PART II

Chapter 5

A Case Study of the Policy-related Transaction Costs of Direct Payments in Switzerland

Executive Summary

This case study presents an estimate of the transaction costs generated by the Swiss direct payment system. The costs are estimated for two case studies concerning the cantons of Grisons and Zurich, for which the implementation and control costs are assessed at five levels; namely the State, the canton, the control organisations, the borough, and the farm. While the costs accruing to public authorities and control organisations can be determined with exactitude, the numerous factors which influence costs as well as the differences between farms result in uncertainties when assessing labour expenditure and labour costs at farm level.

Discussions about the efficiency of direct payments and agricultural policy measures form the background of this case study. To date, transaction costs have been neglected in investigations on efficiency. However, due to the new orientation of agricultural policy in Switzerland and the European Union, with the associated de-linking of measures from production levels and their link-up with specific or farm-related regulations (cross compliance), the extent to which transaction costs influence the implementation and efficiency of policy and farm participation must be determined.

In Switzerland, direct payments have gained considerably in importance, with regular development in the delivery system and regular increases in the funding. between 1992 and 1998. Based on a new article to the Constitution and new agricultural laws, since 1999 direct payments have been linked to proof of ecological performance. General direct payments (Red Ticket measures) remunerate the multi-functional services provided by agriculture, while special ecological and ethological services (Green Ticket measures) are covered by additional payments.

In 2003, agriculture received a total of CHF 2.47 billion in the form of direct payments; 81% of this sum was granted for general payments and 15% for ecological direct payments. The remaining 4% covered summer pasturage contributions. In the same year, 89% of all Swiss farms fulfilled the conditions of proof of ecological performance. These farms covered 96% of the total utilised agricultural area. At the same time, organic farms held a 10% share, and this share rose noticeably in the 1990s. Participation also increased strongly with regard to ethological payments: in 2003, 30% of all livestock units were kept in accordance with BTS (animal housing system) requirements and 62% of total livestock units were entered in the RAUS (outdoors regularly) programme.

Overall transaction costs amount to CHF 3 million in Canton Grisons and CHF 3.9 million in Canton Zurich. Given the total transaction costs of CHF 1 100 per farm, costs between CHF 690 and CHF 755 arise for the farms. In Canton Grisons, these values are set off by overall direct payments amounting to CHF 167 million or CHF 60 800 per farm, and in Canton Zurich to CHF 141 million or CHF 38 500 per farm. This results in high transfer efficiency for the payments. In Canton Grisons, total transaction costs amount to 1.8% of the overall direct payments and 2.8% in Canton Zurich.

Public authorities pay approximately 37% of the total transaction costs in Canton Grisons and approximately 30% in Canton Zurich. The farms cover the remaining costs. From the point of view of the public authorities, the relationship between transaction costs and the direct payments disbursed can be regarded as very efficient. Transfer efficiency is influenced by factors relating to the system and environmental conditions as well as by the overall direct payments disbursed.

Overall transaction costs depend on five factors: 1) farm size; 2) the farm's participation in Green Ticket measures (ecological and ethological programmes); 3) organisation differences between the two cantons; 4) orientation of the farms; and 5) environmental influences. On the other hand, transaction costs per participating unit depend primarily on the size of the farm. The larger the farm, the lower the transaction costs per area unit, as bigger farms can spread their fixed cost share of the transaction costs over a greater area. The farm's fixed cost share and the transaction costs per farm depend not only on the processes stipulated by the State, but also on the capabilities of the farm manager.

The classification and interpretation of transaction costs must be in direct relation with the respective direct payment programmes and agricultural policy target system. Under the Swiss system, the services agriculture is called upon to provide as defined in the Federal Constitution are remunerated by means of direct payments. This means that transaction costs can be interpreted as part of the costs of quality assurance. The greatest part of the costs is attributable to controlling the regulations governing eligibility to receive payments. Thus, in the first instance, the sum of the direct payments is attributable to the desired quality of public goods, *i.e.* the multifunctional services provided by agriculture. This applies to both public authorities and the farms. Within the scope of the current direct payment system, any substantial reduction of transaction costs can probably only be achieved by modifying the quality requirements of the multifunctional services. An improvement in implementation and control efficiency demands simultaneous optimisation of transaction costs and the quality of the services, whereas these two dimensions exhibit conflicting objectives.

