costato, P. Borghi *et al*., *Compendio di diritto alimentare*, 11th ed., (Milan, Wolters Kluwer 2025), p. 3 ff.

[6] S. Carmignani, "Filiera agroalimentare", in *Digesto, Discipline Privatistiche,* Aggiornamento, XI (2018), p. 226.

[7] FAO C 89/2-Sup.2: August 1989, page 6, para. 6.

[8] United Nations, 2009, "The Contribution of Sustainable Agriculture and Land Management to Sustainable Development", in *Sustainable Development Innovation Brief*, Issue 7.

> Although the abovementioned elements are often discussed separately, they are not mutually exclusive: sustainable agriculture meets environmental, economic, and social objectives simultaneously. In many cases, sustainable agriculture practices are not new, but draw on traditional knowledge and practices, many of which have now been positively evaluated by scientific methods.

Taken together, these definitions clearly illustrate that sustainable agriculture, like sustainable development more broadly, is a multidimensional concept grounded in three interdependent pillars: environmental protection, economic development and social development. Moreover, these definitions of sustainable agriculture highlight the close link between sustainable agriculture and food security, in the sense that a fundamental aspect of the concept of sustainable agriculture is to promote food security.

This connection is explicitly recognized in the *Johannesburg Plan of Implementation.* Paragraph 40 acknowledges that "agriculture plays a crucial role in meeting the needs of a growing global population and is inextricably linked to the fight against poverty, particularly in developing countries." The plan further emphasizes that "[s]ustainable agriculture and rural development are essential to the implementation of an integrated approach to increasing food production and enhancing food security and food safety in an environmentally sustainable way" among other provisions.[9]

In 1996, the Food and Agriculture Organization of the United Nations (FAO) formulated the definition of "Food security" which is currently the most comprehensive and widely accepted. It is contained in paragraph 1 of the FAO World Food Summit Plan of Action (13-17 November 1996, Rome) which states that "[f]ood security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their needs and food preferences for an active and healthy life."

[9] S. Manservisi, "I riflessi del diritto ambientale sulla PAC prima e dopo il Trattato di Lisbona", in L. Costato *et al* (eds), *Dalla riforma del 2003 alla PAC dopo Lisbona. I riflessi sul diritto agrario, alimentare e ambientale* Atti del convegno di Ferrara, 6-7 maggio 2011, (Napoli, Jovene, 2011), p. 245 ff.

This definition identifies four key dimensions of Food security: the physical availability of food, economic and physical access to food, food utilization, and the stability of these three dimensions over time. It emphasizes that, to effectively achieve food security objectives, all four dimensions – commonly referred to as the four pillars of food security – must be fulfilled simultaneously.

With regard to the stability of the three dimensions of Food Security over time, *the State of Food Security and Nutrition in the World (SOFI) 2025* report,[10] jointly released by the FAO, the International Fund for Agricultural Development (IFAD), the United Nations Children's Fund (UNICEF), the World Food Program (WFP), and the World Health Organization (WHO), identifies conflict, extreme weather events, and economic crises as main drivers of food insecurity.

The SOFI 2025 report also notes a decline in global hunger in recent years: in 2024, 8.2% of the world's population experienced hunger, compared to 8.5% in 2023 and 8.7% in 2022. However, this global figure masks stark regional disparities. Progress has been driven by notable improvements in Southeast Asia, South Asia, and South America, while hunger has continued to increase in most subregions of Africa and Western Asia. At the same time the report highlights that, while millions of people suffer from hunger, many others consume more than they need, with adult obesity rising from 12.1% in 2012 to 15.8% in 2022.

Finally, the SOFI 2025 report emphasizes that improving diet quality is essential and that healthy diets must become more accessible. In 2024, 2.6 billion people could not afford a healthy diet, illustrating the double burden of malnutrition – the coexistence of undernutrition alongside overweight and obesity.

In the outcome document *The Future We Want* of Rio+20,[11] the United Nations Conference on Sustainable Development

[10] FAO, IFAD, UNICEF, WFP and WHO, (2025) *The State of Food Security and Nutrition in the World 2025 – Addressing High Food Price Inflation for Food Security and Nutrition*, Rome. https://doi.org/10.4060/cd6008en.

[11] A/CONF.216/L.1, *The Future We Want*, 19 June 2012.

held from 20 to 22 June 2012 in Rio de Janeiro, sustainable agriculture, together with food security and nutrition, is identified as one of the seven thematic areas given priority attention.[12] Paragraph 111 of the document outlines the characteristics of sustainable agriculture, describing it as agriculture that "improves food security, eradicates hunger and is economically viable, while conserving land, water, plant and animal genetic resources, biodiversity and ecosystems and enhancing resilience to climate change and natural disasters." The document also recognizes the need to maintain natural ecological processes that support food production systems and affirms "the necessity to promote, enhance and support more sustainable agriculture, including crops, livestock, forestry, fisheries and aquaculture."

Alongside the three traditional pillars of sustainable development, a fourth pillar has emerged within the framework of the United Nations Educational, Scientific and Cultural Organization (UNESCO): culture. On 17 May 2013, in Hangzhou, Zhejiang Province, in China, the United Nations Educational, Scientific and Cultural Organization (UNESCO) adopted the "Hangzhou Declaration", calling on countries worldwide to place "culture" at the forefront of sustainable development policies. Subsequently, UNESCO developed a framework of thematic indicators for "Culture 2030", aimed to supporting and integrating the global indicators agreed under the 2030 Agenda in order to measure the contribution of culture to the national and local implementation of 17 the Sustainable Development Goals (*SDGs*). As highlighted in doctrine[13] with regard to the agrifood sector, the cultural dimension is particularly important in assessing the impact of products with indications of origin, since geographical indications are deeply rooted in local culture and traditional knowledge and have the potential to contribute significantly to the sustainability of their territories.

At the same time, it is essential to take into account the distinc-

[12] In Chapter V, paras. 108 to 118.

