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SWISS CONFEDERATION

2024 GREEN BOND ALLOCATION AND IMPACT REPORT

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INTRODUCTION

The rationale for Green bond issuance

To bolster Switzerland's commitment to sustainability and to establish its financial center as an international leader in sustainable financial services, the Federal Council decided in November 2021 to include Green Confederation Bonds in its funding strategy. The Federal Council also aims to further increase transparency about public green expenditure and its impact. Given that parliament ultimately has to approve any type of expenditure independent of its funding, sovereign green bonds do not lead to more environmental projects and spending. Nonetheless, the Green Confederation Bond is expected to have numerous benefits, such as strengthening the application of international green bond standards in Switzerland, providing investors with an additional sustainable asset class and encouraging the issuance of further green bonds by private and public players. This in turn will enhance the competitiveness of the Swiss financial center in sustainable finance and could also lead to more investments and projects with a positive environmental impact over time.

Commitment to reporting

The Swiss Confederation is committed to ensuring full transparency about the issuance of Green Confederation Bonds. Investors will be provided with an allocation and impact reporting annually until full allocation of proceeds. The reporting is based on the Swiss Confederation's Green Bond Framework (July 2022) and follows the requirements of the International Capital Markets Association's (ICMA) Green Bond Principles (GBP). The reporting can be adjusted in the case of new requirements and developments regarding the content and type of reporting.

The Swiss Confederation follows, to the greatest extent possible, the recommendations presented in the ICMA Harmonized Framework for Impact Reporting (June 2021). Both the allocation and impact reporting will be published on the website of the Swiss Confederation in the year following each issuance. The impact report will be available publicly until bond maturity.

The allocation report shows that the proceeds have been allocated in accordance with the present Green Bond Framework's criteria for eligible green expenditures. The report includes general information about the issuance of the past year and a detailed list of allocated proceeds, including a break-down by type of expenditure. Moreover, the amount of total identified eligible green expenditures is also reported.

The impact report outlines the environmental impact achieved with the green expenditures where Green Bond issuance proceeds have been allocated to. The report includes a detailed description of the allocated green expenditures and the environmental objectives of these expenditures. Specific impact and output results form the core of the report.

ALLOCATION REPORTING

Green Confederation Bond

In October 2022, the Federal Treasury issued Switzerland's first sovereign green bond (CH0440081567, 1.50%, 10/26/38) with a volume of 766 million Swiss francs. In 2023, the Federal Treasury then increased the Green Confederation Bond by another 671 million Swiss francs. In 2024, the bond was further tapped for a total of 621 million Swiss francs across three auctions, which were once again met with solid market demand. As a result, the total outstanding volume of the Green Confederation Bond reached 2'059 million Swiss francs by the end of 2024.

The financing instrument will enable the proceeds to be allocated to green expenditures that have already been approved by Parliament, with a one-year lookback period. An analysis of the federal budget based on the 2023 state financial statements identified green expenditure of around 4.8 billion Swiss francs, primarily in the areas of public transport, biodiversity, green buildings, international cooperation and research.

The framework adopted by the Federal Council during its meeting on 17 August 2022 forms the basis for issuing Green Confederation bonds. It shows how the bonds are integrated into the Confederation's sustainability strategy, which expenditures from the federal budget can be classified as green and how reporting is set up. When preparing the framework, the Confederation was guided by the GBP of the ICMA, which are considered the market standard internationally. The Confederation has also taken into account the EU Taxonomy to some extent despite not being subject to the regulation (i.e. the eligibility criteria for the eligible green expenditures criteria follow the substantial contribution criteria of the EU Taxonomy on a best effort basis). ISS ESG was commissioned to provide an external review (ISS ESG in July 2022) of the framework.

In accordance with the selection process described in the framework, the proceeds from the issue have been linked to expenditures in the federal government budget that contributes to fulfilling Switzerland's environmental and climate objectives, the UN Sustainable Development Goals (SDGs) and the Paris Agreement (PA) among others. This report presents how the proceeds of the year 2024 are distributed among the different eligible areas of expenditure of the year 2023. The report also includes output and impact statements outlining the positive environmental impacts of the green expenditure if such information is available.

Allocation Overview

The Swiss Confederation tapped the Green Confederation Bond (CH0440081567, 1.50%, 10/26/38) three times in 2024, thereby raising proceeds of 621 million Swiss francs. This increased the total volume outstanding of the bond to 2'059 million Swiss francs.

An additional 600 million Swiss francs are counted to the 2024 issuance proceeds attributable to so called "own holdings", thereby increasing the total 2024 issuance proceeds to 1'221 million Swiss francs and the volume outstanding of the bond to 2'659 million Swiss francs.

The recognition of the "own holdings" to the 2024 issuance proceeds follows the conversion of the previously "own tranches" to "own holdings" in August 2024. These own tranches were Confederation bonds that were prepared for issuance as part of an auction but were not yet placed. Previously, own tranches could be sold individually between the auction dates if required, allowing this final step in the placement process to be completed. These own tranches have now been fully paid up and thus converted into own holdings of bonds. This creates new opportunities for the Federal Treasury. In particular, own holdings of bonds can be used as collateral on the repo market, providing an additional financing instrument.

The issuance proceeds in 2024 can be attributed to expenditures that are classified as green according to the categories described in the Framework. The 2023 State Financial Statements include approximately 4.8 billion Swiss francs in expenditures that meet these requirements. The issuance proceeds in 2024 represent approximately 25 percent of available eligible green expenditures in the 2023 State Financial Statements. Proceeds were managed according to the process defined in the Framework. No proceeds were allocated to expenditures that are excluded according to the Framework.

Issuance proceeds were only allocated to eligible green expenditures of the 2023 financial statement. The expenditures from the 2024 budget would also be eligible in principle. However, since the issuance volume was significantly lower than the eligible expenditures according to the 2023 state financial statement, the expenditures from the 2024 budget were not used. The green bonds have become an integral part of the Confederation's issuance program since the first issue. Therefore, the expenditures from the 2024 budget (respectively the 2024 state financial statement) can be allocated to the Green Confederation Bond issues in 2025. It should be noted that the allocation to the individual categories is not proportional to the total amount of eligible expenditures in the individual categories. This allows for a meaningful representation of the different areas of responsibility within the federal budget. This is especially true for the smaller categories in terms of volume, which nonetheless make an important contribution to achieving the federal government's sustainability goals.

The following table shows how the 2024 issuance proceeds are mapped to the available green expenditures from the 2023 state financial statement. In addition, each category shows which UN SDGs the expenditures correspond to and which expenditures were selected within each category. It is important to note that some of the total eligible green expenditures include expenditures (other budget items) to which no funds were allocated, as the total volume of green eligible expenditures exceeds the issuance proceeds.

