Resource Mobilization Information Digest N° 435 October 2013

Estimating Public and Private Financial Contributions to Biodiversity in Switzerland

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1998 Reporting

Switzerland[1] reported on budgets. At the national level, the implementation of the activities and programmes described in this report are spread over domains and services under state control; it is not easy to provide complete and comparable numbers for the means available to implement the provisions planned by the Convention. The costs of measures taken to ensure the protection of species during the construction of a motorway, for example, are met by the costs of construction and not from the budget of the agency responsible for nature protection. Similarly, as agricultural policy is oriented towards ecology. Diverse programmes, such as aid to marginal (mountain) regions to prevent the abandonment of farming there, contribute to maintaining biological diversity in Switzerland: the amount whose final destination is biological diversity is however difficult to estimate.

The budget which SAEFL devotes to biological diversity amounted to Sfr. 37 million in 1996, divided in the following manner: Sfr. 30 million subsidy for cantonal activities and measures, Sfr. 2 million for activities and projects of private organizations, and Sfr. 5 million for projects directly run by SAEFL, such as establishing the inventories. Currently, the budget in relation to the legal tasks assigned to SAEFL is restricted. It is estimated that proper application of the Convention by this agency would cost around Sfr. 70 million annually.

Estimate of budgets directly devoted to biological diversity at national level

Activity	Amount (in Sfr. million per year)
SAEFL. projects and subsidies for nature and the landscape	37
and projects for biological diversity in the forest (1996)	15
SFOA. agricultural payments for ecological compensation (1996)	91
Cantons (estimate for 1993/94)	40
Non-governmental organisations (WWF and Pro Natura) (1996)	5.5
Swiss Landscape Protection Fund (SO million for 10 years)	5

In general, the funding available for the conservation of biological diversity in Switzerland is relatively limited, particularly compared to spending in other domains: spending for the tasks of protecting nature come to about 0.2 per cent of the federal budget, whereas 6.7 per cent go to road construction. Similarly, a study has shown that in 1992, around Sfr. 6 billion were spent on the environment in a broad sense, of which only Sfr. 103 million went to the protection of nature and the landscape, that is 1.7%. At the cantonal level, we note significant disparities reinforced by the system of subsidies prevalent in

[1] Switzerland (1998). National Report of Switzerland for the Convention on Biological Diversity, Swiss Agency for the Environment, Forestry and Landscape, 64 pp.

Switzerland: the measures taken by the cantons are subsidized by the Confederation. So the less active a canton is the lower the subsidy it receives, and the lower the amount used for conservation of biological diversity will be. Many cantons have limited human resources: certain cantonal services do not employ more than two people, although the implementation of protective measures is a cantonal responsibility.

2009 Reporting

Switzerland[2] reported an overview of funding. (Forum Biodiversité Suisse: Les coûts d'une protection conforme aux exigences légales des biotopes d'importance nationale, http://www.biodiversity.ch/f/publications/biotopschutzkosten/index.php, status June 2009.)

Domestic funding for nature conservation is tracked through indicator M7 of the Swiss BDM. The indicator is derived from the Federal Finance Administration's annual "Publication of the public finances of Switzerland", which provides information on expenditures at the federal and cantonal levels as well as by communities.

Along with other issues such as water supply, environmental protection, watercourse regulation and avalanche control structures, nature conservation is part of the superordinate "environment and regional planning" expenditure category. The nature conservation domain covers expenses for biotopes, landscape protection, conservation measures within agricultural landscapes, Switzerland's National Park and other protected areas. It also includes administrative costs; for example, expenses for personnel and materials.

Spending on nature and landscape conservation tripled between 1990 and 1998, predominantly due to the introduction of ecological compensation in agriculture, and appears to have remained more or less stable since then.

Between 2001 and 2005, the federal government contributed roughly CHF 10 million a year to the Foundation for the Preservation and Management of Near-natural Cultural Landscapes.

The federal government pays compensation to communities affected by the loss in the exploitation of hydrodynamic resources for power production, insofar as these losses are a consequence of conservation and protection measures for valuable landscapes of national importance. Spending by the federal government in this area has tripled since the mid-1990s and amounted to CHF 3.1 million in 2006.