[13] A. Di Lauro, "Le denominazioni d'origine protette e le indicazioni geografiche protette di fronte alla sfida dello sviluppo sostenibile", in *Rivista di diritto agrario*, 2018/1, p. 395.

tion clearly emphasized in legal scholarship by Klaus Bosselmann[14] between *sustainability* and *sustainable development* and, more specifically, within the context of "sustainability", between the *concept* itself and the *term*. This distinction is necessary in order to avoid the possible and frequent misuse of the term "*sustainability*", which is used in such a variety of meanings that it risks becoming almost devoid of real and effective content. By contrast, the *concept* of sustainability, according to Bosselmann, is strong, penetrating and meaningful and continues to exert a fundamental influence on scientific and legal thinking. Within the broad doctrinal debate on the concept of sustainable development,[15] Bos-

[14] K. Bosselmann, *The Principle of Sustainability*, cit., pp. 9 and 25.

[15] On the origin of the concept of sustainable development and its subsequent evolution, see *ex plurimis* (in the Italian legal literature): S.M. Carbone, F. Munari, "Lo sviluppo sostenibile nel contesto degli scambi internazionali e delle regole di diritto internazionale ad essi relative", in *Il Diritto del commercio internazionale*, 1999, p. 35 ff.; S. Marchisio, "Il diritto internazionale dell'ambiente", in G. Cordini, P. Fois, S. Marchisio (eds), *Diritto ambientale. Profili internazionali europei e comparati* (Torino, Giappichelli 2005), p. 10; P. Fois (ed), *Il principio dello sviluppo sostenibile nel diritto internazionale ed europeo dell'ambiente,* XI Congresso 16-17 Giugno 2006, SIDI (Società italiana di diritto internazionale), (Napoli, Editoriale Scientifica, 2006).

See also extensively: P. Sands, "Environmental Protection in the Twenty-First Century: Sustainable Development and International Law", in R.L. Revesz, P. Sands, R.B. Stewart (eds), *Environmental law, the Economy and Sustainable Development* (Cambridge, Cambridge University Press, 2000), p. 252 ff.; P. Birnie, A. Boyle, C. Redgwell, *International Law & Environment* 3rd ed. (Oxford/New York, OUP 2009), p. 115 ff.; K. Bosselmann, The Principle of Sustainability, cit.; M. Montini, "Evoluzione, principi e fonti del diritto internazionale dell'ambiente", in P. Dell'Anno, E. Picozza (eds), *Trattato di diritto dell'ambiente*, vol. I (Padova, Cedam 2012), p. 37 ff.; S. Manservisi, "Il principio dello sviluppo sostenibile: da Rio+20 al diritto dell'Unione europea e il suo fondamentale ruolo nel diritto agrario", in G. Sgarbanti, P. Borghi, A. Germanò (eds), *Il divenire del diritto agrario italiano ed europeo tra sviluppi tecnologici e sostenibilità*, Convegno organizzato in onore del prof. Ettore Casadei in occasione del suo 70° compleanno, Bologna-Rovigo, 25-26 Ottobre 2012, CNR-IDAIC series, (Milano, Giuffrè, 2014), p. 177 ff.; L. Pineschi, "I principi del diritto internazionale dell'ambiente: dal divieto di inquinamento transfrontaliero alla tutela dell'ambiente come Common Concern", in R. Ferrara, C.A. Gallo (eds), *Trattato di diritto dell'ambiente*, I (Milano, Giuffrè, 2014) p. 92 ff.

selmann's thesis[16] succeeds in capturing the holistic dimension, i.e., the multidimensional scope of the principle of sustainable development.

Bosselmann emphasizes that the inclusion of social and economic aspects within the concept of "sustainable development" does not therefore require any deviation from the ecological core.[17] On the contrary, it is precisely this core that makes it possible to relate the social and economic dimensions of sustainable development to a central point of reference.

Bosselmann characterizes sustainable development as a legal principle, arguing it derives both its meaning and its legal status from the principle of sustainability. This status, he contends, stems from the fact that sustainability itself constitutes a legal principle which he regards as "the most fundamental environmental principle, only equal to other fundamental principles of law such as freedom, equality and justice".[18] He defines the principle of sustainability as "the duty to protect and restore the integrity of the Earth's ecological systems". Bosselmann further underscores its normative character, noting that it reflects a fundamental ethical value grounded in respect for ecological integrity, entails obligations to act – namely the duties to protect and restore – and is therefore capable of producing legal effects, thereby fully meeting the criteria of legal principle.

Bosselmann also defines ecological integrity – the essence of sustainability – as the *Grundnorm* of international environmental law.[19]

From this perspective, the intergenerational dimension of sustainability in agriculture and food systems should be understood as inherent in the very concept of sustainability and particularly, in its ecological core, as reflected in Bosselmann's definition of

[16] K. Bosselmann, *The Principle of Sustainability*, cit., p. 53 ff.

[17] *Ibid*.

[18] K. Bosselmann, *The Principle of Sustainability*, cit., p. 57.

[19] K. Bosselmann, *The Principle of Sustainability. Transforming Law and Governance* 2nd edition (London/New York, Routledge 2017), p. 97 ff.; R. E. Kim, K. Bosselmann, "Operationalizing Sustainable Development: Ecological Integrity as a Grundnorm of International Law", in *Review of European Community & International Environmental Law,* XXIV (2015), p. 194 ff.

sustainability as "the duty to protect and restore the integrity of the Earth's ecological systems."[20]

In this light, therefore, it is possible to fully agree with Scovazzi's incisive observation on the theory of intergenerational equity. While acknowledging that the theory seeks to protect genuine needs deserving of the most careful consideration, Scovazzi notes that it raises certain perplexities. In particular, he argues that "there is no strict need to invoke future generations to affirm the concept whereby current patterns of production and consumption, risk destroying life on Earth" and that "the problem exists in the present, even before it concerns the future, and the right to a balanced environment must be understood today as a fundamental human right belonging to all individuals, directly linked to the human rights to life and health." [21]

In fact, it should be noted that in the 2030 Agenda, there is no explicit reference to "intergenerational equity" in the formulation of the *SDGs*. In this regard, according to Spijkers,[22] meeting the needs of the present generation without compromising the ability of future generations to meet their own needs is intrinsic to the concept of sustainable development itself, which constitutes the overarching aim. Accordingly, all *SDGs* should be interpreted and applied in such a way as to help achieve this aim.