Abbreviations

German		English	
ÖLN	Ökologischer Leistungsnachweis	PEP	Proof of ecological performance
		PRTC	Policy-related transaction costs
RGVE	Raufutter erzehrende Grossvieheinheit	GLU	Grazing livestock unit
TEP	Tierhaltung unter erschwerten Produktionsbedingungen	TEP	Keeping livestock under difficult conditions
BTS	Besonders tierfreundliche Stallhaltungssysteme	BTS	Animal housing systems
RAUS	Regelmässiger Auslauf im Freien	RAUS	Turning animals outdoors regularly
Bio	Biologischer Landbau	Bio	Organic crop farming
		PSE	Producers support estimate
IP	Integrierte Produktion	IP	Integrated crop production
GVE	Grossvieheinheit	LSU	Livestock unit
A	Are	A	Are
Ha	Hectare	Ha	Hectare
BLW	Bundesamt für Landwirtschaft	FOAG	Federal Office for Agriculture
ALN	Amt für Landschaft und Natur Zürich		Zurich Office for Landscape and Nature

5.1. Background and goal

This case study examines the implementation of the direct payment system in two Swiss Cantons and estimates associated costs. The primary objective is to evaluate transaction costs, giving special consideration to cross compliance under the Swiss direct payment system. Due to the relationship between the regulations governing the proof of ecological performance for the farm's eligibility to receive direct payments and the ecological compensation programmes, the latter is also taken into account in the evaluation. Since the sums paid out in association with the ecological quality regulations are virtually insignificant, these measures are not included.

The primary objective can be sub-divided into three sections, or tasks:

● representation of the current direct payment system and the individual payments, giving due consideration to the regulations relevant for the farms, overall cross compliance on the farms, as well as the existing implementation and control institutions (Section 5.2);

● selection of suitable methods for the evaluation of transaction costs (Section 5.3); and

● evaluation of transaction costs under the existing direct payment system at federal and cantonal levels, as well as at the level of the implementation and control institutions and the farms (Section 5.4).

The evaluation of transaction costs presented in this chapter is limited to those costs arising from the implementation and control of the respective policy measures. In particular, this means that the costs arising from the following policy programmes are not taken into account:

● costs for planning and setting up a policy programme; and

● farm modification costs for participation in a programme (costs associated with a switch-over, reduction of number of livestock units or changes in use of land to comply with PEP, etc.).

5.2. The Swiss direct payment system

This section explains the direct payment system applied under Swiss agricultural policy. A short section describes the creation of this system. It is followed by a definition of its position within the constitutional context and its role in agricultural policy objectives. As direct payments are subject to numerous regulations it is necessary to describe them in detail to provide a basis for the calculation and interpretation of the transaction costs. The development of the direct payments granted and the areas, or animals, covered by the programmes is then presented.

Background of the direct payment system

In 1992, the seventh Federal Agricultural Report heralded a change in Swiss agricultural policy. Up until that time, policy had focussed mainly on ensuring that the nation was supplied with essential goods and services, and agricultural support was realised largely by means of market intervention. At the beginning of the 1990s, three reasons arose which, in parallel to the on-going GATT negotiations, demanded a fundamental revision of Swiss agricultural policy (Rieder, 1998):

● over-production resulting from the high price policy was costly for the State;

● high degree of pollution; and

● deteriorating income distribution between large and small farms, and likewise between lowland and mountain farms.

To counter this, a new agriculture article was introduced in 1996 into the Federal Constitution defining a policy based on the idea of multifunctional agriculture. This new definition is based on the perception that agriculture not only produces foodstuffs but also provides public goods which cannot be remunerated via the market. The provision by agriculture of these public utility services is ensured and remunerated by means of direct payments which are not linked to production.

Following the introduction of the first direct payments in the 1970's, the system underwent systematic development between 1993 and 1999, whereby the following four steps were fundamental:

1. The seventh Agricultural Report of 27 January 1992 formed the basis for the separation of price and income policies, and for the introduction of direct payments which were not linked to production as per 1 January 1993. New ecological direct payments were introduced. These were subject to regulations which related either to the area or animals involved (cross compliance on the level of farm activities).

2. Passage of the new constitutional article 104 BV (Federal Constitution) following the referendum of 9 June 1996. This article forms the basis for the agricultural policy 2002 and thus for the new law on agriculture.

3. Complementary direct payments linked to a minimum share of ecological compensatory areas of 5% as per 1997 and 7% as per 1998.

4. The new law on agriculture and the present direct payment system came into force on 1 January 1999. Entitlement to direct payments is linked to the proof of ecological performance for all farms (cross compliance on the farm level).

The Swiss direct payment system as an element of agricultural policy

The new agricultural policy, and thus the direct payment system, is based on Article 104 of the Swiss Federal Constitution. Section 5.1 of this chapter defines the multifunctional role of agriculture:

● Guaranteed food supply for the population: ample food supplies should not only be available for the population in "normal times", but it must also be possible to step up production to an adequate level in times of crisis.

