On the road to the Sustainable Development Goals (SDGs)

7-Point Position Paper from the French Water Partnership (FWP) on **Water, Soils, Agroecology and Food Security**

french water partnership
fwp pfe
partenariat français pour l'eau

SUMMARY

The work of the FWP's Water, Soils, Agroecology and Food Security working group, enriched by that of the SESAME seminars which followed on from it, highlights 7 major points of attention of international interest which form a whole to be considered in its overall coherence:

1. At a time when food and water insecurity is on the increase and penalizing the poorest and most vulnerable populations, a battle needs to be waged at the international level to raise awareness of the decisive joint importance of water, soil and agriculture in achieving the SDGs. While situations differ from one region to another and call for responses tailored to each context, scenarios with strong co-benefits are often possible.

2. Strategic and political discourse on water must now include soil.

3. Agriculture, an essential intermediary in the integrated management of water and soils, has a central role to play in all three dimensions of sustainable development.

4. Achieving SDGs 2, 6, 13 and 15 on food security, water, climate action and biodiversity/terrestrial ecosystems requires:
   - Water-saving farming methods that protect soils, control pollutant discharges and encourage water infiltration, and,
   - Where justified by the context, increasing the availability of water for various uses, including irrigation, while respecting the renewal of water resources and the good ecological status of the environment.

   Agroecological approaches that improve soils and contribute to triple security - water (in terms of both quantity and quality), food and climate - including soil conservation agriculture, agroforestry and well-managed irrigation, are of strategic importance.

5. Coherent collective action - across public and private actors - for water, soils, biodiversity and agriculture requires governance that involves all stakeholders and a culture of compromise at several territorial levels (living areas, river basins, provinces and countries), ensuring mutual inspiration among them. This governance must lead to effective regulations at each level and to assessments based on the systemic logic of the SDGs.

6. Strengthening the capacities of all rural stakeholders and their ability to communicate, organize themselves collectively and interact positively with each other and with other stakeholders, in terms of natural resource management and agricultural and rural development, is a key factor in ensuring territorial sustainability. This involves training in the agroecological approach, renewed R&D and support for collective action.

7. Supporting the transition to sustainable agricultural and rural development also means backing the risks associated with changing agricultural models and financing the services provided by rural communities to water, the environment, biodiversity and climate.

FRAMING NOTE

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60% women & girls

1 ppl in 5 in Africa

According to the World Food Program

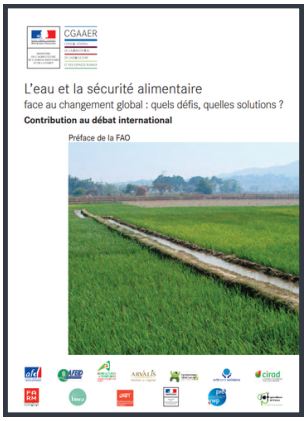
According to the World Food Program, one in 11 people - 60% of whom are women and girls – experienced hunger in 2023, and one in 5 in Africa. These alarming figures reflect the worsening of food crises caused by conflict, increasing socio-economic and territorial inequalities, the impact of climate change, land and soil degradation and insufficient access to water resources due to lack of investment and increasing water insecurity (see Glossary).

Sustainable Development Goal (SDG) 2 aims to "eradicate hunger, achieve food security, improve nutrition and promote sustainable agriculture" by 2030, with a focus on empowering small-scale farming and fostering resilient, productive and soil-enhancing systems.

The right to adequate food, recognized as a fundamental human right in Article 25 of the Universal Declaration of Human Rights (1948) and reinforced in 1966 by Article 11 of the International Covenant on Economic, Social and Cultural Rights (ICESCR), provides an essential foundation for guaranteeing the dignity and well-being of populations.

In this context, and to inform dialogues and debates on the interconnected issues of water, soils, agriculture and food security, and thereby contribute to advancing international discussions, the French Water Partnership (FWP) established a dedicated working group (WG) on these topics.

In 2012, the WG produced a report (Water and food security) published by the French Ministry of Agriculture's General Council for Food, Agriculture and Rural Areas (CGAAER), with a preface by the Minister and the FAO Deputy Director-General. Featuring forty examples of solutions, the report included contributions from fourteen FWP member institutions. This work was followed by the seven Water and Food Security in the Mediterranean Seminars - "SESAME" - organized from 2013 to 2022 by the General Councils of the French and Moroccan Ministries of Agriculture with the support of the FWP, the French Development Agency (AFD), the Moroccan Ministry of Agriculture, Agropolis International and the FARM Foundation.



The present framing note, drawing on these reflections and the WG notes already approved by the FWP's Governing Board (the most recent focusing on water and rural development), is intended to evolve and be improved over time. It highlights seven main points.

Notes and references:

This 7-point framing note is based in particular on documents produced or analyzed by:

- The FWP's working group on Water, Soils, Agroecology and Food Security https://www.partenariat-francais-eau.fr/thematique/eau-sols-agroecologie/
- The seven international SESAME seminars https://www.agropolis.fr/SESAME

The FWP working group on Water, Soils, Agroecology and Food Security is currently preparing focus notes on "groundwater", "agroecology" and "the Water, Soils, Agroecology and Food Security nexus /climate change relationship". Other topics beyond the scope of this paper include forestry ; water, agri-food chains, food losses and transitions ; and the role of "green, blue and virtual waters" in achieving sustainable food security?