2. *The Key Role of Sustainable Agriculture and Sustainable Food Systems among the Sustainable Development Goals of the 2030 Agenda*

As FAO incisively highlighted in its 2016 report *Food and Agriculture: Key to achieving the 2030 Agenda for Sustainable Development*[23]

[20] K. Bosselmann, *The Principle of Sustainability* (2008), cit., p. 53.

[21] T. Scovazzi, "La dimensione temporale del diritto internazionale dell'ambiente: i diritti delle generazioni future", in *Rivista giuridica dell'ambiente*, 2023/1, p. 234; T. Scovazzi, "I principi", cit., p. 196.

[22] O. Spijkers, "Intergenerational Equity and the Sustainable Development Goals", in *Sustainability* (2018, 10, 3836).

[23] FAO, *Food and agriculture: Key to achieving the 2030 Agenda for Sus-*

> The 17 SDGs of 2030 Agenda aim at ending poverty and hunger while restoring and sustainably managing natural resources. They integrate the three dimensions of sustainable development – economic, social and environmental – with closely interwoven targets. The SDGs are indivisible – no one goal is separate from the others, and all call for comprehensive and participatory approaches. And they are universal – the 2030 Agenda is as relevant to developed as it is to developing nations.

Sustainable agriculture and sustainable food systems play a key role in the Sustainable Development Goals set by the 2030 Agenda. The latter establishes Goal 2, specifically focused on the need to end hunger, achieve food security, and improve nutrition and promote sustainable agriculture. In particular, target 2.4 emphasizes the need by 2030, to

> ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.

"Food and agriculture are key to achieving the entire set of SDGs": in this sense, the FAO expressed itself incisively as early as 2016 in its report *Food and Agriculture: Key to achieving the 2030 Agenda for Sustainable Development*[24] and later in 2018 in *Transforming Food and Agriculture to Achieve the SDGs* (2018),[25] guidelines in which it underlined that food and agriculture are the essence of the 2030 Agenda and that the implementation of sustainable agriculture is a key factor in achieving many SDGs.

In the 2018 guidelines the FAO stresses that

> This includes ending poverty and hunger; ensuring sustainable use of natural resources; addressing inequalities; achieving gender equality and women's empowerment; promoting sustainable pro-

tainable Development (2016), p. 4, available on the website: www.fao.org.

[24] *Ivi,* cit. p. 6.

[25] FAO, *Transforming Food and Agriculture to Achieve the SDGs* (2018) p. 1, available on the website: https://openknowledge.fao.org/items/f579315d-69ee-4aef-a346-9bcd3b94ad2c

duction and consumption and healthy diets; reducing and removing the sources of vulnerability to conflict and crisis; mitigating and adapting to climate change; promoting accelerated and inclusive economic development; and building more just and peaceful societies.

3. *The COP28 UAE Declaration on Sustainable Agriculture, Resilient Food Systems, and Climate Action and the Key Role of Sustainable Agriculture and Sustainable Food Systems in Climate Resilience*

During COP 28, held in Dubai from 30 November to 13 December 2023, the final text of the first *Global Stocktake* was issued on 13 December 2023, after almost two years of data collection, technical dialogues and political negotiations.[26] This report is designed "to assess collective progress towards achieving the purpose of the [Paris] Agreement and its long-term objectives." For the first time at a COP, para. 28, letter d) of the report clearly states the transition away from fossil fuels in energy systems in an orderly and equitable manner. It also calls for accelerated action in this critical decade to achieve net-zero emissions by 2050, in line with IPCC recommendations.

The *Global Stocktake* highlights that the countries are largely off track in meeting the objectives of the Paris Agreement and must submit new Nationally Determined Contributions (NDCs) by 2025. It indicates that greenhouse gas emissions must be reduced by 43% by 2030 and by 60% by 2035, compared to 2019 levels, in order to meet the 1.5°C target (Art. 27). From a mitigation perspective, it further calls for: tripling renewable energy capacity and doubling energy efficiency by 2030 (Art. 28, letter a); accelerating the phase-out of unabated coal (Art. 28, letter b); reducing methane emissions – mentioned explicitly for the first time – (Art. 28, letter f) and emissions from road transport (Art.

[26] J. J. Qi *et al.*, "Reflections on the first Global Stocktake of the Paris Agreement", in *Earth System Governance*, XXI (August 2024), p. 2, https://doi.org/10.1016/j.esg.2024.100212.

28, letter g); and gradually eliminating "inefficient" fossil fuel subsidies as soon as possible (Art. 28, letter h).

The synergy and interdependence between Goal 2 of the 2030 Agenda – to "end hunger, achieve food security and improved nutrition and promote sustainable agriculture" – and Goal 13, which calls for "urgent action to combat climate change and its impacts", and which underpin the objectives of the Paris Agreement and the first *Global Stocktake*, are reflected in the *COP28 UAE Declaration on Sustainable Agriculture, Resilient Food Systems, and Climate Action*, issued during COP28 in Dubai, staged from 30 November to 13 December 2023. For the first time at a COP, agriculture and food systems were placed in the forefront, highlighting both the key role they can play in climate resilience if made sustainable and the impact of global greenhouse gas emissions from the agrifood sectors.