Category	Eligible green expenditures (State financial statement 2023)		Responsible Federal office / Selected expenditures (budget item and name)	Allocation		SDG
	in CHF million	*in % of total eligible green expenditures*		*in CHF million*	*in % of total allocation*	
Clean transportation	3'638.0	75.8 %	Federal Office of Transport / A236.0110 Deposit railroad infrastructure fund	741.4	60.7 %	7, 11, 13
Agriculture, forestry, natural landscapes and biodiversity	886.2	18.5 %	Federal Office for Agriculture / A231.0234 Direct payments agriculture, biodiversity contributions	224.3	29.1 %	13, 14, 15
			Federal Office for the Environment / A236.0123 Nature and landscape	96.2		13, 14, 15
			Federal Office for the Environment / A236.0126 Revitalization	35.4		13, 14, 15
Green buildings and energy efficiency	118.7	2.5 %	Federal Office for Buildings and Logistics / A201.0001 Investments (global budget)	40.2	3.3 %	7, 11, 13
Renewable energy	0.0	0.0 %	No available expenditures in the 2023 state financial statements	0.0	0.0 %	7, 13
International cooperation	72.6	1.5 %	Federal Department of Foreign Affairs / A231.0330 Contributions to multilateral organizations	37.4	5.9 %	13, 15, 17
			Federal Office for the Environment / A231.0322 Multilateral environmental funds	35.3		13, 15, 17
Research, Innovation and awareness-raising	85.0	1.8 %	Agroscope / A200.0001 Functional expenses (global budget)	11.3	0.9 %	7, 13, 15
Total	**4'800.5**	**100 %**		**1'221.4**	**100 %**	

Clean Transportation

(Share of total allocation: 60.7 %)

The federal government finances the operation, maintenance and expansion of the railroad infrastructure via the Railway Infrastructure Fund (RIF). With the RIF, the federal government is making an important contribution to keeping the Swiss rail network and its infrastructure efficient. The Swiss electorate approved the financing and expansion of the railroad infrastructure in 2014, thus laying the foundation for the creation of the fund. In addition to various earmarked revenues, which are excluded in the Framework, just about 50 percent of the RIF is financed from the general federal budget (equivalent to 2.9 billion Swiss francs in 2023). Under the Framework, the funds from the general federal budget are eligible for the Green Confederation Bonds. By allocating 741 million Swiss francs and thus the largest share of the issuance proceeds to the RIF expenditure, the high importance of rail transport is underlined.

Agriculture, Forestry, Natural Landscapes and Biodiversity

(Share of total allocation: 29.1 %)

Various expenditures in the area of biodiversity and sustainable agriculture are summarized under this category. For the allocation of the proceeds, we focus on the budget item of direct payments to agriculture sector, primarily to biodiversity contributions within this budget item. Over the years, many of the habitats in agriculture that are valuable for biodiversity have disappeared. Reasons include increasing mechanization and intensification of land use. With the biodiversity contributions, the federal government wants to counteract this development and financially compensate farmers for the adapted use of their land. In particular, the objective is to prevent the decline of priority species and valuable habitats on agricultural land. In total, issuance proceeds of 224 million Swiss francs are allocated to the total biodiversity contributions.

In addition to the biodiversity contributions in the area of agriculture, a part of the issuance proceeds are allocated to eligible expenditures of the Federal Office for the Environment (FOEN). On the one hand, this includes the eligible expenditure in the “Nature and Landscape” budget item used to promote biodiversity, species diversity and landscape (including biotopes of national importance and mire landscapes of outstanding beauty, UNESCO World Natural Heritage sites). On the other hand, the FOEN makes contributions to the planning and implementation of measures for the revitalization of water bodies with the budget item “Revitalization” based on the Flood Protection Act. A total of 132 million Swiss francs are allocated in total for Natural Landscapes and Revitalization.

Green Buildings and Energy Efficiency

(Share of total allocation: 3.3 %)

The federal government has a large real estate portfolio to house the civilian parts of the Federal Administration. Sustainability plays a major role in the management of the real estate portfolio, which comprises several thousand buildings and objects, and in particular in reducing greenhouse gas emissions and the environmental impact of pollutants. To achieve this goal, the federal government applies a combination of the three basic impact mechanisms: Higher efficiency (less energy per service provided), consistency (use of energy with lower impact), and sufficiency (lower services provided). In doing so, the federal government consistently relies on materials that release as few pollutants as possible into the biosphere over their entire life cycle. Specific examples include energy renovations that take into account the proper life cycle, the replacement of oil and natural gas heating systems, or the expansion of electricity and heat production on suitable infrastructure sites. Issuance proceeds are allocated to the two projects with the largest eligible expenditures incurred in 2023. These are the second stage of the construction of administration buildings at Guisanplatz 1 in Berne and the third stage of the construction of the new administration buildings in Zollikofen. Together, these expenditures amounted to just over 40 million Swiss francs.

International Cooperation

(Share of total allocation: 5.9 %)
Switzerland's international cooperation aims to reduce poverty, hardship and global risks and promote peace. One of the Federal Council's strategic goals is to combat climate change and its effects on the environment. Natural resources are to be managed sustainably. In recent years, Switzerland has steadily expanded its commitment to combating the advance of climate change and the associated impacts on millions of people. It does this in particular through contributions to multilateral environmental funds (including the Green Climate Fund [GCF] and the Global Environment Facility [GEF]). Proceeds of 73 million Swiss francs are allocated to this area.

Research, Innovation and Awareness-raising

(Share of total allocation: 0.9 %)
In addition to concrete measures in the areas described above, the Swiss Confederation is also active in basic research in the field of sustainability. This particularly includes "Agroscope", the center of excellence for agricultural research, which makes a significant contribution to sustainable agriculture and the food industry, as well as to an intact environment, and thus to improving the quality of life. Research is carried out along the entire value chain of the agricultural and food industry. Furthermore, there are research programs in the field of energy research, energy efficiency and to increase the share of renewable energies within the Swiss Federal Office of Energy. In some cases, financial aid is paid to private-sector actors to support innovative projects at the development stage. 11 million Swiss francs of the Green Confederation Bond are allocated to the eligible green expenditures from Agroscope.

ESG risk management

The identification and monitoring of ESG risks are important aspects when issuing green bonds. The processes within the Federal Administration, the Swiss legal system, and Switzerland's direct democratic processes ensure that all new federal legislation and projects are thoroughly analyzed.

On the one hand, any new law has to be assessed in terms of its expected impact on the environment. This assessment is part of the legislative process and done by the Federal Administration. On the other hand, there are many opportunities for third parties outside the administration (e.g. lower levels of government, political parties, interest groups) to influence the legislative process. These opportunities exist both before and after laws are passed by the Federal Council and Parliament. Since every federal expenditure must have a legal basis, this process is indirectly applied to all new expenditures.

The available green expenditures are reviewed at least once a year by an interdepartmental working group of the Federal Administration ("Green Bond Working Group", GWG). The FOEN and the Federal Finance Administration are represented in the working group. In addition, various offices of the Federal Administration that have potential green expenditures are consulted. The GWG will call on experts on specific topics to confirm, refute or raise points of attention in the verification of eligibility of new or current eligible expenditure. This process will ensure that any changes in underlying expenditures can be identified and assessed at an early stage and the eligible expenditures comply with the applicable framework. Potential ESG controversies will also be investigated as part of this review. In this context, the market standards are used as a guideline for eligibility. If there are relevant changes to the defined categories, processes or eligible expenditures, the framework will be updated.