Game management and damage caused by animals cost the federal government roughly CHF 1.8 million a year in the 1990s. Today, the amount has increased to around CHF 2.7 million.

The "species conservation" category in the hunting and fisheries domain includes costs for preventive measures against large carnivores. As part of the government's 2003 budget restriction programme, species conservation implementation subsidies were reduced, above all in large carnivore management.

[2] Switzerland (2010). Switzerland's Fourth National Report under the Convention on Biological Diversity, Federal Office for the Environment (FOEN), Bern, 148 pp.

These subsidies are aimed at maintaining and promoting species diversity of wild animals (species protection projects, particularly for ungulates, carnivores and migratory birds, but also other mammals and birds). In 2006, these subsidies amounted to CHF 3.2 million.

Within the framework of its 2011 Agricultural Policy, Switzerland's government has decided to continue its support of the National Action Plan relating to genetic resources. This National Action Plan was developed to implement the FAO's World Food Summit Plan of Action adopted in June 1996.

A recent study conducted by the Federal Institute of Research (WSL), Pro Natura and the Swiss Forum Biodiversity estimates the financial resources required for the protection and maintenance of biotopes of national importance according to legal standards. The amount required would be CHF 148 - 183 million. This is more than double the sum allotted today by the Confederation and the cantons. The study concludes that it is impossible to satisfy legal requirements with the existing level of funding. Furthermore, a non-recurring investment of CHF 700 - 1 500 million would be necessary to rehabilitate the biotopes of national importance so as to restore their original quality.

This list is incomplete. It does not capture other types of spending that cannot be specifically signalled as conservation spending; for example, the cost of green bridges that result from road building projects.

A new project launched by the Federal Statistical Office (FSO) aims to record all expenditure relating to the environment (both governmental and private). The FSO intends to include the ecological dimension in the overall public accounts; for example, the cost of prevention of air and water pollution, noise protection or waste disposal. The decision on which items of expenditure do or do not impact nature protection is based on the European classification of environmental protection activities and expenditure (CEPA 2000). The expenditure listed refers to CEPA Code 6: "protection of biodiversity and landscape". Tables 18–19, below, provide an overview of expenditure coming under the nature conservation domain.

Table 18: Federal subsidies impacting nature conservation paid under the nature conservation domain (in thousands of CHF) (Source: BDM indicator M7, status October 2008).

Federal subsidies in thousands of CHF	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Nature and landscape conservation	45105	43553	45808	48250	45890	49918	51124	48020
Compensatory amounts for loss in the exploitation of hydrodynamic power	1334	1628	2037	3065	3065	3065	3129	3129
Fund for the Preservation and Management of Near-natural Cultural Landscapes	–	–	10000	10000	9900	9850	10000	–
Compensation to enterprises involved in non-military community service for conscientious objectors	–	410	349	703	728	828	914	1195

Table 19: Federal subsidies impacting nature conservation paid under other domains (in thousands of CHF) (Source: BDM indicator M7, status October 2008).

Federal subsidies in thousands of CHF	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Hunting and fisheries								
Support measures under the Federal Fisheries Act	565	638	640	653	683	680	690	699
Game management and damage caused by animals	1797	1860	2210	2260	2287	2335	2413	2703
Species protection	1839	3331	3707	4423	4435	3950	3608	3177
Agriculture: animal husbandry								

Preservation of plant genetic resources	–	1368	1223	1353	2475	2813	3375	3239
Agriculture: direct payments								
Payments for ecological compensation	100674	108130	118417	122347	124927	125665	126023	126976
Payments based on the Environmental Quality Ordinance (ÖQV)	–	–	–	8934	14638	23007	27442	30256
Payments for the extensive production of cereal and oilseed rape	35135	33398	32526	31938	31255	30824	31516	31094
Payments for extensively used meadows on fallow farmland	17652	17150	–	–	–	–	–	–
Payments for organic farming	11637	12185	23488	25484	27135	27962	28601	28672

2012 Submission

1. Introduction

Switzerland's submission[3] assessed Switzerland's financial contributions from public and private sources in support of the objectives of the Convention. The report provided methodology of estimation, estimates from Federal budget, Cantonal budgets and municipal budgets, as well as private sector, non-governmental organizations and academia.