Regarding the first aspect, the *COP28 UAE Declaration* recognizes the need to include agriculture and food systems in any pathway toward fully achieving the long-term goals of the Paris Agreement, the potential of agriculture and food systems to provide impactful and innovative responses to climate change and shared prosperity for all, and the fundamental role of agriculture and food systems in the lives and livelihoods of billions of people. On this basis, it emphasizes the need, in para. 1, the need to "pursue broad, transparent, and inclusive engagement, as appropriate within our national contexts, to integrate agriculture and food systems into National Adaptation Plans, Nationally Determined Contributions, Long-term Strategies, National Biodiversity Strategies and Action Plans, and other related strategies before the convening of COP30" and, in para. 4, the need to "Accelerate and scale science – and evidence-based innovations – including local and indigenous knowledge – which increase sustainable productivity and production of agriculture and related emerging domains."

Furthermore, the issuance of the *Declaration* although not legally binding and falling within the scope of soft law, is of considerable importance. It marks the first time at a COP that the key role of agriculture and food systems in climate resilience – if made sustainable – and the impact of global greenhouse gas

emissions from the agrifood sectors have been recognized at the global level, with the approval of 159 heads of state and government, representing over 80% of agricultural GDP [Gross Domestic Product], 70% of the world's farmers and 80% of emissions from agriculture.

With regard to the second aspect, data on the impact of global greenhouse gas emissions from intensive and unsustainable agriculture, forestry and land use are presented in the IPCC's Sixth Assessment Report,[27] which confirms that human activities, mainly through greenhouse gas emissions, have unequivocally caused global warming and that 22% of global greenhouse gas emissions come from agriculture, forestry and land use.

According to the FAO report, *Greenhouse Gas Emissions from Agrifood Systems – Global, Regional and Country Trends, 2001 –2023*,[28] published in 2025, agrifood systems account for approximately one-third of total anthropogenic greenhouse gas emissions. In 2023, these emissions reached 16.5 billion tonnes of carbon dioxide equivalent, representing a 21 percent increase since 2001. Over the same period, the share of agrifood systems in total global emissions fell from 38 to 32 percent. These emissions are generated in various ways: on-farm activities related to crop and livestock production; land use change driven by deforestation, biomass burning, and peatland degradation, often linked to agricultural expansion; and pre- and post-production processes, comprising the supply chain, including food manufacturing, retail, household consumption and food waste disposal.

During COP 28, the FAO also presented the *FAO Global Roadmap on Achieving SDG2 without Breaching the 1.5° C Threshold,*[29] a new global roadmap for achieving the SDG2

[27] *Climate Change 2023: Synthesis Report AR6*, issued on 20 March 2023, with which the IPCC concluded the publication of the Sixth Assessment Report on Climate Change (AR6).

[28] FAO, *Greenhouse gas emissions from agrifood systems – Global, regional and country trends, 2001-2023*. FAOSTAT Analytical Brief Series, No. 115. Rome (2025). See also FAO, *Greenhouse gas emissions from agrifood systems – Global, regional and country trends, 2000-2020*, FAOSTAT Analytical Brief No. 50, Rome (2022).

[29] FAO, *Achieving SDG 2 without breaching the 1.5°C threshold: A global*

("End hunger, achieve food security and improved nutrition and promote sustainable agriculture") without exceeding the 1.5°C temperature limit set by the Paris Agreement on climate change. This is a key tool for achieving sustainable development goals, launched as a concrete package of solutions, which is being implemented over a three-year period, spanning COP28, COP29 and COP30.

This publication represents the first report in a three-year process beginning with COP28 and continuing through COP29 and COP30. The FAO roadmap process outlines a global strategy covering the next three years and includes a diverse package of solutions in ten distinct areas of action (clean energy, crops, fisheries and aquaculture, food losses and waste, forests and wetlands, healthy diets, livestock, soil and water, and inclusive, data-related policies) and encompassing a total of 120 proposed actions. In this initial report, FAO underscores the urgent need to reform agrifood systems, not only to meet climate targets, but also to enhance food security and address malnutrition, a fundamental aspect of the right to food. The roadmap further includes creating a project repository, exploring financing mechanisms, and developing country-specific action plans by 2025 (COP30).

The first part of the report, released at the conclusion of COP28 presents a global vision for agrifood system transformation. The second part, issued in 2024, moves from a global to a regional perspective and advances from vision-setting to the definition of costs and financing needs. The final phase at the COP30 held in Belém, Brazil (11-22 November 2025), aims to establish country-level action plans and strengthen monitoring and accountability mechanisms, with a focus on regional adaptation, costing of actions, and exploration of financial options.

The need to promote renewable energy solutions within agrifood systems in order to achieve the SDGs and the objectives of the Paris Agreement on climate change – previously emphasized through the FAO and IRENA partnership in the 2021 agree-

roadmap, Part 1 – How agrifood systems transformation through accelerated climate actions will help achieve food security and nutrition, today and tomorrow, In brief. Rome (2023), https://doi.org/10.4060/cc9113en.

ment[30] – was consolidated in the renewed Memorandum of Understanding between FAO and IRENA (The International Renewable Energy Agency) in January 2025. This renewed agreement extends the partnership for an additional four years, through January 2029.[31]

In this context, UNDP (*United Nations Development Programme*), in its 2024 *White Paper Supporting Food Systems Transformation Towards Sustainability and Resilience,*[32] highlights that the interconnectedness of energy and food systems and the need for a joint approach to achieve the Sustainable Development Goals (SDGs) and those of the Paris Agreement on Climate Change. The paper notes that "food systems and climate change also contribute significantly to environmental degradation" and that "food systems alone are responsible for 31% of human generated GHG emissions globally". It then goes on to cite the latest IPCC Report (AR6), which identifies "land, water and food-related adaptation and mitigation options as offering the greatest potential for addressing the climate crisis." Implementing these measures – including reduced conversion of natural ecosystems and increased agricultural carbon sequestration – "will require a fundamental transformation in our food systems." The report further emphasizes that food systems account for 80 percent of global deforestation, 70 percent of biodiversity loss and 70 percent of all freshwater use.[33]

In its 2024 White Paper, UNDP emphasizes that "food systems are interconnected across various sectors and are linked to all the Sustainable Development Goals (SDGs). Consequently, they are crucial for achieving these goals, requiring multidimensional solutions to address them effectively." The paper concludes that energy is a crucial element, noting that "interventions that help food system actors reduce their dependence on fossil

[30] IRENA and FAO, *Renewable energy for agrifood systems – Towards the Sustainable Development Goals and the Paris Agreement,* Abu Dhabi and Rome (2021), https://doi.org/10.4060/cb7433en.