FRAMING NOTE

1. TO BETTER CONVEY THE DECISIVE, INTERLINKED IMPORTANCE OF WATER, SOILS, AND AGRICULTURE FOR ACHIEVING THE SDGS.

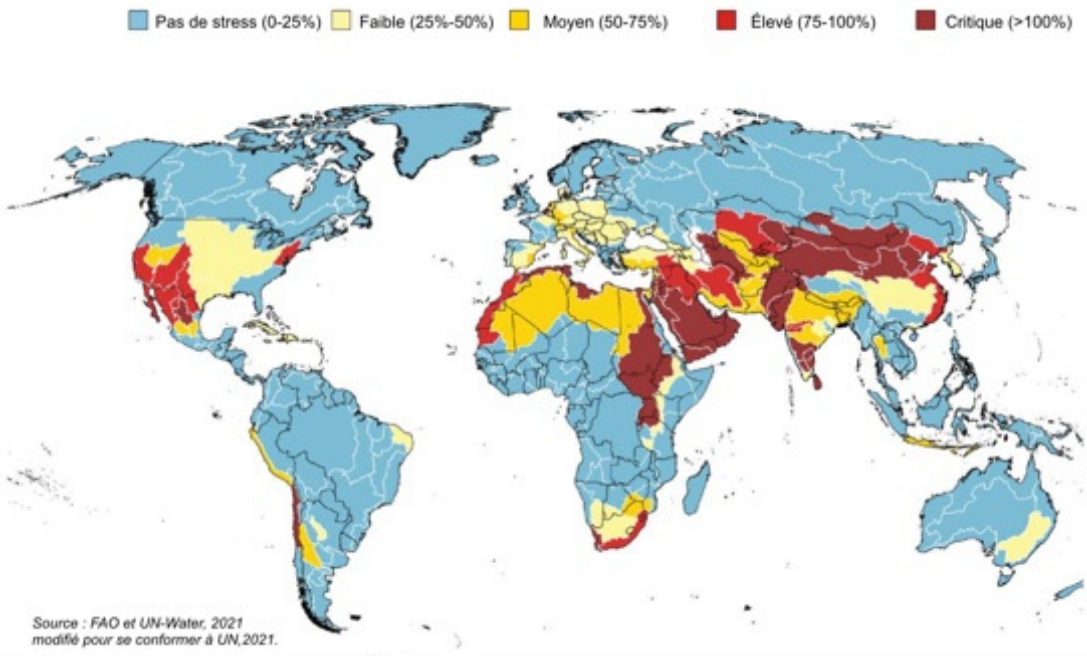
At a time when food and water insecurity is on the increase and penalizing the poorest and most vulnerable populations, a battle needs to be waged at the international level to raise awareness of the decisive joint importance of water, soil and agriculture in achieving the SDGs. While situations differ from one region to another and call for responses tailored to each context, scenarios with strong co-benefits are often possible.

We need to move away from siloed visions, policies and consultation forums, to mobilize different options and levers without pitting them against each other, and to move from "doing" or "not doing" to "doing with": with nature and its resources, with human beings, and with territories. The breakthrough of agroecology (see Glossary) - including soil conservation agriculture (see Glossary) - and of a better territorialization of policies in the international debate and in several countries, are two recent positive but still fragile developments.

Water resources and uses in the major river basins in 2021: major differences in situations

The UN Water map, relating to indicator 6.4.2 of SDG 6 (rates of freshwater withdrawals as a proportion of renewable resources, taking into account reserved ecological flow) illustrates differences in the situations across major basins, highlighting basins and countries in critical situations (rate > 100%) versus those with abundant resources (rate < 25%).

Level of Water Stress by Major River Basin, 2019–2021



Source : FAO et UN-Water, 2021
modifié pour se conformer à UN,2021.

The level of water insecurity also depends on the capacity to strengthen the resource that can be mobilized where and when water is lacking. The ratio between dam capacity and renewable water resources can vary considerably from one basin or country to another, ranging from 4% (9km3/211) in France to 186% (54km3/29) in Morocco (Aquastat 2021 figures, FAO).

The share of agriculture in total water withdrawals - 69% on average globally – is also highly variable: from 9% in France, it rises to 82% in countries on the southern and eastern shores of the Mediterranean. Despite this high level of mobilization, these countries remain heavily dependent on food imports and therefore on the capacity of countries with more water and land to produce beyond their own needs.

Although groundwater plays a growing and essential role in food security, 20% of aquifers are reportedly overexploited (India, northern China, the Middle East, the Maghreb, the USA, etc.) and around 20% of withdrawals exceed annual recharge (unsustainable water resources). However, the World Bank points out that in sub-Saharan Africa, where 12.8 million hectares are irrigated from groundwater, mainly in 5 countries - Mauritius, Madagascar, Sudan, Ethiopia and South Africa - 40 million hectares could be irrigated sustainably, primarily benefiting small-scale agriculture and thereby significantly reducing poverty and food insecurity.

Notes and references:

- Food security should be considered in its 4 dimensions: availability, access, stability, quality. See the CGAAER/FWP report on water and food security. *https://www.vie-publique.fr/files/rapport/pdf/134000137.pdf* page 15
- In 2023, the number of people suffering from hunger has been estimated at 733 million, 152 million more than in 2019. https://fr.wfp.org/communiques-de-presse/des-chiffres-de-la-faim-invariablement-eleves-pendant-trois-annees.
- The SESAME 4 seminar highlighted the territorial dimension of food security. The situation in poor rural mountains is such that many face vicious circles of poverty, ecosystem degradation and poor water infiltration. *https://www.weadapt.org/wp-content/uploads/2023/05/mapping_the_vulnerability_of_mountain_peoples_to_food_insecurity.pdf*
- On groundwater, see the focus note prepared by the FWP's WG on Water, Soils, Agroecology and Food Security. The figures quoted for sub-Saharan Africa are taken from the World Bank report "The hidden wealth of nations: the vital role of groundwater".
- In its 5(th) report, the IPCC classified "the loss of rural livelihoods and incomes due to inadequate access to irrigation and rural populations" among the eight major risks identified with a high level of confidence. *https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf* (p 13)
- The IPCC AR6 WG 2 Fact Sheet - Food and Water d'adaptation ·summarizes the main facts, impacts and risks of climate change related to food and water insecurity, drawing on the IPCC 6threport, and outlines relevant adaptation options.
- The SESAME seminars highlighted the importance of moving from "doing" or "not doing" to "doing with". At the United Nations Water Conference in March 2023, the FWP proposed that a future summit could be co-organized by the water and agriculture communities on the theme of "Water, soil and agriculture working together for sustainable development".