2. Methodology

Methodological Approach

The assessment is based on the following approach:

- The assessment aims at establishing a methodology emphasizing replicability and supporting potential future national reporting.

- The analysis of current level of Switzerland's financial contribution draws on existing information sources and data, such as international and national databases, official reports, government reports, national indicators, and other annual reports.

- The assessment is based on the most recent data available. The year of reference can therefore vary between indicators, depending on the available data-source.

- In order to secure the replicability of the assessment, the data-sources are clearly identified and the methodology applied is described for each indicator. Expert opinion, e.g. on estimates to which degree an activity contributes to sustainable use of biodiversity, is disclosed.

- In addition, a plausibility check for each indicator was conducted, based on existing internal reports and expert opinions. This is to further underpin the approximation.

- The currency used in the figures are Swiss francs CHF, unless otherwise indicated.

[3] Switzerland (2012). Swiss Public and Private Financial Contributions in Support of the Objectives of the Convention on Biological Diversity, 19 April 2012

Obstacles

The following issues required particularly careful consideration:

- In general, public and private entities address biodiversity as a cross-cutting issue. Spending for the conservation of biodiversity and the sustainable use of its components are rarely specifically displayed in accounts but often aggregated with other disbursements, e.g. for environmental protection in general, for agriculture, forestry, wastewater etc. In most cases expenditure information specific for biodiversity was not available.

- Beside the traditional biodiversity sectors of environment, wildlife and protected areas, many other activities contribute to sustainable use of biodiversity In a more or less direct way (e.g. measures against air pollution, climate change activities at large etc.). The decision, whether an activity contributes to the implementation of the CBD and to which extent it does so, cannot be determined precisely and depends on subjective perception.

- Avoiding double counting is a challenge, especially in fields where many stakeholders interact and contribute, e.g. regarding the indicator Academia with resources allocated by private as well as public sources from all levels or e.g. payments from a national level to a regional level and then to private actors.

- The presented financial contributions include investment outlays and write-offs. Distinction of investment outlays and write-offs in an economically precise way was not possible. Therefore, double counting had to be accepted when investment outlays appear again as write-offs in the financial statements or annual reports.

- One NGO indicated that their budget allocation to biodiversity was higher for the year 2010 - the International Year of Biodiversity 2010 - than usual. This could also apply for the budgets of other NGO's.

Against this background it becomes apparent that art aggregation of financial flows in support of the implementation of the Convention results in an estimate providing the magnitude of resources available rather than a definite amount.

The biodiversity factor (BD-factor)

Some budgetary items contribute to the objectives of the CBD to some extent, but not entirely. This is especially true for the indicators domestic budget at all levels, private sector, and non-governmental organizations, foundations, and academia. For these indicators, the effective contribution of budgetary items to the objectives of the CBD needed to be estimated on a case by case basis, drawing on the expertise of stakeholders in the field of biodiversity conservation and/or in payments for ecosystem services.

In order to emphasize replicability, the contribution of budgetary items is described through a biodiversity factor (BD-factor) which is used to readjust the expenses (see Table 1) and is disclosed where applied. This approach aims at facilitating future assessments along with securing comparability of the result.

For the indicators addressed in the report, the BD-factor was defined based on expert knowledge with the collaboration of experts from the Federal administration, the scientific community and from NGO's.

Table 1: The BD-factor is used to readjust expenses listed in the official budgets. It is an estimate of the extent a budgetary item supports the objectives of the CBD

Estimated relevance for CBD objectives	Biodiversity factor	
	Value (0-1)	%
Budgetary item supports CBD's objectives to its full extent	1.00	100%
Budgetary item supports CBD significantly	0.75	75%
About half of the Budgetary item supports CBD's objectives	0.50	50%
Budgetary item contributes to CBD's objectives for the smaller part	0.25	25%
A minor part of the budgetary item contributes to CBD objectives	0.10	10%
A marginal part of the budgetary item contributes to CBD objectives	0.05	5%

3. Estimation of the Federal budget in support of the objectives of the CBD

Methodology

The financial contribution of the Swiss Confederation in support of the objectives of the CBD was extruded from the Model of the Federal Finance administration (FS-Modell 2009; F11.7.5:Ausgabennach Funktlonen, Bund). This model describes Federal budgets according to major budgetary items and does, however, not include staffing expenditures. Most of the identified budgetary items contribute to some extent to the objectives of the CBD, but not in their entity. Therefore, the biodiversity factor (BD-factor) was used to readjust the expenses.

