



*The importance of environmental accounting in increasing environmental tax revenues: a case study of Switzerland during the period (2017 - 2022)*

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**Abstract**

This study aims to determine the role of environmental accounting in improving environmental tax revenues in the Switzerland state during the period 2017 - 2022. We used the deductive approach, the description and analysis tool , in order to study the theoretical aspect linked to environmental accounting and environmental tax. We also used the inductive approach to explain the statistics related to environmental expenditures, which are considered the most important process on which environmental accounting is based and their reflection on the volume of environmental tax revenues, so that the study concluded a set of results, the most important of which is the decrease in the value of tax expenditures during the period of the Corona epidemic, which affected the volume of tax revenues.

✓ **Keywords:** Environmental accounting, Environmental tax, Revenue, Switzerland.

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## 1. INTRODUCTION

The environment is considered one of the most important elements that must be preserved, because of its impact on the lives of individuals, the work of institutions, and the strategies of countries.

In order to regulate environmental matters, an administrative mechanism must be found that allows them to be regulated. This mechanism is represented by environmental accounting, which is based on determining environmental expenses and how to pay them to the parties that the law allows to collect them.

Environmental costs are considered tax revenues for the state, which in turn spends these revenues to preserve the environment.

Based on the above, we studied the environmental costs in Switzerland during the period 2017-2022, which is considered the most important procedure on which environmental accounting is based, while determining the reflection of these environmental costs on tax revenues.

**1.1 The problematic of study:** referring to what has been said previously, the following problematic of study can be posed:

**What is the importance of environmental accounting in increasing environmental tax revenues in Switzerland during the period (2017 - 2022) ?**

**1.2 Study hypotheses:** the hypotheses we formulated for our study are as follows:

- ✓ Environmental accounting contributes to increasing environmental tax revenues;
- ✓ A continuous increase in environmental tax revenues in Switzerland between the period 2017-2022.

**1.3 The aims of study:**

- ✓ Addressing the theoretical concepts related to environmental accounting and environmental taxes;
- ✓ Determine the relationship between environmental expenditures on which environmental accounting is based and environmental tax revenues in Switzerland.

## 2. The theoretical framework of the study

### 2.1 The theoretical framework of the environmental accounting

Environmental accounting, also known as green accounting, environmental management accounting (Agyemang, et al., 2021, p. 12194), ecological accounting,

sustainable accounting, multi-capital accounting, ecosystem accounting or socio-environmental accounting ( DUCHATEAU, 2022, p. 24).

Environmental accounting is a method that aims to measure, analyze and classify the costs of organizational activities that have an impact on the environment, create reports that satisfy different stakeholders, whether they are inside or outside the organization ( Alassuli, 2024, p. 126).

Environmental accounting contributes to achieving the following:

- ✓ Businesses can use environmental accounting as a tool to understand what they need to do in the future (Lolo & Rum, 2019, p. 84);
- ✓ With the help of environmental accounting, companies can assess the environmental impact of their performance and take environmental concerns into account when making decisions ( Mominur Rahman & Ekramol Islam, 2023, p. 69434);
- ✓ Using environmental costs based on data on the environmental effects of each production activity of the economic entity, participate in the effort to improve the quality of internal and external environmental reporting (Gilbert Rely, 2018, p. 160);
- ✓ By focusing on reimproving events that cause disasters for these activities, environmental accounting aims to prevent, reduce or avoid environmental impacts (Dasmaran & Mulyani, 2019, p. 160);
- ✓ In the field of environmental accounting, the integration and support of the costs necessary to restore the environment to its original state after the impact of the company's activity is crucial (Lalmi, 2022, p. 753);
- ✓ Organizations can benefit from the help of environmental accounting to achieve their objectives effectively ensuring the achievement of environmental, economic and financial objectives ( Hanif, Ahmed, & Younas, 2023, p. 2).

Environmental accounting uses two main approaches: the physical approach and the monetary approach. The United Nations has proposed a physical approach or comprehensive development guide indicating the resources available within a country classified according to its condition and uses. The monetary approach has attracted a lot of interest because such data will make it possible to obtain an economic indicator. adapted to the environment and aware of the advantages and disadvantages of

environmental operations ( Polycarp, 2019, p. 196).