[31] V. https://www.fao.org/energy/news/news-details/en/c/1731916/

[32] United Nations Development Programme, *Supporting Food Systems Transformation Towards Sustainability and Resilience* (2024).

[33] UNDP, *Supporting Food Systems Transformation*, cit., p. 6.

fuels will have both climate change and economic (production cost) benefits."

The aim of assisting countries through systemic, country-led and tailored support to translate their commitments into effective actions toward achieving sustainable food systems by 2030 – while leveraging the broader capacities of the United Nations system – led to the establishment of the *UN Food Systems Coordination Hub*[34] following the first UN Food Systems Summit. This gathering was held during the United Nations General Assembly in New York on 23 September 2021 and concluded with the issuance of the UN Secretary-General's Chair Summary and Statement of Action of the same date. The Hub's specific function is to help countries translate their commitments into concrete actions, supporting them, as a coordination and liaison resource, countries in promoting their national pathways towards sustainable food systems and directly contributing to the achievement of the Sustainable Development Goals by 2030. The Hub also actively participates in the Conference of the Parties (COP) of the UN Framework Convention on Climate Change, promoting the integration of food systems transformation into global climate action and reaffirming the crucial role of sustainable and resilient food systems in achieving the goals of the Paris Agreement and the *SDGs.*

The holistic approach underpinning the 2030 Agenda – which closely interlinks the SDGs – their strong interaction with the objectives of the Paris Agreement on climate change, the findings of the first *Global Stocktake* at COP28, and the important commitments in the energy sector undertaken at COP29,[35] as highlighted in particular by FAO, other UN specialized agencies,

[34] The *UN Food Systems Coordination Hub* is hosted by FAO on behalf of the UN system, within the Office of the FAO Director General. It is managed under the operations of FAO's Office of Sustainable Development Goals. The Hub is a hybrid structure when it comes to working space, with some of its members located at FAO headquarters and others working remotely from other UN Agencies, Funds and Programmes. FAO provides overall administrative and programmatic support for the operations of the Hub.

[35] The *COP29 Global Energy Storage and Grids Pledge*, the *COP 29 Green Energy Pledge: Green Energy Zones and Corridors* and the *COP29 Hydrogen Declaration.*

and COP declarations, clearly demonstrates the key role of sustainable agriculture in building sustainable food systems, and consequently the fundamental role of both in advancing the ecological transition.[36]

4. *The FAO Roadmap for Enhancing Sustainability in Geographical Indication Systems*

In the context of its strong commitment to supporting the achievement of the SDGs and the targets of the 2030 Agenda by promoting the transformation of agrifood systems, FAO has long pursued a territorial approach aimed at recognizing the importance of local and regional policies for sustainability. This approach is a fundamental pillar in rural areas, where the economy is dominated by the agriculture and food sector.

The key instrument of this territorial approach is geographical indications (GIs), which enhance the quality and protect the reputation of certain products thanks to their specific geographical origin. By bringing together local producers and other local stakeholders and adding value to local products, GIs can stimulate social and economic development, improve the conservation of natural and cultural environments, and contribute to healthy diets.

Since 2016, FAO has been collaborating with the *Organization for an International Geographical Indications Network* (oriGin), developing several initiatives to highlight and strengthen the relationship between GI systems and sustainability. This collaboration led to the issuance of a *Sustainability Strategy for GIs*, endorsed by GI organizations worldwide at the 2017 oriGin

[36] On the ecological and energy transition, see extensively: L. Ammannati (ed), *La transizione energetica* (Torino, Giappichelli, 2018); P. D. Cameron, X. Mu, V. Roeben (eds), *The Global Energy Transition: Law, Policy and Economics for Energy in the 21st Century* (Oxford, Hart Publishing 2021); F. Vetrò, "Sviluppo sostenibile, transizione energetica e neutralità climatica", in *Rivista italiana di diritto pubblico comunitario*, XXXII (2022) p. 53 ff.; A. Bonomo, "Governare la transizione ecologica: tra nuovi interessi e nuovi conflitti", in *Rivista trimestrale di diritto pubblico*, 2024/3, p. 621 ff.; M. Brocca, N. Ferrucci (eds), *Diritto forestale e transizione ambientale* (Torino, Giappichelli 2025).

General Assembly, paving the way for GI organizations to undertake sustainability roadmaps adapted to local contexts and development needs.

In 2024, FAO and oriGIn issued the guidelines *"Developing a roadmap towards increased sustainability in geographical indication systems – Practical guidelines for producer organizations to identify priorities, assess performance and improve the sustainability of their geographical indication systems"*.

These *Sustainability Strategy Guidelines for Geographical Indications* (SSGI) provide practical guidance to GI organizations and are intended to help them develop their own participatory and inclusive processes to prioritize local challenges, assess the sustainability status of agreed priorities, and formulate their own improvement plans through cooperation and consensus. The guidelines also identify a series of practical steps that producer associations can follow to develop their own sustainability roadmap.

These guidelines offer a bottom-up approach that enables GI producer associations to address complex local realities and challenges.

The primary objective of the SSGI is to provide organizations working with geographical indications with a framework and tools to embark on a sustainability journey. The SSGI were developed after a careful review of existing sustainability initiatives and evaluation frameworks as well as the selection of their best elements.