2. THE STRATEGIC AND POLITICAL DISCOURSE ON WATER MUST NOW INCLUDE SOILS.

In the water sector, there is a tendency to talk only about water, whereas soil and water are two inseparable elements, and we cannot act in a relevant way without taking into account the consequences of one on the other. Soil degradation through erosion or salinization, as well as soil artificialization, are serious problems that affect water resources and food production. Conserving, desilting and improving soils and soil life increases their self-purification capacity and strengthens water infiltration; it improves water storage in the soil so that it can be used when it is lacking; it reduces erosion, the rate at which dams are silting up and the risk of erosive flooding; and, finally, through increased organic carbon storage and the resulting improvement in soil fertility, it supports food security, climate and life. It therefore contributes positively to the joint achievement of SDGs 2 (zero hunger), 6 (water), 13 (climate) and 15 (terrestrial ecosystems).

Notes and references:

- The SESAME seminars and the Parmenides GID/CIHEAM Conference on the sustainable management of catchment areas in the Mediterranean emphasized the extent to which water and soil should be considered as two inseparable elements.

https://www.g-i-d.org/wp-content/uploads/2022/01/Declaration-commune-GID_CIHEAM-118.pdf

- The objective of neutrality with regard to land degradation (NDT) aims to achieve a world in which the loss of this vital asset is halted, and to move towards positive trends. For the Executive Secretary of the UNCCD (United Nations Convention to Combat Desertification), NDT is "the simplest answer to tackling climate change, ensuring food, energy and water security, and halting forced migration and conflicts over access to resources.

  Cf https://catalogue.unccd.int/877_LDN_TS%20_FRE.pdf

- The international initiative "4 for 1000: soil for food security and climate", successfully introduced by France at COP 21 is a political expression of the importance that should be attached to soil today. *https://4p1000.org*

3. THE ESSENTIAL ROLE OF AGRICULTURE, AS A KEY INTERMEDIARY IN INTEGRATED WATER AND SOIL MANAGEMENT, FOR SUSTAINABLE DEVELOPMENT.

Agriculture, an essential intermediary in the integrated management of water and soil, has a central role to play in all three dimensions of sustainable development.

Criticized, often with good reason, for its negative impact on water (pollution, overexploitation of certain aquifers, etc.) and on aquatic environments and soils, agriculture accounts for 38% of the earth's surface (excluding forestry) and plays a number of essential roles in sustainable development, through its contribution to food security and poverty reduction, as well as through its ability to improve its interactions with the environment and natural resources on a large scale, thereby producing numerous ecosystem services (see Glossary), including those relevant to addressing climate change.

Notes and references:

According to the World Bank, agriculture is "a crucial instrument for development", with "GDP growth originating in agriculture contributing at least twice as much (3.5 times more in China) to poverty reduction as GDP growth originating outside agriculture".

According to the IPCC, the sector of Agriculture, Forestry and Land Use changes is "a unique sector" in terms of its ability to capture and store carbon and to reduce GHG emissions from other sectors of the economy by substituting bio-based products for more GHG-emitting mining products (IPCC AR6, WG3, FAQ 7.1). Beyond its contribution to food and fibre production, this sector produces "a multitude of ecosystem services, climate change mitigation being only one of many that are of vital importance to human well-being ('robust evidence, high agreement')"
https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_full.pdf

As agriculture and forestry manage "a considerable proportion of the world's land surface", the impacts of Agriculture, Forestry and Land Use on soil, water and biodiversity - whether positive or negative - can be considerable.
Thus, "the sector of Agriculture, Forestry and Land Use plays a central role for food security AND sustainable development" (IPCC, AR5, WG3, SPM 4.2.4).

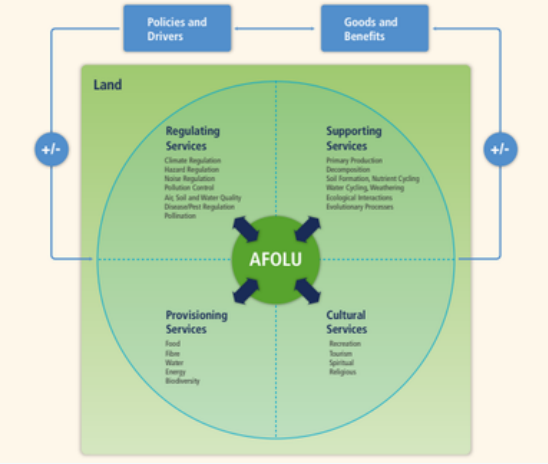


Figure 11.1 | Multiples services écosystémiques, biens et avantages fournis par les terres (d'après MEA, 2005 ; UNEP-WCMC, 2011). Les actions d'atténuation visent à renforcer la régulation du climat, mais il ne s'agit que d'une des nombreuses fonctions remplies par les terres.

4. WATER-SAVING FARMING SYSTEMS AND AGROECOLOGICAL APPROACHES TO JOINTLY ACHIEVE SDGS 2, 6, 13 AND 15.

Achieving SDGs 2, 6, 13 and 15 on food security, water, climate action and biodiversity/terrestrial ecosystems requires:

- **Water-saving farming methods that protect soils, control pollutant discharges and encourage water infiltration, and,**
- **Where justified by the context, increasing the availability of water for various uses, including irrigation, while respecting the renewal of water resources and the good ecological status of the environment.**

Agroecological approaches that improve soils and contribute to triple security - water (in terms of both quantity and quality), food and climate - including soil conservation agriculture, agroforestry and well-managed irrigation[1], are of strategic importance.

The main options relating to the water/soil/agriculture/environment nexus and the associated SDGs are set out in the table below.