Expenses related to ODA and intramural research & development are not taken into account for the present indicator, but are included under Official Development Assistance and Academia.

Results for the budget at Federal level

Table 2: Domestic budgets at Federal level without Official Development Assistance ODA and intramural Research & Development expenditures

Code	Category	Total expenses in millions of CHF annual (fiscal year: 2009)	BD-factor	2009)
311	Museums and fine arts	35.4	0.06	1.8
741	Water engineering	149.2	0.10	14.9
750	Species conservation and landscape protection	103.0	0.75	77.3
781	Air pollution control and climate protection	121.1	0.10	12.1

769	Countering environmental pollution, NES*	6.7	0.25	1.7
779	Environment protection, NES*	134.8	0.25	33.7
790	Regional development	13.0	0.10	1.3
813**	Improvement of animal breed	442.0	0.05	22.1
814**	Improvement of crop production	101.6	0.1	10.2
816	Agriculture: direct support schemes	2742.2	0.10	274.2
820	Forestry	26.6	0.10	2.7
830	Hunting and fisheries	7.5	0.25	1.9
Total expenses supporting the CBD targets In Millions of CHF annual (2009):				CHF 453.7

* NES: not elsewhere specified

** The expenses related to the improvement of animal breeds and crop production (Code 813 and 814) target the conservation and sustainable use of genetic resources. The total amount of both categories roughly corresponds to the budgetary item of the Selection végétale et élevage" of the Federal Office for Agriculture FOAG (OFAG (2011): Rapport Agricole 2011, Tableau 52, p. A58).

Plausibility check

The share of the Federal budget contributing to the conservation and sustainable use of biodiversity was also estimated using a more sophisticated/more detailed approach, based on the State financial statements (2010).

A total of 28 budgetary items relevant for biodiversity were identified within the State Secretariat for Economic Affairs SECO, the Federal Office for Agriculture FOAG, the Federal Veterinary Office FVO, the Swiss Federal Office of Energy SFOE, the Federal Office for the Environment FOEN and the Federal Office for Spatial Development ARE. Based on this detailed approach, the contributions of the federal budget are estimated to be CHF 426.4 million in 2010.

4. Estimate of the Cantonal budgets in support of the objectives of the CBD

Methodology

The estimate of the contributions by the Cantons to the objectives of the CBD is based on the Model of the Federal Finance administration (FS-Modell 2009; F1O.2.5 Ausgaben nach Funktionen, Kantone im Vergleich). This model describes cantonal budgets according to major budgetary items.

The contribution of relevant budgetary items to biodiversity objectives was estimated using the biodiversity factor described in Table 1. In order to avoid double-counting of financial flows from the Confederation to the Cantons, the biodiversity factor was adjusted as described in Table 3.

An adjustment was necessary for the items financed in majority or in their entity by the Confederation, e.g. "Species conservation and landscape protection" and "Agriculture: direct support schemes".

Table 3: Adjustment of the biodiversity factor for Cantonal budgets

Code	Category	Causes of adaptation	BD-factor
311	Museums and fine arts	-	0.05
741	Water engineering	-	0.10
750	Species conservation and landscape protection	Deduction of federal funds	0.25
761	Air pollution control and climate protection	Deduction of federal funds	0.10
769	Countering environmental pollution, NES*	Deduction of federal funds	0.10
779	Environment protection, NES*	-	0.25
790	Regional development	-	0.10
813	Improvement of animal breed	-	0.05
814	Improvement of crop production	-	0.1
816	Agriculture: direct support schemes	Direct support schemes are paid with federal funds	0
820	Forestry	Deduction of federal funds	0.05
830	Hunting and fisheries	Deduction of federal funds	0.05

Results for the budgets at cantonal level

Table 4: Domestic budgets at Cantonal level.