There have been several stages in the development of environmental accounting, which can be summarized in the following table:

**Table 1.** Stages of development of environmental accounting

<b>Stages</b>	<b>Development</b>
<b>Evolution</b>	In the context of business ethics, social obligations, and environmental concerns, social accounting gained popularity in the 1960s.
<b>At the starting</b>	Some start to question the value of accounting and the need to disclose data on environmental effects, although environmental issues gained renewed interest in the 1970s.
<b>The reading wave</b>	Due to the global extent to which corporations are increasingly contributing to environmental degradation, the natural disasters of the 1980s sparked increased interest in this field. The swift growth of this period was also aided by the emergence of specialist accounting publications. During this period, environmental accounting began to develop distinctly from social accounting.
<b>Maturation stage</b>	Environmental accounting became better known within social accounting and became an important area of study recognized in accounting research in the 1990s.
<b>Contemporary environmental accounting</b>	Environmental accounting, which is directly linked to corporate social responsibility, can be used to measure environmental performance. Companies increasingly understand, analyze and control environmental costs and revenues.

**Source:** Md.Sagar Hossain, Most.Mukta Khatun & Sanzida Begum (2023), Civilization costs mother nature:Tracing the conceptual ideals and legal landscape of environmental accounting in Bangladesh, Research journal of finance and accounting, USA, Vol 14, No 19, p4.

## 2.2 The theoretical framework of the environmental tax

Environmental taxes were created under the polluter pays principle, validated by the OECD in 1972. The polluter pays principle states that the polluter must pay the costs of measures taken by the State to maintain the environment in an acceptable state (BELFATMI, 2017/2018, p. 120).

Currently, the polluter pays principle is used as a general basis to justify the use of market instruments such as taxation with the aim of protecting the environment (TIDJANE & LOUNIS, 2023, p. 67).

According to the OECD definition, environmental taxation includes all taxes, fees and charges that arise from a pollutant or a product or service that damages the environment or destroys natural resources (HAMITI, 2022, p. 507).

Two types of measures are used in environmental taxation: the first consists of dissuasive measures which include all taxes relating to products or assets which can harm the quality of the environment, and the second consists of incentive measures which promote sustainable development through tax expenditures (Guicherd, La Batie, & Culliford, 2021, p. 10).

The goals of environmental taxation can be summarized as follows:

- ✓ By imposing a tax on actions that increase carbon dioxide emissions, the goal of an environmental tax is to incentivize people to change their behavior. These taxes aim to reduce these emissions while incentivizing individuals, businesses and sectors to adopt more sustainable practices ( Mehta & Derbeneva, 2024, p. 1);
- ✓ Environmental taxation can play a role in reconciling economic progress and environmental protection ( Wang, Tang, & Boamah, 2022, p. 3).

### **3. RESULTS AND DISCUSSION**

Our studies from 2017 to 2022 were constructed using data from the Switzerland Federal Statistical Office (**FSO**). Thus, we divided our applied study into two parts: the first concerns expenditure linked to environmental protection and the second concerns tax revenue linked to environmental protection.

#### **3.1 Environmental expenditure**

According to data from the (**FSO**), environmental expenditures in Switzerland are as follows:

##### **3.1.1. According to the environmental sector**

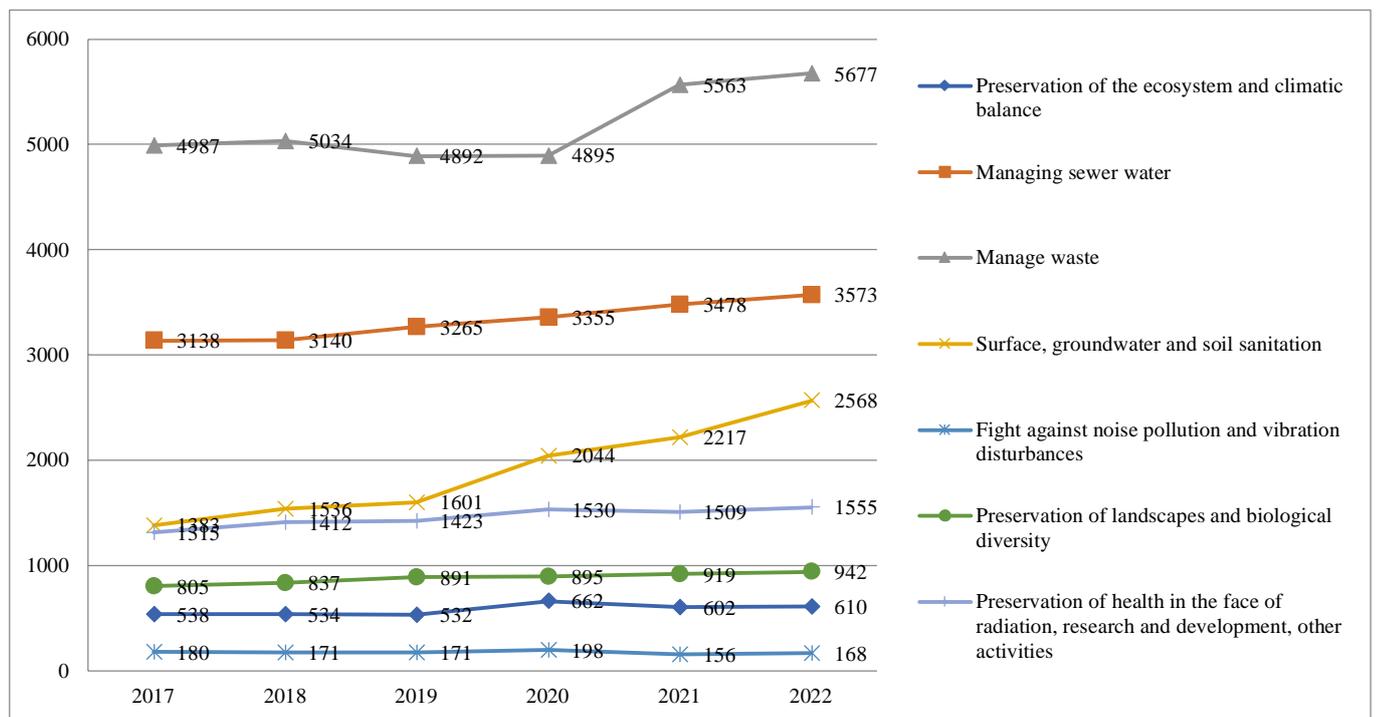
The table below presents environmental expenditure by sector in Switzerland from 2017 to 2022.

**Table 2.** Environmental expenditure by sector (in millions of francs)

According to the environmental sector	2017	2018	2019	2020	2021	2022
Preservation of the ecosystem and climatic balance	538	534	532	662	602	610
Managing sewer water	3138	3140	3265	3355	3478	3573
Manage waste	4987	5034	4892	4895	5563	5677
Surface, groundwater and soil sanitation	1383	1536	1601	2044	2217	2568
Fight against noise pollution and vibration disturbances	180	171	171	198	156	168
Preservation of landscapes and biological diversity	805	837	891	895	919	942
Preservation of health in the face of radiation, research and development, other activities	1315	1412	1423	1530	1509	1555

**Source:** (OFS, 2023) <https://www.bfs.admin.ch/bfs/fr/home/statistiques/espace-environnement/comptabilite-environnementale/depenses-protection.assetdetail.28585071.html>

**Fig.1.** Environmental expenditure by sector



**Source:** Prepared by researchers based on OFS statistics.

Most environmental spending by sector decreased in 2021 due to the effects of the coronavirus pandemic, which led to the shutdown of many economic activities to prevent the spread of the epidemic, as shown in Table n°2 and the figure n°1.