<table>
<tr><td rowspan="2">SDG / Targets</td><td>SDG 6.3 Reduce water pollution</td><td>SDG 6.4 Water efficiency, Sustainability of withdrawals and supplies. Remedy water scarcity</td><td>SDG 13.1 SDG 2.4 Resilience to CC</td><td>SDG 15.3 SDG 2.4 Restoration of degraded lands Soil improvement</td><td>SDG 2.3 Double productivity & income from small-scale agriculture</td><td>SDG 2.4 Agriculture with multiple co-benefits
SDG 2.5 Agri-diversity</td><td>SDG 13 (CC Mitigation) & SDG 2 (food security)</td></tr>
<tr><td colspan="2">ODD 6.6 Protect aquatic environments</td><td colspan="5">SDG 15.5 Halting the loss of biodiversity</td></tr>
<tr><td>Options</td><td>Biological ag. Grassland.... ACS* Livestock effluents management</td><td>Resilience irrigation ACS* Localized precision irrigations</td><td>ACS* Supplemental Irrigation Agroforestery</td><td>Agroforestery GDT/WH** ACS* Agro-ecological irrigation (and drainage)</td><td>Irrigation GDT/WH** ACS*</td><td>ACS* GDT/WH** Agro-ecological irrigation Agroforestery</td><td>Irrigation (large and small-scale farming) ACS* Agroforesterie Precision agriculture</td></tr>
<tr><td></td><td colspan="7">Integration of crop and livestock farming. Grassland and forage systems rich in biodiverse legumes. Rotational grazing. Management of common-pool resources: PDO/PGI schemes, and a return to controlled management of overexploited groundwater and overgrazed pastures</td></tr>
<tr><td></td><td colspan="7">Increasing the availability of water while respecting the renewal of the resource and the protection of the environment: wells and drilling, storage, transfers, REUT, desalinization, farming and landscaping to increase water infiltration</td></tr>
</table>

*** ACS= conservation agriculture (see Glossary)**

**** GDT/WH= sustainable land management / water harvesting (see Glossary)**

Notes and references:

- The IPCC, in its special report on land, listed 28 major options related to land management (agriculture, forests, soils, other ecosystems), value chains and risk management, capable of addressing mitigation, adaptation, combating desertification, restoring degraded lands, and food security. Three options stand out for their high positive potential across these 5 areas: **i)** sustainable agricultural intensification, **ii)** agroforestry and **iii)** increasing soil organic carbon. (See *SRCCL_Technical-Summary.pdf* Table TS 13, page 64 and the Glossary for definitions of terms).

[1] The FWP obviously does not advocate developing irrigation — even water-efficient irrigation — where this would conflict with achieving SDG 6. Returning over-exploited aquifers to sustainable management requires pairing efficiency efforts with the implementation of collective governance (see §6).

Notes et références :

- *According to the 6th IPCC report, the main climate change adaptation options highlighted are "on-farm water management, storage, irrigation and soil moisture conservation", "reducing vulnerabilities that can provide economic, institutional and ecological benefits" (IPCC, AR6, WG 2, SPM, p 21 § C.2.1). Irrigation, however, must be "managed appropriately to avoid potential negative consequences that may include accelerated depletion of groundwater and other water sources, as well as increased soil salinization".*
- *According to the interministerial report CCEA - Climate change, water and agriculture: what trajectories to 2050? - produced by the General Councils of the French Ministries in charge of Ecology and Agriculture (https://www.vie- publique.fr/files/rapport/pdf/277711.pdf), "responding to climate change requires a shift in the agricultural model toward greater water saving and soil protection AND, wherever possible, reinforcing water resources for irrigation, while respecting resource renewal and the mail ecological status of the environment".*
- *The FWP WG on Water, Soils, Agroecology and Food Security's focus note on agroecology will highlight options that, in certain geographical contexts, are likely to contribute to the joint achievement of SDGs 2, 6, 13 and 15, including agroforestry, soil conservation agriculture, well-managed irrigation and runoff water harvesting systems.*

In basins under severe pressure, achieving targets 6.3 and 6.4 requires, beyond efficiency gains from the adoption of localized (drip) and precision irrigation, a new type of resilience irrigation (see Glossary and note below) characterized by three components: "**i)** greater water saving focused on securing agricultural production, **ii)** changes in crop rotation or cultivation practices to make reduced water inputs more efficient, **iii)** managing crops not for maximum yield, but towards an optimum that balances agricultural profitability with water resource saving" (Source: CCEA report, see notes and references below).

Proper application of the basic principles of soil conservation agriculture (SCA) in irrigated or rain-fed systems, namely, i) diversification (a varied succession of crops or species associations), ii) keeping soils always covered by plants or crop residues, and iii) zero or near zero tillage, can, in a large part of the world, help achieve target 2.4 which aims to "increase productivity and production, contribute to ecosystem preservation, strengthen capacity to adapt to droughts and floods, and progressively improve the quality of land and soil". Irrigation water savings and productivity, carbon storage & efficiency gains can, in some cases, be remarkable. Agroforestry and agricultural systems for collecting rainwater and runoff (Water Harvesting; see Glossary), through their ability to support sustainable land management (SLM) objectives and revitalize soils, are also among agroecological options with high potential co-benefits.

Notes and references:

- The preservation of water resources and aquatic environments requires water savings in many areas, particularly for irrigation.
- The shift from gravity-fed irrigation to localized irrigation ("drip irrigation"), which has now been implemented at significant scale in many countries, has in some cases been accompanied by an extension of irrigated areas, preventing a reduction in groundwater over-exploitation.

Notes and references:

- According to Arvalis (the French Plant Institute), the performance of irrigated arable farming in France has improved significantly, with water productivity (tons of dry matter produced per m3 of water withdrawn) increasing by 30% in 20 years. https://agriculture.gouv.fr/sites/default/files/cgaaer_16072_2017_rapport.pdf. Four levers contributed to these efficiency gains: reducing losses in the networks, decision support for irrigation management, genetic selection and avoidance strategies (choice of rotations and staggering of crop cycles). New decision-support tools are emerging and further efficiency gains remain possible in many irrigated areas.
- With rising temperatures and evapotranspiration (see Glossary), several basins, including in a large part of Europe, are expected to face much more severe low-water conditions in the future. The need for additional water savings in current irrigated systems has led the authors of the interministerial CCEA report to propose the concept of "resilience irrigation".
- Soil Conservation Agriculture (SCA) and its three principles (see https://www.fao.org/conservation-agriculture/fr/)) have been officially defined and promoted by the FAO since 2001. Under certain conditions, the co-benefits can be much higher than what is reported in the scientific literature. This is illustrated by a maize farm in southwestern France, which has practiced SCA for 19 years. Compared with neighboring farms using conventional production systems, it has achieved: **i)** 40% higher maize yields for 30% less irrigation demand, **ii)** a rate of run-off after a rainfall event of 200 mm reduced from 23% to 5%, with land losses of 3g/m2 compared with 552g/m2, and **iii)** additional carbon storage of 2 tons per ha per year, a significant amount which remained stable over time. (Source: CCEA interministerial report cited above, pages 79 and 235).