Code	Category	Total expenses in millions of CHF annual (2009)	BD-factor	Expenses supporting the CBD targets in millions of CHF annual (fiscal year: 2009))
311	Museums and fine arts	176.9	0.05	8.8
741	Water engineering	325.7	0.10	32.6
750	Spacies conservation and landscape protection	152.6	0.25	38.1
761	Air pollution control and climate protection	8.6	0.10	0.9
769	Countering environmental pollution, NES*	29.6	0.10	3.0
779	Environment protection, NES*	147.5	0.25	36.9
790	Regional development	187.9	0.10	18.8
813	Improvement of animal breed	92.1	0.05	4.6
814	Improvement of crop production	45.0	0.1	4.5
816	Agriculture: direct support schemes	2792.8	0	-
820	Forestry	361.9	0.05	18.1
830	Hunting and fisheries	65.78	0.05	3.3
Total expenses supporting the CBD targets in millions of CHF annual (2009):				CHF 169.6

5 Estimate of the Municipal budgets in support of the objectives of the CBD

The estimate of the contributions by the municipalities to the objectives of the CBD is based on the Model of the Federal Finance administration (FS-Modell 2009; F 23.7.5.Ausgaben, Gemeinden insgesamt). The same approach as described for the Federal and Cantonal budgets was applied, including an adjustment of the biodiversity factor.

Results for the budget s at municipal level

Table 5: Domestic budgets at municipal level (Annual expenses, fiscal year 2009)

Code	Category	Total expenses in millions of CHF	BD-factor	Expenses supporting he CBD targets in millions of CHF
311	Museums and fine arts	193.3	0.05	9.7
741	Water engineering	210.5	0.05	10.5
750	Species conservation and landscape protection	56.3	0.50	28.2
761	Air pollution control and climate protection	3.5	0.05	0.2
769	Countering environmental pollution, NES*	7.6	0.10	0.8
779	Environment protection, NES	58.7	0.25	14.7
790	Regional development	227.1	0.05	11.4
813	Improvement & animal breed	7.4	0.05	0.4
814	Improvement of crop production	9.0	0.1	0.9
820	Forestry	311.6	0.05	15.6
830	Hunting and fisheries	2.4	0.05	0.1
Total expenses supporting the CBD targets In Millions of CHF annual (2009):				CHF 92.5

6. Private Sector

Methodology

Environmental Protection expenditures in the business sector are assessed by the Federal Statistical Office (FSO). According to the 2011 FSO publication "Environmental Protection Expenditures in the economy in 2009 - First results" enterprises operating in Switzerland spent a total of CHF 2.75 billion in 2009 on the protection of the environment (except agriculture, investments and current expenditures for certain services, for which only the purchase cost of third-party suppliers and the communal royalties were collected), that is to say 0,5% of gross domestic product (GDP). These expenditures are composed by 80% of current expenditures (CHF 2.18 billion) and by one fifth of investments (CHF 0.57 billion), the latter targeting the prevention of pollution (65%) and the treatment of pollution (35%).

Environmental expenditures of Swiss companies are aggregated according to the following categories:

1. Noise control, conservation of biodiversity, research and development on environmental protection, and management activities regarding soils, groundwater and landscape;

2. Air quality management and climate change mitigation;

3. Waste Management;

4. Wastewater Treatment.

The four categories of expenditures have all beneficial effects on the environment but can, however, not always be assigned directly to biodiversity. Therefore, a BD-factor was defined in order to estimate the expenditures of the private sector In support of the objectives of the CBD.

Results for the private sector

Table 6: Contributions to the objectives of the CBD from Private Sector in millions of CHF/year 2009

Category	Total expenses	BD-factor low/high	Low estimate	High estimate	Average estimate
1) Noise control, conservation of biodiversity, research and development on environmental protection, management activities regarding soils, groundwater, landscape	400.0	0.10/0.25	40.0	100.0	70.0
2) Air quality management, climate change mitigation	375.0	0.05/0.1	18.8	37.5	28.1
3) Waste management	1281.0	0.0/0.0	-	-	-
4) Waste water treatment	694.0	0.0/0.0	-	-	-
Total	2750.0	-	59.8	137.5	98.1

Plausibility check

National data on expenditures of the private sector on environmental purposes are scarce. According to available data, the private sector spent a total of CHF 2.75 billion on environmental purposes in 2009. The expenditures relevant for the conservation and sustainable use of biodiversity correspond to approximately 2-5 % of the total spending for environmental purposes.