### 3.1.2 According to the institutional sector

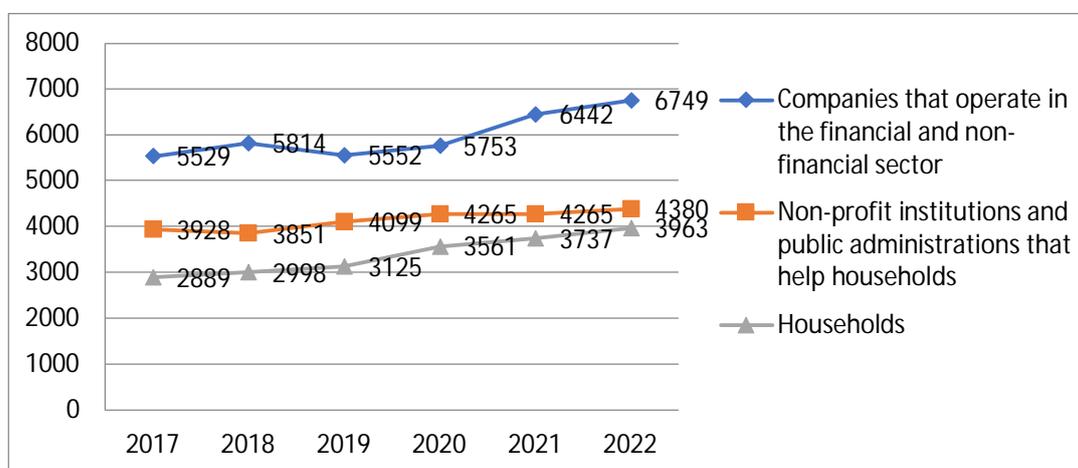
The table below presents environmental expenditure by institutional in Switzerland from 2017 to 2022.

**Table 3.** Environmental expenditure by institutional (in millions of francs)

According to the institutional sector	2017	2018	2019	2020	2021	2022
Companies that operate in the financial and non-financial sector	5529	5814	5552	5753	6442	6749
Non-profit institutions and public administrations that help households	3928	3851	4099	4265	4265	4380
Households	2889	2998	3125	3561	3737	3963

Source: (OFS, 2023) <https://www.bfs.admin.ch/bfs/fr/home/statistiques/espace-environnement/comptabilite-environnementale/depenses-protection.assetdetail.28585071.html>

**Fig.2.** Environmental expenditure by institutional



Source: Prepared by researchers based on OFS statistics.

Most environmental expenditure by institutional sector increased after 2021 due to the Corona epidemic, as institutions increased their spending to help the state cope with the disease, one of the factors influencing its spread was the environment.

### 3.1.3 According to its elements (environmental expenditure)

In the table below, we can see environmental expenditure in Switzerland from 2017 to 2022, according to their different elements.

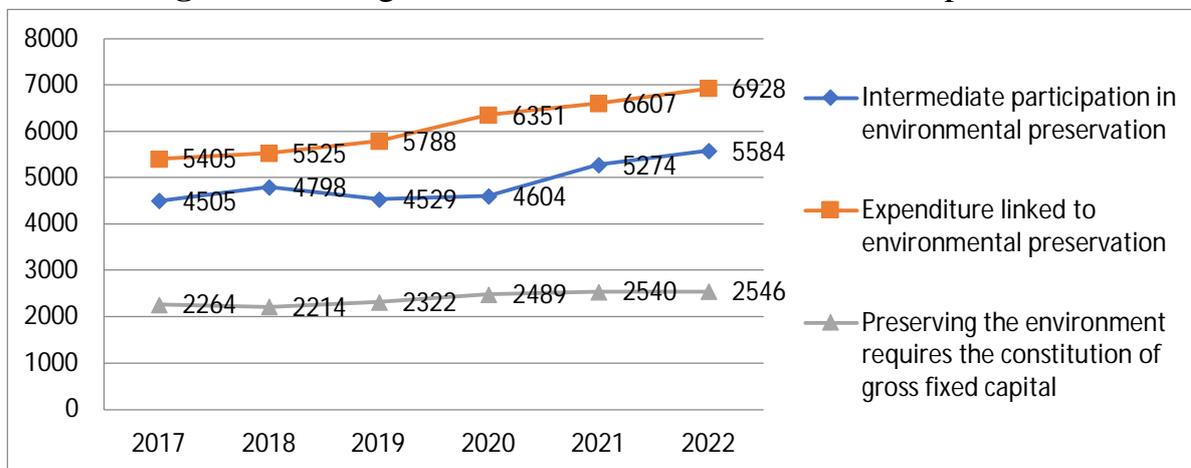
**Table 4.** According to the elements of environmental expenditure (in millions of francs)