With increasing evapotranspiration, the water balance (see Glossary) is deteriorating in several major regions of the world. Crops that have so far been rain-fed now require, or will require, access to supplemental irrigation (see Glossary) and overall irrigation demand is rising significantly.

Achieving target 2.3 (doubling agricultural productivity and the incomes of smallholder farmers), which is strategically important especially in sub-Saharan Africa, involves extending irrigation - where it is feasible under suitable conditions - and promoting eco-intensive agroecological systems. This is a key factor in achieving SDGs 1 - poverty eradication - and 2 - food security - and, consequently, targets 6.1 and 6.2 (universal access to drinking water and sanitation), as well as many other SDGs and targets.

The development of irrigation in large-scale farming systems may also, in certain contexts, be necessary to achieve SDG 2. However, it must not unduly monopolize the resource at the expense of "small-scale farming", as is too often the case. On the contrary, it should support the entrepreneurial and territorial development of small-scale agriculture.

Notes and references:

- The IPCC points out that "agricultural water demand depends not only on crop management and efficiency, but also on the balance between atmospheric moisture deficit and soil water supply". It considers that "climate change will affect water demand for both irrigated and rainfed crops" and states with "high confidence" that "irrigation demand will increase significantly (> 40%) in many regions, including Europe, the United States and parts of Asia", while it is expected to decrease in India, Pakistan and south-eastern China

https://www.ipcc.ch/site/assets/uploads/2018/02GIIAR5-Chap3_FINAL.pdf § 3.5.2.1 ; p 251.

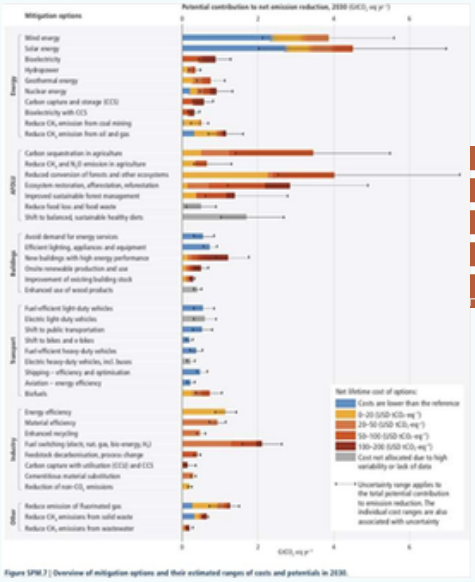
Notes and references:

- The SESAME 7 seminar clearly highlighted the strategic importance of 'small-scale irrigation' in developing countries. In a country like Tunisia, it "now plays a decisive role in terms of employment, preserving social stability and maintaining rural areas". The same seminar underlined the strategic importance of irrigable potential for small-scale farming in the Sahel. The 20 years of cooperation between the NGOs "Puits du désert" and "Tidène" in Niger, presented in the focus note on groundwater, is a remarkable success, including in terms of achieving SDGs 6 (drinking water, hygiene and sanitation) and 16 (peace).
- The SESAME 2 seminar highlighted the relevance of the concept of "farmer investors" and the possibility of positive aggregations between large-scale irrigation and small-scale irrigation (e.g. the development of berry production in the Loukos region, Morocco).

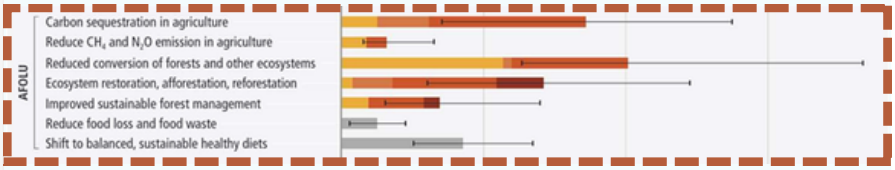
SCA, agroforestry, well-managed irrigation and agricultural water harvesting systems - with, where appropriate, rational fertilizer inputs - are among the main options for increasing **i)** Plant capture of excess atmospheric carbon in the form of CO2, **ii)** its storage in soils and in biobased products and **iii)** the quantity of bioproducts that can replace conventional products with higher GHG emissions, thereby making a powerful contribution to climate change mitigation (SDG 13).
In a world that requires increased food and biofuel production, sustainable intensification of agriculture (see Glossary), of which irrigation is one means, is considered by the IPCC as an important option for greenhouse gas mitigation. It directly enables greater capture of CO_2 from the atmosphere and, where possible, increased storage in soils, and indirectly helps reduce pressure on forests and thus deforestation, while also freeing up land for reforestation.

Notes and references:

The two sectors with the greatest potential to reduce net GHG emissions are energy and land (AFOLU). See Figure SPM.7 in the Summary for Policymakers of the 6th IPCC Report, Working Group III (Source: https://www.ipcc.ch/report/ar6/wg3/figures/summary-for-policymakers/figure-spm-7) reproduced below. The mitigation potential of the land sector is, however, higher than what the figure indicates, because the emission reductions enabled by substituting green carbon for black carbon (e.g. using wood or hemp concrete instead of cement) are accounted for in the energy, industry, construction and transport sectors.



The three main mitigation options in the land sector are reducing deforestation, sequestering carbon in agriculture (in soils and long-lived bioproducts) and reforestation/ecosystem restoration.



Sustainable intensification of agriculture, food transition and the reduction of food losses and waste should also be considered, particularly as they help reduce pressure on forests and thus deforestation, while freeing up land for reforestation.