The SSGI framework is organized around four pillars, including environmental integrity, social well-being, economic resilience and good governance:

– Environmental integrity refers to maintaining life support systems essential for human survival by minimizing negative environmental impacts and fostering positive ones.
– Social well-being concerns meeting basic human needs and providing the rights and freedoms necessary to pursue a better quality of life.
– Economic resilience: in a world plagued by crises, it is more important to focus on economic resilience than on economic development; this dimension is directly linked to the fulfillment of human needs.

A total of 22 sustainability themes are classified under these

four pillars (five under good governance, six under environmental integrity, four under economic resilience and seven under social well-being).

These themes comprise a total of 62 sustainability topics, offering a wide range of sustainability priorities to choose from. GI practitioners are encouraged to become familiarized with this structure of pillars, themes and topics, as well as with the standard definitions of each topic.

Sustainability indicators are used to assess sustainability performance across selected priority topics. In total, 442 indicators are organized across the various pillars, themes and topics: 135 indicators address the economic dimension, 116 the environmental integrity dimension, 89 the good governance dimension and 102 the social dimension. Each topic may be measured by one or more indicators. The SSGI sustainability indicators are drawn from several reputable sources, including *inter alia* SAFA, the SDGs and the Global Reporting Initiative (GRI).

FAO promotes the development of GI systems to ensure that this tool contributes effectively to multiple objectives. These include preserving food heritage, enhancing dietary diversity through the protection of traditional and biodiversity-related food products, and maintaining nutritional quality through traditional processing methods. Other objectives focus on to strengthening rural livelihoods by building inclusive value chains, conserving the natural resources used in GI production, and improving coordination between public and private actors in support of sustainable development. FAO observes and highlights, however, that GI organizations – producer groups responsible for applying for GI protection and implementing GI specifications – are often overlooked as key actors within GI systems.

5. *Concluding Remarks, with Particular Reference to the FAO's Contribution to Bringing Sustainable Agrifood Systems to the Forefront of Climate Action at COP 30*

FAO, continuing its incisive action at COP28 and COP29, strongly supported the *Global Climate Action Agenda* (GCAA)

of the COP30 Presidency at COP30, held in Belém from 10 to 22 November 2025. In particular, FAO supported the thematic axis "Transforming agriculture and food systems", which has as its key objectives land restoration and the promotion of sustainable agriculture, building more resilient, adaptable and sustainable food systems, and ensuring equitable access to adequate food and nutrition for all.[37]

The COP30 GCAA is "a renewed framework to accelerate action",[38] capable of mobilizing civil society, businesses, investors, cities, states, and countries to accelerate the implementation of what has already been negotiated. It builds on the results of the first *Global Stocktake* (GST-1) and responds to the need to accelerate, in particular, the implementation of the *Global Stocktake* and the full implementation of the Paris Agreement.

This focus on implementation is made explicitly in the *Global Mutirão: Uniting humanity in a global mobilization against climate change* decision.[39] In Chapter II ("From negotiation to implementation: Paris Agreement policy cycle fully in motion"), the Conference of the Parties "[r]esolves to decisively transition to a focus on the implementation of the Paris Agreement and decisions adopted since its first session" (paragraph 15). The acceleration of implementation is further emphasized in Chapter III "Responding to urgency: Accelerating implementation, solidarity and international cooperation."[40]

[37] *Global Climate Action Agenda at COP30 Outcomes Report*, 21 November 2025, Advanced Unedited Version.

[38] *Global Climate Action Agenda at COP30, Outcomes Report*, cit., p. 4.

[39] FCCC/PA/CMA/2025/L.24, 22 November 2025.

[40] In particular, see the establishment of the *Global Implementation Accelerator*, in paragraph 41 of the *Global Mutirão* decision, where the Conference of the Parties "Decides, in responding to urgency, gaps and challenges, accelerating implementation, solidarity and international cooperation, to launch the *Global Implementation Accelerator*, as a cooperative, facilitative and voluntary initiative under the guidance of the Presidencies of the seventh and eighth sessions (November 2026) of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement to accelerate implementation across all actors to keep 1.5°C within reach and supporting countries in implementing their nationally determined contributions and national adapta-

At the same time, continuity between COP30 and COP28 is reflected in the *Global Mutirao* decision (seventh sentence of the Preamble: "Also recalling decision 1/CMA.5, on the outcome of the first global stocktake" which refers to the findings of the *Global Stocktake,* in particular Article 27. The preamble further recognizes that "limiting global warming to 1.5 °C with no or limited overshoot requires deep, rapid and sustained reductions in global greenhouse gas emissions of 43 per cent by 2030 and 60 per cent by 2035 relative to the 2019 level and reaching net zero carbon dioxide emissions by 2050."

Guided by *Global Stocktake* (GST) findings, the *Global Climate Action Agenda* (GCAA) is structured around six thematic axes,[41] covering mitigation, adaptation, and means of implementation and thirty key objectives, to be pursued through multiple solutions. The solutions being advanced through the COP 30 GCAA under each axis represent catalytic, cross-initiative efforts with the highest potential for system transformation; each responds to a clearly identified implementation gap and many are supported by a *Plan to Accelerate Solutions* (PAS), which are collective efforts by multiple initiatives to resolve barriers to implementation.[42]

tion plans taking into account the decisions referred to in paragraph 15 above, such as the United Arab Emirates Consensus."

Furthermore, paragraph 42 of the *Global Mutirão* decision provides for the launch of the *Belém Mission to 1.5*, stating that the Conference of the Parties "Also decides to launch, under the guidance of the Presidencies of the sixth, seventh and eighth sessions of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement, the 'Belém Mission to 1.5', aimed at enabling ambition and implementation of nationally determined contributions and national adaptation plans, to reflect on accelerating implementation, international cooperation and investment in nationally determined contributions and national adaptation plans across mitigation and adaptation, and requests those Presidencies to produce a report summarizing the work as they conclude the work by the eighth session of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement."