According to the elements of environmental expenditure	2017	2018	2019	2020	2021	2022
Intermediate participation in environmental preservation	4 505	4 798	4 529	4 604	5 274	5 584
Expenditure linked to environmental preservation	5 405	5 525	5 788	6 351	6 607	6 928
Preserving the environment requires the constitution of gross fixed capital	2 264	2 214	2 322	2 489	2 540	2 546

Source: (OFS, 2023) <https://www.bfs.admin.ch/bfs/fr/home/statistiques/espace-environnement/comptabilite-environnementale/depenses-protection.assetdetail.28585071.html>

[environnement/comptabilite-environnementale/depenses-protection.assetdetail.28585071.html](https://www.bfs.admin.ch/bfs/fr/home/statistiques/espace-environnement/comptabilite-environnementale/depenses-protection.assetdetail.28585071.html)

**Fig.3.** According to elements the of environmental expenditure



**Source:** Prepared by researchers based on OFS statistics.

We see a continued increase in the elements of environmental expenditures from 2017 until 2022.

### 3.1.4 The proportion of national expenditure devoted to environmental protection in relation to GDP

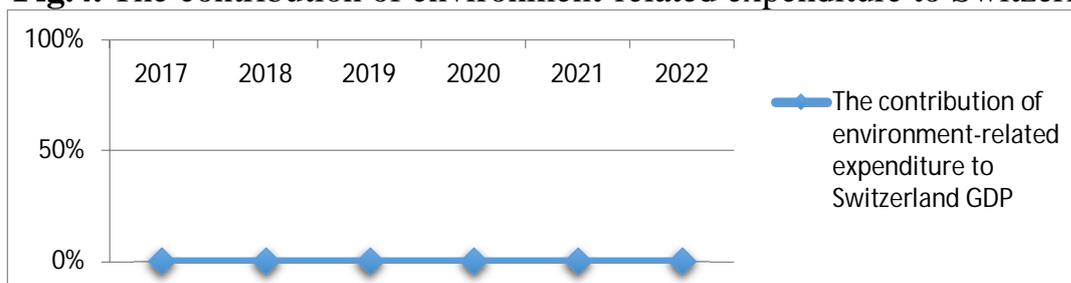
The contribution of environmental expenditures to Switzerland's GDP from 2017 to 2022 is shown in the table below.

**Table 5.** The share of environmental expenditures in Switzerland's GDP

The years	2017	2018	2019	2020	2021	2022
The contribution of environment-related expenditure to Switzerland GDP	1.8%	1.8%	1.8%	1.9%	1.9%	1.9%

**Source:** (OFS, 2023) <https://www.bfs.admin.ch/bfs/fr/home/statistiques/espace-environnement/comptabilite-environnementale/depenses-protection.assetdetail.28585071.html>

**Fig.4.** The contribution of environment-related expenditure to Switzerland GDP



**Source:** Prepared by researchers based on OFS statistics.

We note the stability of the contribution of environmental expenditure to Switzerland's GDP from 2017 until 2022, with very similar ratios oscillating between (1,8) and (1,9).

### 3.2 Environmental tax revenues

According to OFS figures, environmental tax revenues for the period 2017-2022 are as follows:

#### 3.2.1 Revenues linked to mobility

To analyze the revenue from environmental taxes linked to mobility between 2017 and 2022, we have the following table:

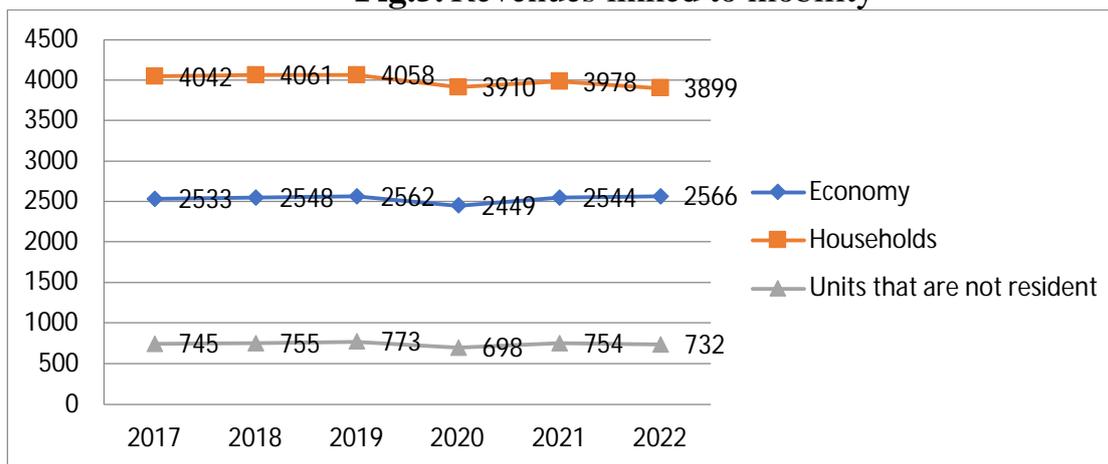
**Table 6.** Revenues linked to mobility (in millions of francs)

Revenues linked to mobility	2017	2018	2019	2020	2021	2022
Economy	2533	2548	2562	2449	2544	2566
Households	4042	4061	4058	3910	3978	3899
Units that are not resident	745	755	773	698	754	732

**Source:** (Office fédéral de la statistique (Suisse), 2023),

<https://www.bfs.admin.ch/bfs/fr/home/statistiques/espace-environnement/comptabilite-environnementale/prelevements-fiscaux.assetdetail.24505243.html>

**Fig.5.** Revenues linked to mobility



**Source:** Prepared by researchers based on OFS statistics.

Due to the quarantine imposed due to the coronavirus pandemic, which led to the closure of many businesses, we saw a drop in tax revenues in 2020.

Due to the increase in environmental tax expenditures imposed on institutions,

the environmental factor is considered an essential factor in overcoming the Corona pandemic, we have also seen an increase in tax revenue from 2021.

### 3.2.2 Revenues associated with stationary activities

To analyze the revenues associated with stationary activities between 2017 and 2022, we have the following table:

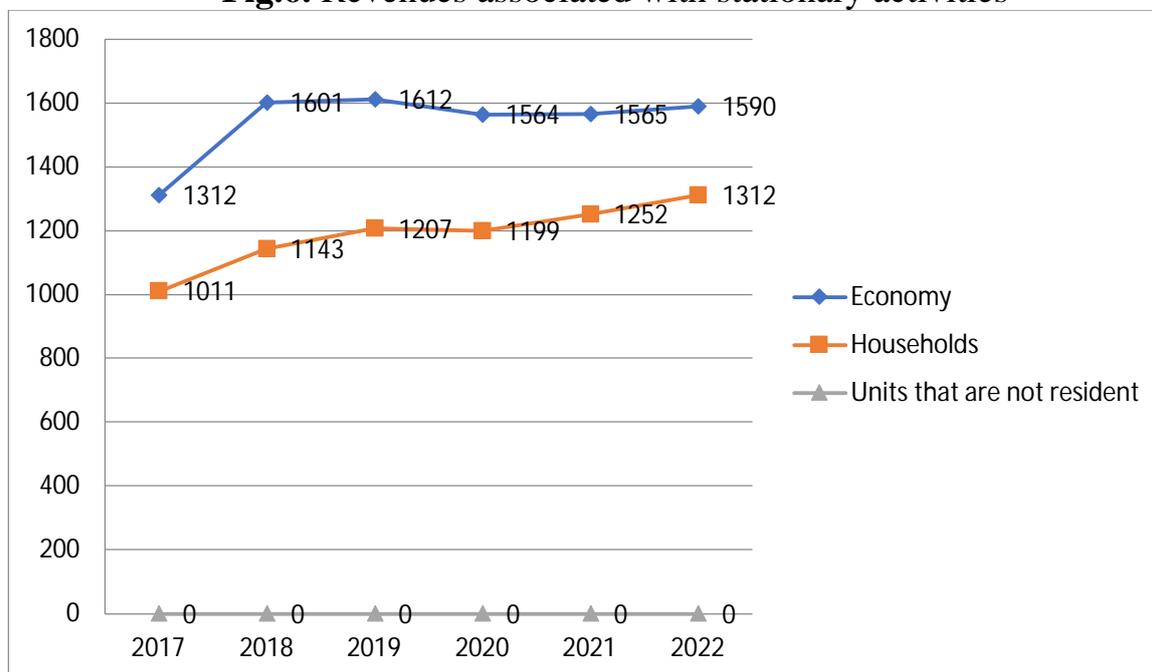
**Table 7.** Revenues associated with stationary activities