Organic farming, although part of the responses needed to achieve SDG 6.3 on reducing water pollution, is not mentioned in the 550 pages of the "food security" chapter of the IPCC Special Report on Land, which outlines the agricultural options necessary to address the dual food and climate challenge. However, the current trend toward a new form of "conservation organic agriculture" (see Glossary) could, in the future, turn organic farming into an agricultural model with far greater co-benefits.

Provided that water resource renewal and the good ecological status of the environment are not compromised, increasing water availability is, in many cases, a precondition for achieving numerous SDGs and targets. The options for increasing water availability are not limited to wells and boreholes, surface storage, reuse (see Glossary), inter-basin transfers from surplus to deficit basins, or desalination.

In the new climatic context, new integrated water storage solutions (in soils, water table and surface systems ; natural, built and hybrid) are strategically important due to their capacity to provide water reserves for drier periods and to reduce the impact of floods.

Water availability can also be secured or improved through the promotion of sustainable agricultural practices and landscape management that enhance water collection and infiltration, and, where appropriate, through gravity-fed irrigation supporting non-polluting agriculture and contributing to aquifer recharge. Agricultural and rural development capable of restoring degraded lands and enhancing water infiltration for downstream benefit could generate significant upstream–downstream co-benefits in terms of sustainable development: poverty alleviation, improved water security for all users, food security, carbon storage, biodiversity, etc.

Notes and references:

- In its 2023 report "What the future holds: a new water storage paradigm", the World Bank issued an urgent call for all stakeholders in the water sector across public and private actors at all scales, to speak with one voice in promoting integrated water storage solutions (natural, built and hybrid) to meet the challenges of the 21st century and the needs of people, economies and the environment. The Bank also considers that "in the years to come, the most stable and sustainable societies will, in many cases, be those that have adopted the most resilient storage methods".
- The ministerial report Water, agriculture and climate change: status quo or anticipation of 2027 (https://www.vie- publique.fr/files/rapport/pdf/174000581.pdf), together with the interministerial AECB report of 2019 cited above, documented 13 case studies across metropolitan France. A key finding was that, in all territories examined, the question of irrigation development is now being raised in a variable but systematic way, and that the agricultural profession everywhere considers that strengthening mobilizable water resources is a determining factor for the future.
- Ensuring food security (SDG 2), reducing poverty (SDG 1), remedying water shortages (SDG 6.4), ensuring universal access to drinking water (SDG 6.1) and, more generally, achieving SDGs 2, 6, 13 and 15 together requires, in many areas, a mix of solutions that includes increasing the mobilizable resource, including, where necessary, through greater use of non-conventional water. In 2022, more than 21,000 desalination plants were in operation worldwide, with the sector expanding by + 6% to +12% in capacity per year (source: IFRI, Géopolitique du dessalement d'eau de mer, 2022).
- The FWP Water, Soils, Agroecology and Food security WG's focus note on groundwater highlights the potential importance of gravity-fed irrigation for recharging aquifers that play a major role in ensuring access to drinking water, using the Crau aquifer (France) as a case study.
- The FWP Water, Soils, Agroecology and Food security WG's focus note on agroecology will present case studies on landscape and agricultural management approaches that can contribute to water harvesting, improved infiltration and groundwater recharge.
- The SESAME 3 seminar addressed the case of mountain water resources and the conditions for their agro-silvo-pastoral and ecological restoration.

5. MULTI-STAKEHOLDER, MULTI-LEVEL GOVERNANCE AND A CULTURE OF COMPROMISE TO ENSURE COHERENT COLLECTIVE ACTION FOR WATER, SOILS, BIODIVERSITY, AND AGRICULTURE.

Coherent collective action - across private and public actors - for water, soils, biodiversity and agriculture requires governance that involves all stakeholders and a culture of compromise at several territorial levels (living areas, river basins, provinces and countries), ensuring mutual inspiration among them. This governance must lead to effective regulations at each level and to assessments based on the systemic logic of the SDGs.

The "territory of life" is a space with recognized challenges and specificities, where local stakeholders concerned by these various SDGs - local authorities and rural communities, men and women, agricultural leaders and innovative farmers, other water users, foresters, NGOs, etc. - can and should collectively define appropriate solutions, with support from public authorities and within the framework of precise governance rules aimed at fostering compromise, but which may require arbitration. Shared diagnoses and territorial projects that combine a wide range of actions without setting them in opposition can restore effectiveness and coherence to public, community and private action, tailored to each specific context.

The rise in conflicts over access to water between cities and rural communities calls for such spaces for dialogue among all water users, as well as strengthening urban actors' understanding of rural specificities and challenges.

Achieving large-scale change requires action across multiple territorial levels, from local to national, including provinces and river basins (planning scales), as well as positive cross-fertilization between these levels. Laws, strategies, policies and public support must be aligned, grant stronger responsibilities to territories, and consider lessons learned from the field.

The Water4allSDGs application (https://water4allsdgs.org), developed by the FWP, is a useful tool for project developers and those involved in water-related projects, planning or policies. It enables them to easily and freely assess their impact on the targets of the 2030 Agenda, and thus determine the extent to which these projects, plans or policies, actually contribute to the Agenda.