[41] Transitioning Energy, Industry, and Transport; Stewarding Forests, Oceans and Biodiversity; Transforming Agriculture and Food Systems; Building Resilience for Cities, Infrastructure and Water; Fostering Human and Social Development; and the final cross-cutting axis of Unleashing Enablers and Accelerators, including on Finance, Technology, and Capacity Building.

[42] *Global Climate Action Agenda at COP 30, Outcomes Report*, cit., p. 5 ff.

FAO supports the COP30 Presidency's Global Climate Action Agenda (GCAA) under Axis 3 "Transforming agriculture and food systems" by promoting agrifood solutions for the climate action through a range of plans and projects, and by playing a central role in their implementation.

Among the initiatives focused on land restoration and the recovery of degraded lands, is the *New Finance Accelerator* RAIZ (*Resilient Agriculture Investment for Net-Zero Land Degradation*)[43] which aims to restore millions of hectares of degraded agricultural land worldwide and is designed to help countries unlock blended finance for large-scale agricultural land restoration. RAIZ supports governments in mapping degraded land, identifying investable solutions and assessing the investment needs, as well as designing optimal financing mechanisms that combine public, private, and multilateral capital. By convening governments and investors, through structured partnerships and shared learning, RAIZ helps countries replicate successful financing models – such as EcoInvest – and mobilize billions of dollars to restore farmland, while advancing climate, biodiversity, and food-security goals simultaneously. RAIZ is implemented under the *FAO FAST* (Food and Agriculture for Sustainable Transformation) *Partnership*, with technical support from the UNCCD G20 Global Land Initiative, the Food and Land Use Coalition, the Green Climate Fund (GCF), CGIAR, the World Bank and others partners.

The TERRA (*Together for the Expansion of Resilient and Restorative Agroforestry and Agroecology*) Plan[44] focuses on accelerating solutions for family farmers, cooperatives and producer associations, including through finance and technical assistance, with FAO support through the Forest and Farm Facility. The Plan sets out a coordinated global pathway to scale agroecology and agroforestry as solutions to the climate crisis, biodiversity loss and food insecurity. Centered on family farmers, Indigenous Peoples and traditional communities, the Plan aims to restore

[43] *Global Climate Action Agenda at COP 30, Outcomes Report*, cit., p. 23. See also https://climateaction.unfccc.int/assets/documents/80_.pdf.

[44] *Global Climate Action Agenda at COP 30, Outcomes Report*, cit., p. 24.

biodiversity, strengthen climate resilience, enhance food and nutrition security and generate decent rural incomes by accelerating the transition from conventional agrifood systems to resilient agroecological and agroforestry models. It also seeks to scale agroecological transitions, protect productive forest landscapes and position family farmers as central agents of climate mitigation, adaptation and sustainable development.

The *Bioeconomy Challenge*[45] is a global, multi-stakeholder platform aimed at translating bioeconomy principles into measurable actions and scalable solutions by 2028. It is a 3-year initiative designed to develop shared metrics, market frameworks, and financing mechanisms for the emerging global bioeconomy sector, with FAO supporting work on metrics and indicators.

Under Axis 2 – *Responsible management of forests, oceans and biodiversity*, the *Tropical Forest Forever Facility* (TFFF)[46] was presented at COP30. Supported by FAO, this Brazil-led financial instrument provides long-term payments to tropical countries based on hectares of standing tropical moist forests. It represents an innovative financing mechanism that seeks to reward countries and forest stewards for conserving and restoring tropical forests. The TFFF aims to deliver continuous long-term payments for hectares of standing forests, explicitly recognizing the full range of ecosystem services provided by such forests, such as climate cooling, water regulation and biodiversity benefits.

The *COP30 Plan to Accelerate Fertilizer Solutions*[47] has the key objective of achieving a global reduction in greenhouse gas emissions fertilizer production and optimizing global nutrient use efficiency (NUE) by 2035. It sets out concrete actions across policy, supply, and demand. Supporting organizations include CGIAR, FAO, the International Energy Agency, the Internation-

[45] *Ivi*, p. 54.

[46] *Ivi*, p. 16. See also G.M. Galbiati *et al*, "Climate-related development finance to agrifood systems – Global and regional trends" Report 2025 (FAO, Rome 2025), p. 124.

[47] *Global Climate Action Agenda at COP 30, Outcomes Report*, cit., p. 25. See also https://climateaction.unfccc.int/assets/documents/51_.pdf.

al Fertilizer Association, UNIDO, the World Bank, the World Resources Institute, and major industry and finance coalitions.

At COP30, FAO also presented a series of reports and publications demonstrating how sustainable agri-food systems are a solution to the climate crisis and highlighted the critical role of climate-related development finance for agrifood systems.

In its report "Climate-related development finance to agrifood systems – Global and regional trends. Report 2025",[48] as part of the *Food and Agriculture for Sustainable Transformation (FAST) Partnership Work Plan*, FAO first of all highlighted the crucial role of climate-related development finance for agri-food systems. It emphasized incisively that "agrifood systems are not just vulnerable to climate impacts – they are central to the solution. Every dollar invested in sustainable and resilient agrifood systems delivers on multiple fronts: strengthening livelihoods, ensuring food for all, lowering emissions, and protecting the biodiversity and environment we all depend upon"; yet current finance flows have failed to realize this potential.

The FAO report shows that agrifood systems continue to be severely underfunded, despite their potential:

> Sectors related mainly to food production – namely crop production, forestry, livestock and fisheries – continue to be underfunded, with their climate-related development finance declining by 14 percent in 2023 and accounting for only 4 percent of total climate-related development finance. The disparity is stark and unsustainable.[49]

Consequently, the report stresses the urgent need to close this financing gap, in particular through the FAST Partnership, as the most consistent COP-to-COP mechanism to engage on agrifood systems, in order to ensure that finance for agrifood systems is not marginal but placed at the center of the discussions at COP and the implementation of their outcomes.[50]

During the COP 30, FAO emphasized that science-based

[48] G.M. Galbiati, cit.
[49] *Ivi*, p. 21.
[50] *Ivi*, p. vi.

agrifood solutions can play a pivotal role in reducing emissions, enhancing carbon sequestration, restoring ecosystems, and strengthening resilience.