The GWG has determined the allocation of issuance proceeds to eligible expenditures in collaboration with the relevant offices of the Federal Administration. In addition to the appropriate representation of the various categories of expenditure, care has also been taken to ensure that reporting is as meaningful and illustrative as possible. The GWG is responsible for the allocation and impact reporting. This report is compiled and published in the year following the issuances of Green Confederation Bonds in 2024. The impact of the allocated expenditures is described in detail in the following part of this report.

OUTPUT AND IMPACT REPORTING

Reporting guidelines and limitations

The impact report outlines annually the environmental impact of the use of the Green Bond proceeds. The report includes both qualitative and quantitative measurements of output and impact generated over the reporting period on an ex-post basis.

After the issuance of the inaugural Green Confederation Bond in 2022, the bond was increased by 671 million Swiss francs in 2023. In 2024, the bond was further increased by 1'221 million Swiss francs (including the conversion of 600 million Swiss francs own tranches into own holdings). As a result, the total outstanding volume of the Green Confederation Bond reached 2'659 million Swiss francs by the end of 2024. In the context of the Green Bond Reporting 2024, these proceeds will be allocated to eligible green expenditures that have already been approved by the Swiss Parliament, with a one-year lookback period. The 2024 issuance proceeds make up only around 25 percent of the eligible green expenditures of 2023. In order to still enable a meaningful reporting, where it seems appropriate or is not otherwise possible, the positive environmental impact of the total eligible expenditure is described in the impact report and not only the part of the expenditure that received allocation from the issuance proceeds. In other words, the impact reporting is based on a portfolio approach and aligns with the reporting requirements of the ICMA Green Bond Reporting Guidelines (June 2021). As the impact is based on a portfolio approach, no estimates are provided about lifetime results or project economic life in years.

To maintain a high level of comparability and consistency among the Green Bond reports, the issuance proceeds were assigned to the same categories as in the previous year.

In addition, to provide an insight into individual projects, the annual impact report also contains selected case studies for individual categories of eligible green expenditures. This year's report includes case studies for the category green buildings and energy efficiency as well as international cooperation.

The remainder of this report is structured as follows: The table below summarizes the outcome and impact indicators for all categories of eligible expenditure in a table. The next chapters contain a description of the expenditure and the impact achieved for each category. The reporting is based on the budget items of the federal government.

Summary of outputs and impacts

Category	Summary	Key indicator
Clean transportation	Highly positive impact of a safe, cost-effective, energy-efficient and largely greenhouse gas-neutral transportation thanks to an expanded and well-maintained railway infrastructure	• Share of electrified railway network • Passenger and freight transport performance • Modal split share of rail in transalpine combined transport
Agriculture, forestry, natural landscapes and biodiversity	Relevant and broad-based spending to strengthen and restore declining biodiversity, for example in agriculture and water bodies	• Hectares of sustainable agriculture • Kilometer of revitalized waterbodies
Green buildings and energy efficiency	Demanding building standards and high sustainability requirements help to sustainably accommodate the Federal Administration using green and efficient construction methods	• Heat consumption per m^2 • Energy demand oil heating and natural gas heating systems • Energy generated by PV
Renewable energy	No available expenditures in the 2023 state financial statements	
International cooperation	In order to fulfill its commitments under the international climate conventions, the Swiss Confederation participates in various international funds that contribute to positive environmental impacts of global significance	• Expected CO_2 e avoided • Total beneficiaries • Hectares of natural resources improved
Research, innovation and awareness-raising	Basic research in the field of sustainable agriculture leads to a higher awareness of environmental challenges and contributes to an intact nature	• Number of practice-oriented and scientific publications • Participation in specialist events

In general, for greenhouse gas emission related key impact indicators the emission factors of the Swiss greenhouse gas inventory have been used.[1]

[1] https://www.bafu.admin.ch/bafu/en/home/topics/climate/state/data/greenhouse-gas-inventory.html

Clean transportation

Financing of the rail infrastructure fund

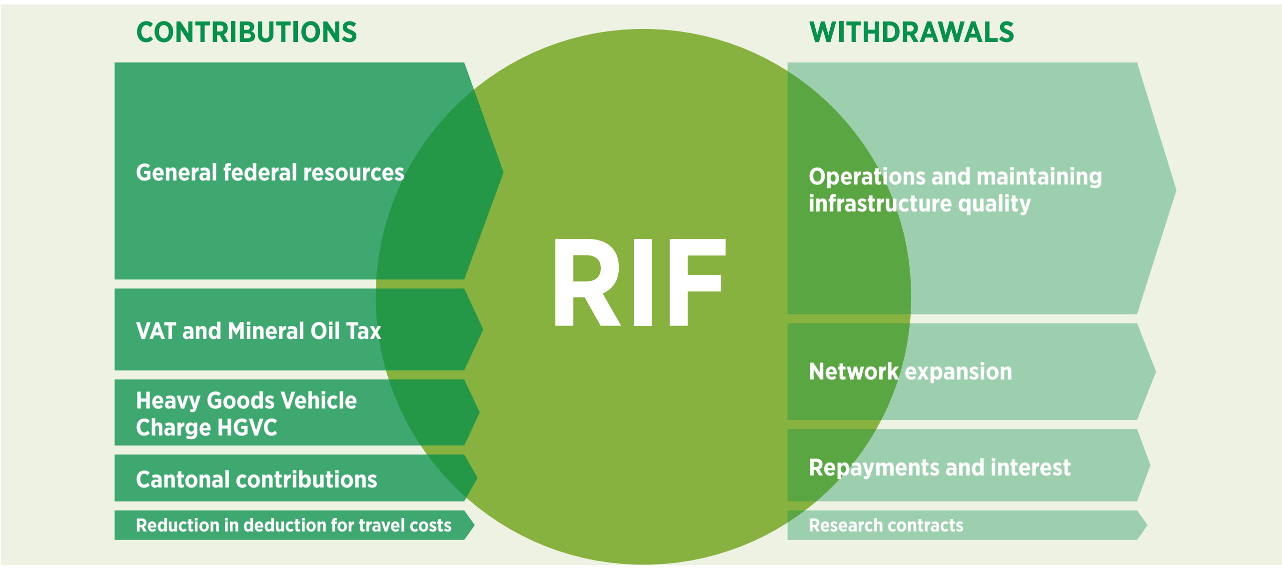
(Federal Office of Transport, A236.0110 "Contribution to the railroad infrastructure fund")

To achieve the sustainability goals of the federal government, public transport plays a decisive role. In order for freight and passenger transport to increasingly take place by rail, an expanded and well-maintained railway infrastructure is of great importance. The rail infrastructure in Switzerland provides the population with a safe, cost-effective, energy-efficient and largely greenhouse gas-neutral transport alternative. At the same time, the rail network is used for a considerable part of daily freight transport, especially transalpine freight transport. In addition to the high use of this transport option, it is particularly noteworthy that almost all trains are electrically powered. The largest public transport company (Swiss Federal Railways, SBB), for example, runs virtually all trains on electric power, which draws 100 percent of its energy from renewable sources.