Revenues associated with stationary activities	2017	2018	2019	2020	2021	2022
Economy	1312	1601	1612	1564	1565	1590
Households	1011	1143	1207	1199	1252	1312
Units that are not resident	0	0	0	0	0	0

**Source:** (Office fédéral de la statistique (Suisse), 2023),

<https://www.bfs.admin.ch/bfs/fr/home/statistiques/espace-environnement/comptabilite-environnementale/prelevements-fiscaux.assetdetail.24505243.html>

**Fig.6.** Revenues associated with stationary activities



**Source:** Prepared by researchers based on OFS statistics.

The values increased from 2017 to 2018 and 2019 then decreased in 2020 and increased from 2021 and 2022. The Corona pandemic has had a detrimental effect on the Switzerland economy.

### 3.2.3 Share of environmental tax revenue in GDP

GDP is affected by environmental tax revenues, as shown in the table below:

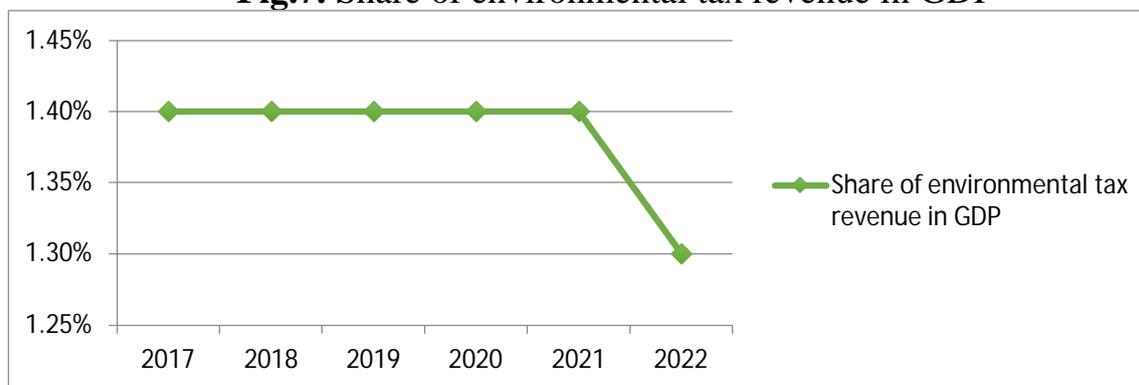
**Table 8.** Share of environmental tax revenue in GDP

The years	2017	2018	2019	2020	2021	2022
Share of environmental tax revenue in GDP	1.4%	1.4%	1.4%	1.4%	1.4%	1.3%

**Source:** (Office fédéral de la statistique (Suisse), 2023),

<https://www.bfs.admin.ch/bfs/fr/home/statistiques/espace-environnement/comptabilite-environnementale/prelevements-fiscaux.assetdetail.24505243.html>

**Fig.7.** Share of environmental tax revenue in GDP



**Source:** Prepared by researchers based on OFS statistics.

The contribution rate of environment-related tax revenues remained stable at a constant rate of 1.4% from 2017 to 2021, except for a slight decrease of 1.3% in 2022.

## 4. CONCLUSION

From the above it can be concluded that:

- ✓ We confirm the validity of the first hypothesis, and therefore environmental accounting is considered an essential tool that has a positive impact on environmental tax revenues;
- ✓ We noticed a decrease in the value of environmental tax revenues during the year 2020, which coincided with the emergence of the Corona epidemic, and therefore we reject the second hypothesis;
- ✓ Environmental taxes have become an essential tool used by various countries, including Switzerland, in preserving the environment.

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