Particularly significant in this regard is the report published jointly by FAO, the Stockholm Environment Institute, Conservation International, and the Nature Conservancy, *Climate and ecosystem service benefits of forests and trees for agriculture* in 2025.[51] This report synthesizes the latest science on how forests and trees regulate climate, water and ecosystem functions that directly underpin agricultural performance and emphasizes that promoting synergies between forests and agriculture is essential for a sustainable transformation of the agrifood systems. It examines their positive influence on temperature, rainfall patterns, water availability, soil fertility, pollination and pest management across multiple scales. Unlocking these benefits requires integrated landscape approaches, cross-sector governance, and policies that recognize forest conservation, restoration and sustainable use as strategic investments in food security, public health and climate resilience. Promoting forest-agriculture synergies thus offers a pathway toward more productive, sustainable and equitable agrifood systems.

The report further highlights that forests and trees are powerful but often undervalued allies, for agricultural productivity and resilience.[52] It notes that restoring 50% of deforested land could reduce the Earth's surface temperature by 1 °C[53] and emphasizes that

> an integrated approach to landscape and natural resource management – forests and water – at various scales is essential for ensuring that the benefits of forests and trees for agriculture are optimized. Decision-support systems that consider trade-offs and synergies among the forest ecosystem services provided are emerging as key tools to facilitate this.[54]

[51] FAO, SEI, CI & TNC, *Climate and ecosystem service benefits of forests and trees for agriculture* (Rome, Stockholm, and Arlington 2025).

[52] *Ivi*, p. 1.

[53] *Ivi*, p. 38.

[54] *Ivi*, p. 53.

From this perspective, the *Highlights from the Extreme Heat and Agriculture Report*[55] published jointly by FAO and WMO (*World Meteorological Organization*), in 2025 and drawn from the forthcoming FAO-WMO report, explores the impact of extreme heat on agricultural producers and crops, livestock, fisheries, aquaculture, and forests worldwide. Drawing on recent scientific evidence and country case studies, the report highlights the independent and complex risks posed by extreme heat, emphasizes the urgency of mitigation measures, and presents pathways to strengthen resilience and sustainability in the agricultural sectors.

The 2025 *Highlights from the extreme heat and agriculture report*[56] incisively point out that while this report focuses on adaptation, the ultimate solution to the challenge of extreme heat lies in ambitious climate change mitigation. The impacts of extreme heat on agriculture create a dangerous feedback loop: heat-induced productivity losses and agricultural expansion increase land-use change emissions. Furthermore, extreme heat can turn natural carbon sinks such as forests into net carbon sources, as evidenced by increasing emissions from wildfires. This cycle, where the impacts of warming drive further emissions and thus more warming, underscores the reality that adaptation has hard limits. Without a decisive global effort to reduce greenhouse gas emissions, the agricultural sector will face challenges that no amount of adaptation can overcome, threatening the viability of the entire global food system.

Along these lines, the 2025 White Paper *Update on scientific findings on the interactions between agriculture, food systems and climate change*[57] reports the latest scientific findings relating to agriculture, food systems and climate change. It builds on the *Intergovernmental Panel for Climate Change (IPCC) Special Re-*

[55] FAO & WMO, "Highlights from the Extreme Heat and Agriculture Report (2025)", available on website: https://openknowledge.fao.org/handle/20.500.14283/cd7572en.

[56] *Ibid.*, p. 7.

[57] E. Milne *et al*, "Update on Scientific Findings on the Interactions between Agriculture, Food Systems and Climate Change", Environment and Natural Resources Management Working Paper No. 110 (Rome, FAO 2025).

port on Climate Change and Land and the contributions of Working Groups II and III to the *IPCC's Sixth Assessment Report*. Although not exhaustive, it examines what is new (since 2018) and what still needs to be researched in terms of agriculture and agrifood systems, including climate impacts, adaptation and mitigation. The paper aims to bring together, in one place, information that can be used by the Food and Agriculture Organization of the United Nations (FAO), other United Nations agencies, the global research community and the IPCC, with the objective of synthesizing information that could inform future IPCC reports on interactions between agriculture, food systems and climate change.

Overall, it can be noted that the practices of the United Nations and its specialized agencies, particularly the FAO, have contributed significantly to highlighting the environmental and intergenerational dimensions of the sustainability of agriculture and food systems, in close correlation with the holistic concept of sustainable development developed in the legal doctrine.

It is also important to highlight that the decision, *Global Mutirão: Uniting humanity in a global mobilization against climate change*, in paragraph 13, recognizes "the critical role of United Nations organizations, specialized agencies, the secretariat, regional and international support programs, bilateral and multilateral agencies, multilateral development banks and other financial institutions in fostering cooperation on and supporting the implementation of the Paris Agreement". In paragraph 39 (Chapter III, "Responding to urgency: Accelerating implementation, solidarity and international cooperation") it

> [w]elcomes the offer of technical assistance for the preparation and implementation of nationally determined contributions and invites relevant United Nations organizations, specialized agencies, the secretariat, including through its regional collaboration centers, regional and international support programs, and bilateral and multilateral agencies to enhance the provision of technical assistance and support to developing country Parties to facilitate their preparation and implementation of nationally determined contributions.

At the same time, these developments make it possible to out-

line the emerging leading role of sustainable agriculture and food systems in the implementation of the *SDGs,* as well as in the ongoing ecological transition – not only in mapping out pathways to be followed, but also in supporting and sustaining their implementation.

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