To keep the railroad infrastructure up to date, regular investments and maintenance work are required. Switzerland finances the operation, maintenance and expansion of the railroad infrastructure via the RIF. The RIF is a legally independent fund with its own financial accounts. The RIF receives an annual contribution of around 5.7 billion Swiss francs (2023) from the federal budget, of which around half is financed by earmarked revenue. Until the end of 2020, the fund could additionally borrow from the Confederation. The debt (2023: 5'102 million Swiss francs) is interest-bearing and is expected to be repaid by about 2031. Two thirds of the RIF's resources are used for the operation and maintenance of the railroad infrastructure. Around one billion Swiss francs per year is invested in the expansion of the rail infrastructure.

The funds for infrastructure maintenance have legal priority. In this way, the Swiss Confederation wants to ensure that the infrastructure remains in a well-maintained and efficient condition. The gradual expansions will eliminate bottlenecks in the rail system, increase capacity at major rail hubs such as Geneva, Basel and Berne and expand the rail network. On the one hand, this will make it possible to absorb the rising demand for traffic (passenger and freight trains), and on the other hand, it will increase the range of public transport services. This includes, for example, the introduction of half-hourly or quarter-hourly service on frequently used sections of line. The RIF also provides funds for research contracts in order to clarify fundamental issues relating to the operation, maintenance and expansion of the railroad infrastructure.

Rail infrastructure fund (RIF)



Impact of the expenditure

Accurate impact measurement based specifically on the allocation of issuance proceeds to clean transportation expenditures is nearly impossible because the funds for rail infrastructure receive only a relatively small allocation from the Green Bond. To consider the positive environmental impact of rail, the totality of this spending must be considered. In addition, the maintenance and expansion of the infrastructure is required by law. The impact of the very well-developed railroad infrastructure and the high use for passenger and freight transport undoubtedly has a high and positive effect on Switzerland's greenhouse gas emissions. For example, an analysis by the SBB shows that around 10 percent of Switzerland's total emissions are avoided each year thanks to the modal shift to rail.[2]

This corresponds to around five million tons of CO_2 per year. In this context it is important to note that the Swiss railway network is already over 99 percent electrified. For example, SBB trains already draw 100 % of their energy from renewable sources.

The following table shows how various metrics have been developed over time, also thanks to the investments of the Rail Infrastructure Fund (RIF). These metrics also illustrate the positive environmental impacts that can be achieved through rail infrastructure with economic development. It should be noted that not all of the federal government's contribution to the RIF can be attributed to the Green Confederation Bond, as about half is funded by earmarked revenues. In turn, of its total eligible expenditures in 2023, only about 25 percent was allocated from the Green Confederation Bond. Accordingly, only a proportional share of the indicators shown can be considered an impact of the green bond. Furthermore, it should be emphasized that in addition to SBB, there are another 35 transport companies that transport passengers and goods on the Swiss railroad infrastructure and benefit from the investments of the RIF.

Indicator	Unit	Status end 2021	Status end 2022	Status end 2023
Share of electrified railway network SBB only (Source: SBB)	%	100	100	100
Passenger transport performance (pkm) of railroad operators (Source: Federal Statistics Office)	Billion	14.35	19.40	22.36
Freight transport performance (net Tkm) of railroad operators (Source: Federal Statistics Office)	Billion	10.39	10.48	9.88
Greenhouse gas emissions from energy consumption SBB only (Source: SBB)	tCO_2	70'985	70'271	61'207
Course km in regional passenger transport (RPV) (Source: internal database Federal Office of Transport, data collected electronically from regional transport companies)	Million km	339.82	350.79	357.85
Modal split share of rail in transalpine combined transport (Source: Federal Statistics Office)	%	74	74	76

[2] Climate protection | SBB: https://company.sbb.ch/en/the-company/responsibility-society-environment/sustainability/ environmental-protection/climate-protection.html

Agriculture, forestry, natural landscapes and biodiversity

Biodiversity contributions for agriculture
(Federal Office for Agriculture / A231.0234 "Direct payments agriculture")

Biodiversity is the variety of life. It enables many ecosystem services, for example pollination, natural pest regulation or the provision of recreational space, from which the whole of society benefits. Over the years, many of the habitats valuable for biodiversity have disappeared due to agricultural activities. Reasons include increasing mechanization and the intensification of land use.

With the biodiversity contributions, the federal government wants to counteract this development and financially compensate farmers for the adapted use of their land. In Switzerland, around 41'600 farms and around 6'700 summer pasture/alpine farms receive direct payments and biodiversity contributions. In particular, the objective is to prevent the decline of priority species and valuable habitats on agricultural land and in summering. In this way, the objectives and measures defined within the framework of the biodiversity contributions can also contribute to the achievement of environmental objectives in the field of agriculture. A total of around 449 million Swiss francs in biodiversity contributions will be paid out to farms in 2023 as part of the direct payment system in this area, accounting for 16% of all direct payments to agriculture.

In fact, there are two types of biodiversity contributions that support the so-called biodiversity promotion areas (or BFF, in German): Farmers are paid for the quality of the BFF, and/or for the connectivity of the areas. There are two levels of quality and accordingly levels of payments depending on the condition of the biodiversity in the area, more than half of the supported areas were of high quality in 2023. The payments for connectivity of an area are determined by how well the connectivity of ecosystems (or species habitats) in and between areas are secured. More generally, the biodiversity contributions seek to promote and accordingly reward the existence of extensive meadows and pastures, hedges, high trunk trees, and arable strips among others.

The quality contributions are fully financed by the federal government. In the case of the connectivity contributions, the federal government assumes a maximum of 90 % of the payment; the remaining share of financing is provided by the cantons, municipalities or private sponsors.

The biodiversity contributions are based on Article 73 of the Agriculture Act according to which the contributions support the conservation and promotion of biodiversity by agriculture.

Impact of the expenditure
Switzerland has been measuring and monitoring the impact of its agricultural practices on the environment since at least 1990. Thus, the Federal Office for Agriculture (FOAG) has been collecting information on a number of aspects including nitrogen and phosphorous cycles, biodiversity, soil, energy, and climate using internationally comparable indicators. The collected data and information allows the FOAG to assess the qualitative and quantitative impact of Switzerland's agricultural policy over the past three years. While initially all important environmental indicators improved, the performance over the past ten years has been more mixed. However, greenhouse gas emissions from agriculture have decreased. They stood at 6.54 million tCOe in 2023, almost 15% less than at the outset.

Also, the share of agricultural land supported with biodiversity contributions has been increasing; in 2023 a total of 199'007 hectares of agricultural land (19 % of the total agricultural land in Switzerland) and around 223'000 hectares of summer pastures in the Alps were supported with biodiversity contributions.

Indicator	Unit	Status end 2021	Status end 2022	Status end 2023
Agricultural land supported with biodiversity contributions in ha (and % of total agricultural land) (Source: Agrarumweltmonitoring, Federal Office for Agriculture)	ha (%)	190'609 (19 %)	195'413 (19 %)	199'007 (19 %)
Number of high trunk field fruit trees (Source: Agrarumweltmonitoring, Federal Office for Agriculture)	#	2'213'320	2'214'300	2'220'325
Greenhouse gas emissions from agriculture (Source: Switzerland's greenhouse gas inventory, Federal Office for the Environment)	tons CO_2 e (million)	6.73	6.58	6.54

Nature and landscape
(FOEN / A236.0123 "Nature and landscape")

The Swiss population cares about a healthy nature and landscape. Their beauty and diversity should also ensure a high quality of life and location in the future. The FOEN has multiple budget items including expenditure that meet the requirements of the framework and serve to achieve these objectives.