7 Non-governmental organizations and foundations

Methodology

There are numerous national and regional NGO's as well as foundations in Switzerland committed to activities related to the objectives of the CBD. However, the present indicator is limited to NGO's and foundations being active at the national level, i.e. having the right to appeal (Verbandsbeschwerderecht) or implementing development cooperation activities. The list was complemented with those zoological gardens implementing conservation projects abroad.

An overview on expenditures/revenues of NGOs and foundations does so far not exist. Therefore, the data for the present indicator had to be gathered on a case-by-case basis, by reviewing each NGO's financial statements and/or annual report.

The work of all the NGO's listed hereinafter has positive effects on biodiversity. Their support of the objectives of the CBD is far from limited to policy making. Year after year these organizations generate substantive funding, mainly from private donors, to carry out biodiversity-related projects. From the total expenditures the one relating to biodiversity were estimated based on available information in annual reports. Finally, only the project costs are summarized and transformed in a BD-factor, all administrative efforts to run the NGO's are excluded, as is - in order to avoid double counting - the financial support received from the federal, cantonal and communal administrations.

Results for NGOs and foundations

Table 7: Contributions to the objectives of the CBD from national NGOs.

-	Total expenses (CHF)	BD-factor low/high	Low estimate (CHF)	High estimate (CHF)	Average estimate (CHF)
Total national NGOs	146045735	-	60342000	85062000	73820500
Greenpeace Switzerland	25710000	0.50/0.75	12855000	19283000	1606900
Pro Natura	19628000	0.75/0.75	14721000	14721000	14721000
Pro Specia rara	3393000	0.50/0.75	1697000	2545000	2121000
SVS/Birdlife Switzerland	4534000	0.50/0.75	2267000	2297000	3400500
Swiss Transport and Environment Association	16096000	0.10/0.25	1610000	4024000	2817000
WWF Switzerland	40860000	0.50/0.75	20430000	30645000	25537500
Fifteen other NGOs					9154500

Table 8: Contributions to the objectives of the CBD from NGOs predominantly active abroad.

	Total expenses (CHF)	BD-factor	Low estimate (CHF)	High estimate (CHF)	Average estimate (CHF)
Total NGO predominantly active abroad	240418000	-	13001000	19527000	16264000
HELVETAS	71720000	0.05/0.10	3586000	7172000	5379000
Swissaid	19594000	0.10/0.25	1959000	4899000	3429000
Caritas	93430000	0.05/0.05	4672000	4672000	4672000
HEKS	55674000	0.05/0.05	2784000	2784000	2784000

Table 9: Contributions to the objectives of the CBD from Zoological Gardens.

-	Total expenses	BD-factor	Low estimate	High estimate	Average estimate
Total Zoological Gardens	63407000	-	3170000	3170000	3170000
Basel Zoo	38823000	0.05/0.05	1941000	1941000	1941000
Zurich Zoo	24584000	0.05/0.05	1229000	1229000	1229000

Plausibility check

NGOs and foundations 76.5 - 107.8 mm CHF

This is the first time that the financial resources of Swiss based NGO's and foundations operating at national or international level in support of the objectives of the CBD have been assessed. However, it should be noted that the multitude of local NGO's and foundations, which do a very important job for the conservation and sustainable use of biodiversity in Switzerland, are not taken into account by the present assessment.

Efforts by charitable foundations are not included in this report, due to very scarce publicly available information about their financial resources. it is thus plausible that the financial resources provided by NGO's and foundations are larger than listed in this report. Additional work is necessary to get a more adequate assessment.

8. Academia

Methodology

Biodiversity-related research and education supports the objectives for the CBD as well, in direct and more in indirect forms. This section provides an overview of existing data in this sector and an estimate of the yearly expenses in Switzerland far research and education. Data from surveys undertaken by Swiss Statistics and official reports, such as annual reports and audited financial statements were used as a basis for collecting information:

A) Swiss National Science Foundation SNSF

The Swiss National Science Foundation (SNSF) is the most important agency promoting scientific research in Switzerland. It supports, as mandated by the Swiss Federal government, all disciplines, from philosophy and biology to the nanosciences and medicine. The yearly statistics provided by SNSF include all applications processed and approved during the financial year as well as contributions paid out in the area of National Centres of Competence in Research. In 2010 the SNSF granted funding to the total value of CHF 726 million.