Water 4all SDGs

Water4allSDGs supports the Sustainable Development Goals

Notes et references :

- The need to restore coherence and efficiency to collective, private and public action, and to adapt “territories of life” to the new climate reality, led France to introduce a new approach to water and agriculture governance at local level: the PTGE (“Projets de Territoires de Gestion de l’Eau“ - Water Management Territory Projects implemented in France). The FWP focus notes on "agroecology and climate change" will provide examples of this approach. This procedure, at the scale of a territory of life, invites the stakeholders concerned to agree on a shared diagnosis and on an action plan of general interest.
- In developing countries, women play a key role in subsistence agriculture, particularly on very small farms that do not produce enough to meet family needs, leading young men to seek work in cities. Rural women, by organizing into groups or women’s cooperatives in agri-food or rural crafts, or by developing agritourism, can also play an important role in increasing locally-produced added value and diversifying the rural economy.
- The "territory of life" is not just a "laboratory" where collective, private and public action can regain coherence and effectiveness, but also a space where local development dynamics can be organized to generate greater wealth and, in developing countries, move beyond survival strategies that often lead to degradation of the water-land-agriculture nexus.
- The CGAAER / FWP report "Water and food security", through three case studies (Angat reservoir in the Philippines, Cauca valley in Colombia and Chambo valley in Ecuador) documented by FWP member NGOs and Coalition Sud, showed that in the face of increasing conflicts over water access between cities and rural communities in developing countries, the problem often stems less from resource scarcity than from its management, and that in general, mutually beneficial solutions can be reached once a balanced dialogue between urban and rural stakeholders has been established.
- Source: https://agriculture.gouv.fr/sites/default/files/documents/pdf/Eau_et_securite_alimentaire_VF_31-07-2012_cle4f7f21.pdf

6. STRENGTHENING THE CAPACITIES OF RURAL STAKEHOLDERS: COMMUNICATING, ORGANIZING COLLECTIVELY, AND INTERACTING POSITIVELY FOR AGRICULTURAL DEVELOPMENT.

Strengthening the capacities of all rural stakeholders and their ability to communicate, organize themselves collectively and interact positively with each other and with other stakeholders, in terms of natural resource management and agricultural and rural development, is a key factor in ensuring territorial sustainability. This involves training in the agroecological approach, renewed R&D and support for collective action.

Over time, rural people have developed invaluable know-how, including in the social management of water at the scale of catchment basins (associated canals and irrigated perimeters), knowledge that is too often overlooked. Today, they need recognition, to be better heard and, in developing countries, access to collective responsibility, credit, markets and land tenure security.

The adoption of an agroecological approach relies in particular on initial and continuous training in agronomy and the integrated management of water, soils and agriculture, targeted at farmers and agricultural advisors.

Several examples show that the transition to controlled management of overexploited groundwater (sustainability objective), as well as the restoration of degraded and collectively used pastoral areas, require the proper application of the principles of Elinor Ostrom, winner of the 2009 Nobel Prize in Economics for her work on the governance of "Common Pool Resources" (see Glossary), in line with collective objectives defined through consultation with all stakeholders. Where necessary, the reality of land and water uses must be clarified and recognized, and territorial community management institutions with sufficient prerogatives and capacities must be established.

Notes et références :

- The SESAME 2 seminar, which focused on entrepreneurial and territorial dynamics in small-scale farming, highlighted the strategic importance, in developing countries, of improving small-scale producers' access to markets and to credit suited to agricultural investment needs, as this is crucial for their ability to invest in irrigation and, more generally, for the success of sustainable agricultural and rural development.
- Examples of success stories documented by the FWP Water, Soils, Agroecology and Food Security WG, the SESAME seminars and the focus note on groundwater (Desert wells in Niger, recovery from overexploitation of the Bsissi (Tunisia) and La Mancha Oriental (Spain) aquifers, regaining water quality in the Xermaménil drinking water catchment area in France, preservation of the Crau aquifer) all confirm strengthening capacities and social capital is indeed key to the sustainability of territories.
- ·In Morocco, the large-scale development of no-till farming and agroforestry, as presented by the Director of INRA - Morocco during SESAME 7, relies in particular on a broad training program for farmers (as well as for administration and agricultural advisers) and on demonstration platforms.

Notes et références :

- The focus note on groundwater explains the principles of Common Pool Resources management defined by Mrs Ostrom, whose application enabled the transition to sustainable management of the Raymond (California), Bsissi and Mancha Oriental aquifers, documented in the note. Conversely, the focus note highlights the failure of purely top-down approaches.
- In the framework of the CGAAER/FWP report on "Water and food security", case studies 4, 5 and 6 - on the efficiency of irrigated systems in Senegal, Cambodia and Ethiopia - showed that it largely depends on irrigators' ability to organize collectively as well as on secure land tenure. In the Prey Nup perimeter in Cambodia, the creation of a Community of Polder Users (CUP) bringing together 15,000 irrigators, and the issuance of 22,000 land titles, led over 8 years to a 165% increase in yields and the emergence of a lively, democratic associative network that helped restore cohesion to a society shattered by the Khmer Rouge.

7. FINANCING THE RISK-TAKING INVOLVED IN SHIFTING AGRICULTURAL MODELS AND THE SERVICES PROVIDED BY RURAL COMMUNITIES FOR WATER, THE ENVIRONMENT, BIODIVERSITY AND CLIMATE.

Supporting the transition to sustainable agricultural and rural development also means backing the risks associated with changing agricultural models and financing the services provided by rural communities to water, the environment, biodiversity and climate.

New economic instruments could be introduced to finance what is of major public interest for water but is not remunerated by the market. With support for conversion to agroecology, many farmers would be willing to take the risk of embarking on a transition. Payments for environmental services (see Glossary) would be particularly useful to compensate the costs of temporarily resting certain pastures for ecological restoration, to reward and enhance increases in soil carbon stocks, or to engage rural communities in land management that improve water conservation and infiltration and restore degraded areas of common interest (ponds, shallows, ditches, etc.).

While short-term profit and survival strategies can threaten assets of common interest, agricultural and rural transformation will only take place on a large scale if all those who can and should contribute have the capacity to engage and see clear benefits in doing so.

GLOSSARY

Adaptation Actions that contribute to reducing vulnerability to the current or expected effects of climate change.

Sector of Agriculture, Forestry and Other Land Use / Sector of Land Use and its Changes, Agriculture and Forestry The land and bioeconomy sector as analyzed by the IPCC. A key economic sector to be considered not only in terms of food security and employment, but also in terms of vulnerability, climate action (adaptation, mitigation), sustainable development and water security.

Conservation Organic Farming (COF) Organic farming that, following the example of Conservation Agriculture, focuses on treating the soil as a living environment, improving its fertility, reducing erosion, contributing to climate change mitigation, and lowering mechanization expenses.