The expenditures in the budget item "Nature and landscape" (2023: about 96.2 million Swiss francs) are used for measures in favor of biodiversity (2023: 77 %) and landscape (2023: 23 %). Based on the Federal Act on the Protection of Nature and Cultural Heritage, the federal contributions support the implementation by the cantons on the basis of program agreements. Of the total 96.2 million Swiss francs, 94.5 million Swiss francs are eligible (1.7 million Swiss francs are financed through earmarked financing from road traffic). From the total 2023 issuance proceeds, 96.2 million Swiss francs are allocated to the budget item "Nature and landscape".

In the area of biodiversity, the eligible expenditure involves the planning, protection, enhancement and conservation of biotopes of national importance, mire landscapes of particular beauty and national importance, and other biotopes worthy of protection. In coordination with direct agricultural payments, contributions are paid to the agricultural sector for specific services. In addition, measures to promote biodiversity and habitat connectivity are supported.

In the area of landscape, federal expenditures are primarily used for measures in favor of landscapes and natural monuments of national importance, parks of national importance and UNESCO World Natural Heritage sites.

The budget item also covers support for conservation organizations operating throughout Switzerland, as well as research and training institutions for their activities in the public interest. Furthermore, some emergency measures in biodiversity are being financed via this budget item.

The legal basis for the expenditure is the Nature and Cultural Heritage Protection Act of 1.7.1966 (NHG; SR 451) and there in particular articles 13, 14, 14a, 18d and 23k NHG.

The expenditures contribute significantly to the preservation and promotion of biodiversity as well as to the quality-oriented further development of the landscape as a high-quality living, economic and cultural space. They serve to strengthen awareness and action competence for the promotion of biodiversity and landscape.

Impact of the expenditure
The program agreements (PA) with the cantons are geared towards effective implementation. The cantons are supported by the federal government throughout the entire cycle (goals and objectives, reporting, controlling and measures). Program objectives as well as performance and quality indicators are defined in the PAs. The cantons report to the federal government. On the basis of the controlling reports and on the basis of random samples, it is checked whether the PAs are being fulfilled as agreed.

The impact of the measures for the protection of biotopes of national importance is scientifically assessed by means of the Impact Monitoring Biotope Protection Switzerland (WBS). For this purpose, remote sensing and field surveys are carried out cyclically in all types of biotopes of national importance. This enables specific statements to be made about the condition and development of the areas studied.

Continuous monitoring is ensured in the area of biodiversity thanks to Biodiversity Monitoring Switzerland (BDM). The program has been running since 2001 and is based on cyclical sampling, which is carried out in a regular grid across the entire country. BDM thus provides insight into the state and development of biodiversity as a whole.

Basic monitoring in the area of landscape is carried out by the Monitoring Program Landscape Observation Switzerland (LABES). LABES uses around 30 indicators to record both the physical and the perceived quality of the landscape.

Monitoring Program LABES **Selected indicators**	**Unit**	**Status end 2021**	**Status end 2022**	**Status end 2023**
Annual change in urban greenery* (Source: Environmental Indicators and Biodiversity Indicators, Federal Office for the Environment)	%	-1.6	n.a.	n.a.
Areas designated for biodiversity** (Source: Report on Federal Financial Statement 2023, Volume 2B)	%	13.4	13.4	13.6

Selected indicators related to biotopes:
* Urban greenery is a characteristic element of urban landscapes. It is relevant to climate and biodiversity (cooling of cities; creation of biotopes). Please note that this indicator is only published every four years.
** Proportion of the Swiss national territory designated for the conservation of biodiversity or specific species.

Indicatore Name	State	Trend
Agricultural area	☹	☹
Attitude toward biodiversity	☺	☺
Biodiversity footprint	☹	☹
Butterfly Index	☹	☹
Deadwood	☺	☺
Diversity of species communities in meadows and pastures	😐	😐
Evolution of annual mean temperature		☹
Fragmentation of landscapes	☹	☹
Invasive alien species	☹	☹
Light emissions	☹	☹
Particularly valuable habitats	☹	☹
Red lists	☹	😐
Sealed area	☹	☹
Structure of watercourses	☹	
Swiss Bird Index®	😐	☺
Temperature of watercourses	😐	☹
Urban sprawl	☹	😐
Wildlife corridors	☹	😐

Indicators of the Monitoring Program LABES

Revitalization
(FOEN / A236.0126 “Revitalization”)

At first glance, Swiss water protection is a success story. A differentiated analysis, however, shows considerable deficits in the management of Switzerland’s water bodies. Great efforts are still needed both in the structure of streams, rivers and lakeshores and in water quality to achieve the best possible condition.

The watercourses in Switzerland have a high degree of obstruction. The background was to ensure flood protection and the creation of agricultural land in the 18th/19th to mid-20th centuries. For this purpose, wetlands were drained and watercourses were canalized and straightened. In addition, Swiss streams and rivers are highly fragmented, which prevents the free migration of fish.

Since the revision of the Water Protection Act (GschG in German) in 2011, the cantons are obliged to revitalize built-up or covered water bodies (rivers and lakeshores). The goal is to revitalize about a quarter of the obstructed watercourses in 80 years, which corresponds to a length of about 4’000 km. The federal government is providing approximately 35 million Swiss francs per year for this purpose.

Based on the Water Protection Act, federal subsidies support implementation by the cantons on the basis of program agreements or as individual projects. The share of federal subsidies amounts to 35–80 %. The legal basis for the expenditures is the Water Protection Act of 24.1.1991 (GSchG; SR 814.20) and there the Art. 38a GSchG. The cantons have partially delegated the task to the municipalities or private parties.

Flood protection projects can also receive an additional subsidy from the GSchG if they significantly exceed the required ecological minimum.

The implementation of revitalization projects is intended to achieve the following goals:

- Restoration of the natural functions of obstructed or covered watercourse sections (watercourses and lakeshores) with structural measures.
- The measures will restore site-appropriate habitats in the aquatic, amphibian and terrestrial realms along the watercourses.
- The measures promote aquatic longitudinal connectivity.
- The measures promote natural bedload dynamics.
- The measures promote momentum.

As a result of watercourse corrections and obstructions, aquatic biodiversity is threatened and has the highest proportion of extinct or threatened species.

To stop and reverse this trend in aquatic biodiversity, revitalizations are necessary. Against the backdrop of advancing climate change, the implementation of revitalizations is all the more needed in order to make water bodies more resilient.

Impact of the expenditure
Revitalized water bodies provide habitat for many native species, both in the aquatic and amphibian realms, as well as in terrestrial riparian areas. Through dynamic processes and constantly emerging and changing habitats, specialized species can become established, whereas in built-up monotonous waters, generalists with unspecific habitat requirements become established.

With revitalization, obstructions are removed and the section of watercourse has a near-natural or natural character after implementation. This can be verified by ecomorphological mapping. The main goal of revitalization is to reverse the trend of aquatic biodiversity loss.