A full text search in the SNSF project database for biodiversity resulted in 41 (Title/Keywords) respectively 61 (Title/Keywords/Abstracts) current projects. The financial support amounts to approximately CHF 115000 for each project and year. This results in yearly expenditures of CHF 4.72 to 7.59 millions. That means that about 0.65% to 1.0% of the yearly granted funding from SNSF supports biodiversity related projects.

The allocation of SNSF-grants is directed by a scientific committee. Therefore, the abovementioned statistics of the SNSF (0.65% and 1.0%) provide helpful values for further estimates of biodiversity-related research in relation to general expenses for research on universities and universities of applied sciences.

B) Swiss Statistics

Publications and the online portal of the Swiss Federal Statistical Office (FSO) provide plenty of high quality data about “Education and Science”. Unfortunately, the data and indicators are not directly biodiversity-sensitive. Nevertheless, the data provide valuable basic information on general research and education expenses in Switzerland:

• *Swiss research and development (R&D) expenditure in 2008*: According to estimates from the FSO, private enterprise, the Swiss government and the universities spent CHF 16.3 billion on research and development (R&D) activities in 2008. Approximately CHF 4 billion was used for R&D-projects at universities and associated research centers. An adjustment of the expenditure on R&D is made with the above-mentioned statistics of the SNSF (0.65%- 1.0%).

• *Costs of the universities 2009*: In 2009 the Swiss universities spent over CHF 3 billion on education. Approximately CHF 440 million were used for biodiversity-related disciplines like Environmental Sciences, Earth Sciences, Biology, Geography, Agriculture or Forestry. An adjustment of the expenditure on education in universities is made with the BD-factor (5% - 10%).

• *Costs of universities of applied sciences (Fachhochschulen) 2009*: In 2009 the Swiss universities of applied sciences spent nearly CHF 2 billion on education. Approximately CHF 115 million were used for biodiversity-related disciplines like Life-Sciences, Agriculture or Forestry. An adjustment of the expenditure on education in universities of applied sciences is made with the BD-factor (5% - 10%).

Results for Academia

With the above-mentioned information and a rough estimate of yearly expenses for education and research in the wide field of biodiversity is feasible.

Table 10: Aggregated financial flows for biodiversity related research and education

-	Millions of CHF annual		
	Low estimate	High estimate	Average estimate
Academia	54.0	96.0	75.0
Research and development expenditures at universities and universities of applied sciences (inducing SNSF-prqects)	26.0	40.0	33.0
Educational expenditures at universities	22.0	44.0	33.0
Educational expenditures at universities of applied sciences	6.0	12.0	9.0

Plausibility check

Estimation based on the number of scientific papers published

The costs for the scientific work leading to a scientific publication, is roughly estimated to be CHF 100,000. According to the Database *Web of Sciences*, Swiss scientists published a total of 506 papers related to the topic biodiversity in the years 2009 -2011 (August 2011), i.e. approximately 200 papers per year, thus generating costs of approximately CHF 20 million per year. This estimate is broadly In accordance with the low estimate for costs related to research and development expenditures at universities and universities of applied science.

Enquiry among experts of the Swiss Biodiversity Forum

A non-representative enquiry among experts of the Swiss Forum Biodiversity resulted in an estimate of the costs related to research and development expenditures at universities and universities of applied science between CHF 11-150 million.

Estimation based on the costs for students at universities and universities of applied sciences

In the year 2009, a total of CHF 130 million were spend for the basic and advanced study periods at universities (field of study: biology) and universities of applied sciences (field of study: civil engineer). These costs are certainly not relevant for biodiversity in their entity. However, biodiversity relevant

parts of other degree programmes - such as forestry and agronomy -probably compensate the non-biodiversity relevant parts of the biology and civil engineer degree programmes.

Further information

Switzerland[4] referred to spatial development, transport and mobility, tourism and leisure, energy, hydropower and renewables, soils, defence, environment related taxes, innovation, research and training for sustainable development, cooperation.

[4] Resource Mobilization Information Digest No. 409: Sectoral Integration of Biodiversity in Switzerland, May 2013.