Soil conservation agriculture (SCA) Agriculture based on three interdependent principles adapted to local conditions and needs: **i)** minimal mechanical soil disturbance through direct placement of seeds and/or fertilizers, **ii)** permanent organic soil cover (at least 30 percent) using crop residues and/or cover crops, **iii)** species diversification through varied crop sequences and associations (FAO, 2001). SCA enhances biodiversity and natural biological processes above and below the soil surface, which helps to increase water and nutrient use efficiency and improves and maintains agricultural production.

Agroecology An integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of food and agricultural systems, aiming to optimize the interactions between plants, animals, humans and the environment while addressing social aspects necessary for a sustainable and equitable food system (FAO/Agroecology Coalition).

Mitigation (of climate change) Action aimed at reducing or avoiding greenhouse gas emissions caused by human activities.

Water balance A simple method used to monitor changes in the soil's water reserve (Readily Available Water). This estimate takes into account crop water needs, calculated from an assessment of adjusted potential evapotranspiration (PET), and natural inputs through rainfall or irrigation.

Bioeconomy The economy of photosynthesis and, more broadly, of living systems. It is based on the production and mobilization of biomass for optimal use. It maximizes the use of an abundant, renewable and free source of energy: solar energy. The bioeconomy encompasses production and processing activities involving biomass, whether from forests, agriculture or aquaculture, for food production, animal feed, bio-based materials and energy. (French Ministry of Agriculture, 2019).

GLOSSARY

Common Pool Resource A well-defined resource that benefits a group of right holders whose value to all decreases when each individual acts solely in their own interest. The value of a common pool resource can be reduced through over-exploitation.

Land degradation A change in the soil's health that results in a reduction in the ecosystem's capacity to provide goods and services to its beneficiaries (FAO).

Evapotranspiration The amount of water that evaporates through the soil, groundwater and plant transpiration.

Sustainable land management (SLM) Management and use of land resources, including soil, water, animals and plants, to meet evolving human needs, while ensuring both the long-term productive potential of these resources and the maintenance of their environmental functions.

Social water management A collective process implemented to ensure sustainable and equitable access to water resources for one or several communities.

Sustainable intensification (of agriculture) Increasing yields from the same land area while reducing the negative environmental impacts of agricultural production and enhancing the provision of environmental services (CGIAR, 2019).

Supplemental Irrigation Providing crops with an additional supply of water to compensate for temporary rainfall deficits and maintain sufficient soil moisture levels during dry and critical periods.

Precision irrigation A method aimed at adjusting water quantities intelligently, adapting them precisely to the actual needs of the crops.

Resilience irrigation Characterized by three components:

- **i)** to rely on more water-saving practices by focusing on securing agricultural production;
- **ii)** leveraging crop rotations or cultivation practices to make reduced water inputs more efficient;
- **iii)** managing crops not for maximum production, but for an optimum that balances agricultural profitability and water savings.

(CGAAER and CGEDD Interministerial report Climate change, water and agriculture: what trajectories for 2050? Ministries of Agriculture and Ecology, 2019.)

Land Degradation Neutrality (LDN) A state in which the quantity and quality of land resources needed to support ecosystem functions and services and to enhance food security remain stable or increase within given temporal and spatial scales and in a given ecosystem (UNCCD, 2019).

GLOSSARY

(Adaptation) options Strategies and measures available and appropriate to address adaptation.

Payments for environmental services (PES) Mechanisms that provide financial compensation to farmers for actions that contribute to restoring or maintaining ecosystem services that benefit society (water quality preservation, carbon storage, landscape protection, etc.) (Ministry of Agriculture, France).

Water Reuse Use of water that already served another purpose, after appropriate treatment.

Food security A situation in which all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. The four main dimensions of food security are availability, access, quality and stability – i.e. the stability of the other 3 dimensions over time (World Food Summit, 1996).

Water security The availability of an adequate quantity and quality of water to sustain socioeconomic development, livelihoods, health and ecosystems worldwide, without exceeding the resource's capacity for renewal (World Water Council, 2018). Council, 2018).

Ecosystem services (ES) Benefits provided to human societies by ecosystems. Four main categories are distinguished: provisioning services (food, fibre, etc.), regulating services (pollination, climate regulation, etc.), socio-cultural services (aesthetic, spiritual, recreational aspects, etc.) and support services which are necessary for the production of all other services and ensure the proper functioning of the biosphere, in particular the major water and carbon cycles and soil formation. (Millennium Ecosystem Assessment).

SESAME (Seminars on Water and Food Security in the Mediterranean) A North-South platform for reflection, ranging from science to policy and field practice. Co-led by the General Councils of the Ministries of Agriculture of France and Morocco, SESAME seminars were extended from their second edition to include Sahel countries. A total of seven seminars were held between 2014 and 2021.

Water Harvesting in agriculture Agricultural systems that collect rainwater and runoff for productive purposes, instead of allowing it to become a source of erosion. Water harvesting techniques support the objective of SLM (sustainable land management) and, in drought-prone semi-arid regions, help improve yields and production resilience.

FRENCH WATER PARTNERSHIP

The French Water Partnership (FWP – Partenariat Français pour l'Eau – PFE) is a key platform of French water stakeholders active internationally.

For nearly 20 years, the FWP has been advocating at an international level to improve the way water-related issues are considered in various actions and policies. The FWP stimulates know-how exchanges between France and other countries by promoting a unique approach: multi-stakeholders, collaborative, and innovative - rooted in the French tradition of water management since the 1960s.

Together with its members, the FWP develops common messages about water resources and promotes them in European and international arenas such as the United Nations Water Conferences, the World Water Forums, the Stockholm World Water Weeks, the COPs on climate change, biodiversity, and desertification, as well as the High-Level Political Forums on the Sustainable Development Goals.

The French Water Partnership is a network of expertise that gathers public, private, and civil society actors, organized into six colleges: the Government and its public bodies; NGOs, associations and foundations; Local authorities and members of parliament; Economic stakeholders; Research and training institutions; French and foreign individuals.

french water partnership
fwp pfe
partenariat français pour l'eau