Impact monitoring is conducted to better understand habitat and biodiversity impacts and to make future revitalization efforts more effective. Impact monitoring is characterized by the following features:

- Since 2020, recordings have been made throughout Switzerland according to a uniform concept and methods.
- Before/after pictures are taken (with an interval of several years between them).
- Abiotic and biotic indicators are assessed.
- Not all projects are evaluated, but a budget is defined per canton from which the recordings are financed (approx. 30 % of the projects are evaluated).
- Results are periodically evaluated and recommendations for action are to be derived from them.

Indicator	Unit	Status 2011	Status end 2021	Status end 2022	Status end 2023
Revitalized watercourse* (Source: internal, Federal Office for the Environment)	km	0	187	206	223
Revitalized lake shore* (Source: internal, Federal Office for the Environment)	km	0	8.3	8.4	8.5

* The calculations are made based on the information and data provided by the cantons. At the beginning of each year, the Federal Office for the Environment requests information on implemented rehabilitation projects from the cantons.

Green Buildings and Energy Efficiency

(Federal Office for Buildings and Logistics / A201.0001 "Investments")

The Federal Office for Buildings and Logistics (FOBL) is responsible for housing the civilian part of the Federal Administration. It provides the real estate for the federal offices and is responsible for its planning, construction, maintenance and operation.

In 2023, the FOBL's real estate portfolio comprised around 2'800 properties and 1'900 plots of land with an acquisition value of 9.8 billion Swiss francs in total. Among other things, the FOBL is responsible for 34'000 office workplaces, 28'000 of which are located in the Berne area. As a resource office, the FOBL plays a key role in terms of sustainability within the Federal Administration and sets an example for the business community and the public. The FOBL is committed to implementing the principles of the Federal Council's SDS 2030 and the UN 2030 Agenda for Sustainable Development. It takes into account further strategies such as the Energy Strategy 2050, the Climate Strategy, the Biodiversity Strategy, the Swiss Landscape Concept as well as the Baukultur Strategy, and is guided by generally applicable standards for sustainability. Furthermore, it follows the recommendations of the Coordination Conference of Construction and Real Estate Bodies of Public Builders (KBOB) and the Federal Procurement Conference (BKB).

In order to anchor the principle of sustainability centrally in the office, the FOBL adopted its sustainability strategy in 2019 and updated it in 2022. The understanding of sustainability here goes beyond the classic three sustainability dimensions. With an additional focus on processes, the FOBL continues to drive the consideration of sustainability aspects in its structures, activities and projects. The FOBL publishes yearly its sustainability report, it informs its stakeholders annually about its commitments, its achievements and its progress in the area of sustainability.

The Ordinance on Federal Real Estate Management and Logistics (VILB) obliges the FOBL to create and follow sustainable standards with regard to the construction, furnishing, management and operation of its real estate. In its directives on sustainable real estate management, the Federal Department of Finance has defined eleven guiding principles in this regard. The Recommendation on Sustainable Real Estate Management and the fact sheet Sustainable Building Standard Switzerland (SNBS) 2.1 of the KBOB further specify these guiding principles.

For projects in Switzerland, the FOBL uses the SNBS as a planning basis. In accordance with the federal government's Model Energy and Climate (VEK) initiative, the FOBL aims for SNBS and/or Minergie-P/A-ECO® certification for new buildings. In doing so, it strives for the maximum possible use of renewable energies and equips all suitable areas with photovoltaic systems (PVA).

The FOBL is thus fulfilling its exemplary role in sustainable real estate management. In accordance with the Federal Council's mandate of September 2020, it is taking the measures from the implementation concepts for the Federal Administration Climate Package and taking into account the mandates of different parliamentary motions (10.3638 Energy efficiency and renewable energies in federal buildings as well as motions 19.3750 Energy autonomy of federal real estate and 19.3784 Energy autonomy of federal real estate – photovoltaic offensive).

Impact of the expenditure

The proceeds from the issuance of the Green Confederation Bond will be allocated to two large construction projects of the FOBL according to the 2023 state accounts: These are the second stage of the construction of administration buildings at Guisanplatz 1 in Berne (28 million Swiss francs) and the third stage of the construction of the new administration buildings in Zollikofen (12.2 million Swiss francs). Both buildings are new administrative buildings with around 2'000 workplaces, which will be built according to the SNBS and Minergie-P-ECO® standards.

Approximately 14 % of the FOBL's total investments in 2023 received allocation from the 2024 issuance proceeds.

The third stage of the administrative buildings in Zollikofen received the platinum rating, the highest SNBS certification. The SNBS certification is also being sought for the second stage of the administrative buildings at Guisanplatz 1 in Berne.

From 2020 to 2023, three new FOBL buildings were certified according to the Swiss Sustainable Building Standard SNBS.

- The new Federal Administration building on Pulverstrasse in Ittigen was awarded the SNBS Gold Certificate in 2020.
- In 2022, the second, and in 2023, the third stage of the administrative buildings in Zollikofen received the SNBS platinum certificate.
- The SNBS certificates have been available in silver, gold and platinum levels since 2016. The SNBS takes into account all areas of sustainability in construction projects involving the economy, society and the environment on the basis of 45 indicators. Among other things, the energy consumption of a building, its life cycle costs, the flora and fauna of the surrounding area, mobility or regional value creation are evaluated.

The following information relates to the real estate portfolio covered by the FOBL's energy statistics that is limited to Switzerland and of which only a part is attributable to the green bond:

Indicator	Unit	End 2021	End 2022	End 2023	Target 2030
Heat consumption per m² (Source: Federal Office for Buildings and Logistics)	**kWh/m² Energy reference area**	58	60	52	–
Energy demand oil heating (Source: Federal Office for Buildings and Logistics)	**tCO_2/a or GWh a**	2'255 or 8.5	2'096 or 7.9	2'122 or 8.0	1'326 or 5.0
Energy demand natural gas heating systems (Source: Federal Office for Buildings and Logistics)	**tCO_2/a or GWh a**	5'112 or 25.4	3'851 or 19.1	2'857 or 14.2	4'085 or 20.3
Energy generated by PV (Source: Federal Office for Buildings and Logistics)	**GWh/a**	1.1	1.5	1.7	3.7

Visualization of the new building D, Guisanplatz 1, Berne (© Federal Office for Buildings and Logistics (FOBL) / Aebi & Vincent Architects AG)

Case study: New construction of administration buildings in Berne and Zollikofen

Proceeds from the 2024 issuance of the Green Confederation Bond are allocated to the two largest construction projects of the FOBL according to the 2023 state financial statement: The second stage of the construction of administration buildings at Guisanplatz 1 in Berne (28 million Swiss francs) and the third stage of the construction of the new administration buildings in Zollikofen (a municipality in the canton of Berne and a suburb of the city of Berne; 12.2 million Swiss francs).

Objective: Sustainable accommodation of the Federal Administration

Measure: New administrative buildings with around 2'000 workplaces in accordance with SNBS and Minergie-P-ECO® standards

Indicator:

2nd stage Guisanplatz 1, Berne:	SNBS Certificate Platinum – targeted
3rd stage Zollikofen:	SNBS Certificate Platinum – achieved

Investment costs: 160 million Swiss francs 2nd stage Guisanplatz and 129.8 million Swiss francs 3rd stage Zollikofen (both BKP 1–9, including reserve for inflation)

Construction period: 2022–2026 2nd stage Guisanplatz, 2020–2023 3rd stage Zollikofen

Commissioning: 2026 2nd stage Guisanplatz, 2023 3rd stage Zollikofen

International Cooperation

(FOEN, A231.0322 "Multilateral environmental funds" / Swiss Agency for Development and Cooperation, A231.0330 "Contributions to multilateral organizations")

The Confederation contributes to various multilateral environmental funds, in particular the GCF, the GEF, the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF). Federal contributions co-finance projects and measures to protect biodiversity, restore nature, reduce pollution, and combat climate change in developing countries. Whereby the GCF focuses on climate change mitigation. LDCF and SCCF exclusively fund projects that strengthen climate change adaptation in the poorest developing countries and mainly in small island developing states, respectively. Only the GEF has a broader mandate and finances projects that address various environmental problems in different sectors. This concerns climate change, biodiversity, desertification, chemicals, waste and water.

All four funds (GCF, GEF, LDCF and SCCF) serve the UN Framework Convention on Climate Change and the PA. The GEF also serves other multilateral environmental conventions, such as the Convention on Biological Diversity.

Switzerland influences the use of funds on two levels: on the one hand as a member of the environmental conventions, which regularly set and recommend programmatic guidelines, and on the other hand as a member of the respective councils of the various funds, which, among other things, must approve all major projects financed by the funds. The councils decide on the detailed programmatic content as well as on policy and governance issues of the various funds.

With a contribution of 135 million Swiss francs for 2023–2026, Switzerland is one of the larger donors to the GCF. With a contribution of 155 million Swiss francs over the next four years (2022–26), Switzerland holds a 3.64 % share of the GEF burden and is thus a medium-sized donor.

With these contributions, Switzerland fulfills its obligations under the International Climate Conventions and contributes to environmentally sound, sustainable development in all developing countries. The effects of climate change and biodiversity loss are becoming increasingly visible and tangible. Switzerland has a strong interest in addressing these two crises, mitigating and halting the effects, and increasing the adaptive capacity of developing countries.

The contribution to the GCF comes from the budget item for development cooperation ("Contributions to multilateral organizations"). The contributions to the other three funds come from the budget item for the global environment ("Multilateral Environmental Funds").

For two of the funds (GCF and GEF), Switzerland makes multi-year commitments and disburses them in regular tranches. Contributions to the other two funds are more variable.

Impact of the expenditure

The funds contribute to positive environmental impacts of global significance, such as reducing CO_2 emissions, restoring land, or protecting marine areas, directly benefiting many people in developing countries. The positive environmental impact is measured at the level of the projects financed by the funds. The disclosures generally correspond to the expected values. The data are granular. For example, beneficiaries are gendered and sub-indicators are added to each indicator.

The impact analysis focuses on the most meaningful indicators, namely the reduction of CO_2 emissions and the number of beneficiaries. To avoid any double counting, Switzerland reports only that part of the impacts that corresponds to its respective share of the burden in the different funds (e.g. 3.64 % in the GEF and 1.27 % in the GCF. At the GEF, impact measurement is done using the GEF-8 Corporate Scorecard. This is a comprehensive report on the performance of the Global Environment Facility during the GEF-8 period, i.e., the current GEF-8 cycle (2022–26). In particular, the scorecard reports on progress toward GEF-8 targets. It is published on a semi-annual basis. The GCF uses what it calls an Integrated Results Management Framework (IRMF) and continuously publishes expected CO_2 reductions and beneficiaries at the overall portfolio level.[3]

In the time period 2023, the approved projects had the following impact:

Indicator	Unit	From projects approved in 2023	Swiss share
Expected CO_2 e avoided (Sources: internal, the Green Climate Fund [GCF] and the Global Environment Facility [GEF])	million metric tons CO_2e	2'171.7	58.4
Total beneficiaries from all five results areas including biodiversity, climate change (mitigation and adaptation), chemicals, international waters, and land degradation (Sources: internal, the Green Climate Fund [GCF] and the Global Environment Facility [GEF])	million	441.6	6.37
Hectares of natural resources managed with improved low-emission or climate-resilient management practices (Sources: internal, the Green Climate Fund [GCF] and the Global Environment Facility [GEF])	million hectares	364.2	12.7

[3] The GEF resp. GCF Secretariat receive the data from the GEF agencies, GCF accredited entities respectively that implements the projects on the ground in the recipient countries with other international and local partners and bear the responsibility for the reporting of the data.

Picture: Surkhandaryo region Uzbekistan taken from a World Bank Blog

Case study: Project financed by the Global Environment Facility

72.6 million Swiss francs of the 2023 Green Confederation Bond issuance were allocated to international cooperation. As part of its international cooperation Switzerland supports climate change action in developing countries. It does this in particular through contributions to multilateral environmental funds including the Green Climate Fund (GCF) and Global Environment Facility (GEF).

The GEF supports developing countries in managing the most pressing environmental challenges in the areas of biodiversity loss, chemicals and waste, climate change, international waters and land degradation by financing projects that are implemented through international and local implementing partners. Since its start in 1991, it has provided more than 25 billion US dollars and unlocked multiple times that amount in co-financing. Currently, the GEF supports more than 2'100 active projects and programs across 160 recipient countries. In 2023, the GEF approved a project benefiting Uzbekistan, one of the members of Switzerland's constituency on the GEF Council – the governing body of the GEF. The project aims to scale up innovative restoration approaches in Uzbekistan's high-value dryland mountain landscapes, driving transformational change in policy, financing, and land management to deliver lasting benefits for local communities and ecosystems.

Project Objective: Support Uzbekistan in restoring valuable ecosystems and bringing landscapes under improved practices in a sustainable way by involving local communities and enhancing their livelihoods, in line with Uzbekistan's international commitments under the Convention of Biological Diversity among others and international best practices.

Measures: The project is implemented by the United Nations Development Program (UNDP) together with the Ministry of Ecology, Environmental Protection an Climate Change and local partners.

Indicator: Direct beneficiaries: 3000 (45 % women, 55 % men)

GEF Contribution: 6.5 million US dollars

Project duration: 2024–2029

Research, Innovation and Awareness-raising

Description and basis of the expenditure

Agroscope is the federal competence center for agricultural research and is affiliated with the FOAG. Agroscope makes a significant contribution to sustainable agriculture and food production as well as to an intact environment, and thus helps to improve the quality of life.

Agriculture uses natural resources with the aim of producing food, while at the same time exerting an influence on the environment and the other functions of the agroecosystem. Politicians and the society expect the agricultural and food industries to further improve their efforts to use resources sustainably and to reduce greenhouse gas emissions. Agroscope is devoting 11 million Swiss francs of its pure research funds of 92 million Swiss francs to four areas specifically dedicated to these issues, out of a total expenditure of 190 million Swiss francs. The expenditure regarding those four areas has been deemed eligible under the green bond framework. The four areas include:

- Sustainability assessment
- Careful use of soil
- Promotion and use of biodiversity and habitats in the agricultural landscape
- Agriculture and Climate Change

International agreements, legislation and national policies based on them underpin the activities in these areas. The specific framework is provided by the federal government's research concept for agriculture and the food industry, which is revised every four years.

In the area of *"sustainability assessment"*, the activities are based on the Ordinance on the Assessment of Sustainability in Agriculture. This involves a systematic assessment of sustainability and eco-efficiency and how this can be improved in agricultural production. These analyses show which production methods are economically efficient and best conserve natural resources. They thus contribute to site-adapted optimization and a reduction in environmental impact.

The basis of research activities in the field of *"careful use of soil"* can be found in the Environmental Protection Act, the Swiss Soil Strategy and the Ordinance on Soil Pollution. Agricultural soils in Switzerland are exposed to hazards and stresses that lead to a decrease in their fertility and to losses of land. In order to counteract the negative developments, a better knowledge of the processes in the soil and the effective stress situation, as well as the development of recommendations for a sustainable, site-appropriate soil management and for the protection of the soil are important

The area *"Promotion and use of biodiversity and habitats in the agricultural landscape"* shows how ecologically valuable habitats can be preserved and used for agriculture. For this purpose, Agroscope conducts monitoring for the federal government and evaluates the measures that have been introduced for the conservation of biodiversity. The evaluation makes it clear where to start in order to improve the effect of ecological compensation measures.

According to the federal government's climate strategy, greenhouse gas emissions in agriculture are to be reduced by at least one third by 2050. In the area of *"Agriculture and Climate Change"*, analyses provide important bases for policy makers and practitioners to decide which measures should be pursued to achieve the targets.

Impact of the expenditure

The following examples show the impact in three of the four eligible areas. As this primarily concerns basic research, it is not possible to show quantitative impact measures.

How to assess the agroecological status of Swiss farming systems?

The 'Tool for Agroecology Performance Evaluation' (TAPE) has been developed under the coordination of the Food and Agriculture Organisation of the United Nations to assess the impact of agroecology with a globally applicable and comparable method. In this study[4], we tested the applicability of TAPE on Swiss farms and developed a new biodiversity index. With some adaptations – as TAPE has predominantly been applied in low- and middle-income countries – we were able to derive preliminary agroecological results. The new biodiversity index is freely available for other users as needed.[5]

Crop Yields Prediction in Small Scale Agriculture

Prediction, modelling and mapping of crop yields based on remote sensing holds a great potential for a multitude of applications and stakeholders. For farmers, policymakers, crop insurance and non-governmental organisations, it is of great interest to anticipate crop yield. On large scales the feasibility of prediction already proven, but for small scale agricultural settings as in Switzerland this was to be tested. The results show that the new Sentinel-2 satellites allow a relatively good prediction of crop yields for cereals indicating also future prediction for other crops like grass leys, potatoes, oilseed rape and sugar beet.[6]

Global warming is changing insect fauna

Climate and land-use changes are main drivers of insect declines, but their combined effects have not yet been quantified over large spatiotemporal scales. We analysed changes in the distribution of 390 insect species – butterflies, grasshoppers, dragonflies – using 1.45 million records from Switzerland between 1980 and 2020. We found no overall decline, but strong increases and decreases in the distributions of different species. Climate warming was strongly linked to these 40-year changes in distributions, indicating its key role in driving insect trends in recent decades. Also, interactive effects of climate and land-use changes indicate the potential for reinforcement of simultaneous global changes.[7]

Dissemination of new knowledge

The following graph shows the number of contributions and publications for practice and science where the issuance proceeds have been allocated to.

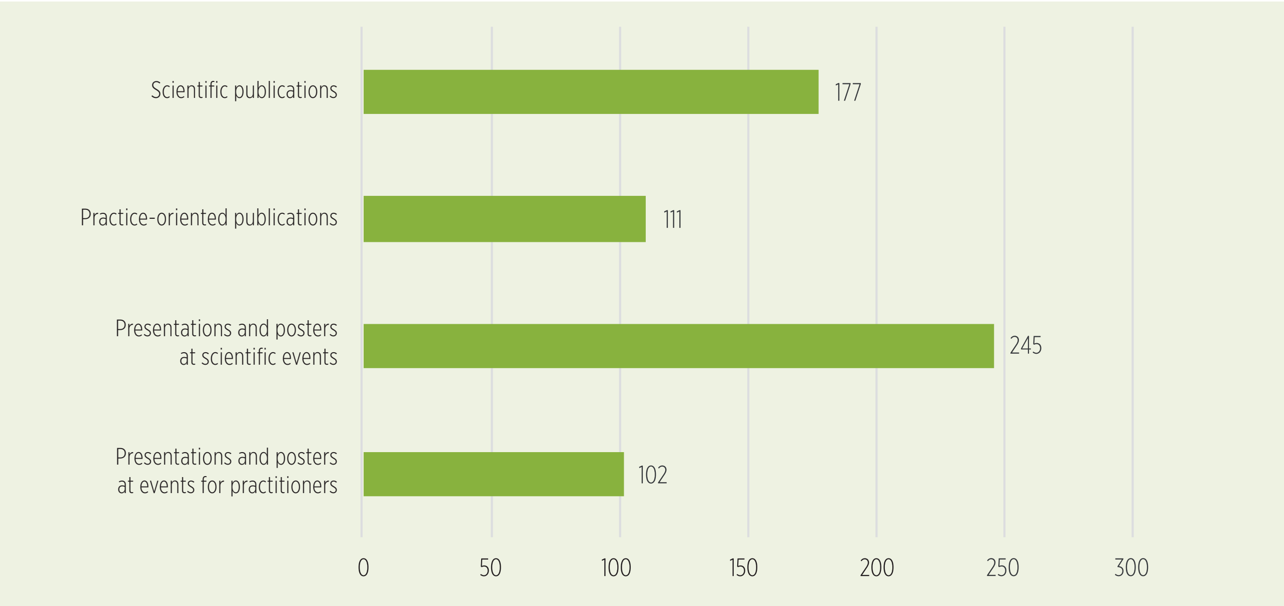
4 Gilgen A., Felder R., Baumgartner S., Herzog F., Jeanneret P., Séchaud R., Paunovic S., Merbold L., Lucantoni D., Cluset R., Mottet A. How to assess the agroecological status of Swiss farming systems?: Application of the Tool for Agroecology Performance Evaluation (TAPE) and further development. Agroscope Science, 172, 2023. https://doi.org/10.34776/as172e

5 GitHub - MAUS-team/tape_calculator F

6 Gregor Perich, Mehmet Ozgur Turkoglu, Lukas Valentin Graf , Jan Dirk Wegner, Helge Aasen, Achim Walter, Frank Liebisch: Pixel-based yield mapping and prediction from Sentinel-2 using spectral indices and neural networks https://doi.org/10.1016/j.fcr.2023.108824

7 Neff F., Korner-Nievergelt F., Rey E., Albrecht M., Bollmann K., Cahenzli F., Chittaro Y., Gossner M. M., Martinez Nunez C., Meier E., Monnerat C., Moretti M., Roth T., Herzog F., Knop E.: Different roles of concurring climate and regional land-use changes in past 40 years insect trends. https://doi.org/10.1038/s41467-022-35223-3

Sustainable agriculture and food industry in 2023



Source: Internal data, Agroscope.

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