● Conservation of natural resources and upkeep of rural scenery: the "soil" factor is of primary importance for agricultural production. As such, the protection of soil fertility is the central element in the conservation of natural resources. Furthermore, water, air, fauna and flora are also natural resources and must be given due consideration in the course of agricultural production.

● Rural scenery is marked by agricultural production. Both settlement structures and farming practices produce typical landscapes. However, husbandry does not involve the maintenance of a particular state, but rather the avoidance of disruptive interventions and influences.

● Decentralised settlement of the country: village communities, with their specific political and cultural life, should be preserved and developed thanks to strong agriculture.

Under the terms of the Federal Constitution, the State must ensure that these assignments are fulfilled by means of sustainable and market-orientated production. Due consideration must be given to the fact that, to a large extent, the tasks assigned to agriculture under the Constitution tie-in directly with prevailing production. There is a trade-off relationship between production targets and the environmental targets set for agriculture: the more intensive the production of agricultural goods, the greater the pollution. Therefore, Swiss agricultural policy perceives the target of sustainability mainly in its ecological dimension, but at the same time, production must be competitive and should allow farmers to produce efficiently and meet current demands.

Section 3a of the Constitution permits the State to supplement farm incomes by means of direct payments. The payments are made as remuneration for the provision of multifunctional services on condition that ecological performance is proven. The upper part of Figure 5.1 shows the direct payment measures as foreseen by law and their significance for the fulfilment of the multifunctional tasks assigned to agriculture.

There is a difference between general direct payments and ecological direct payments which are based on Section 3b of Article 104 of the Constitution. Under the terms of this article, the State is required to grant economically attractive incentives to encourage forms of production that are particularly environmentally acceptable, animal-friendly and close to nature. This means that specific direct payments can be granted for the provision of additional services as illustrated in the lower part of Figure 5.1. These ecological direct payments encourage additional, clearly defined services. While it is not possible to identify with certainty the effects of general direct payments on the fulfilment of the multifunctional tasks assigned to agriculture, the benefits of ecological direct payments which remunerate a specific service are immediately obvious.

Regulations of the direct payment system

In Switzerland, the disbursement of direct payments to farms is subject to regulations, whereby there are clear distinctions between the regulations for general direct payments and ecological or ethological contributions.

Cross Compliance Concept

In the relevant literature, the tie-in between financial support – in the case of agriculture, the eligibility to receive direct payments – and specific (ecological or social) regulations is generally referred to as "cross compliance": "*In the European Union debate, the terms cross compliance and environmental conditionality are often used interchangeably to describe the linking of a farmer's eligibility for agricultural subsidies to environmental conditions*" (European Environment Agency 2004). In this way, agricultural and environmental targets are linked together.

In the cross compliance concept, the differentiation between general and ecological direct payments can be made using the Red and Green Ticket Approaches (Christensen, 2000):

● Red Ticket Approach: if a farmer does not provide the required services, the payments are lowered or completely discontinued. The payments are linked directly to agricultural policy targets and only depend to a small extent on the benefits or costs of a programme.

● Green Ticket Approach: farms are offered an additional payment for measures which exceed the minimum requirements. To be precise, this is no longer a case of cross compliance, but rather an ecological requirement.

Figure 5.1. **The direct payment system**

Art. 104 BV Paragraph 1			
Sustainable and market-orientated production			
Policy	Secure food supply for the population	Conservation of natural resources and the upkeep of rural scenety	Decentralised settlement of the country
Area payments	XXX	XX	XXX
RGVE payments[1]		XXX	
TEP payments[2]		XXX	XX
Slope payments[3]		XX	XX

(Left side of rows above labelled: Direct payments)

Art. 104 BV Paragraph 3b	
	Promotion of forms of production which are particularly close to nature, environmentally acceptable and animal-friendly by means of economic incentives
BTS payments[4] RAUS payments[5]	Animals must be kept in groups in free-range housing systems. There must be three different parts in the shed. Animals kept outdoors at least 26 days a month during the vegetation period (13 days during winter)
Ecological compensation. Extensive cereals. Organic farming.	First crop: 15 June, no manure. No application of growth regulators and pesticides. Whole farm must follow organic farming directives.

(Left-side labels: Ethological payments; Ecological payments)

1. Payments for keeping grazing farm animals.
2. Payments for keeping livestock under difficult conditions.
3. Payments for farming on steep slopes.
4. Payments for animal housing systems.
5. Payments for turning animals outdoors regularly.

Source: FOAG.

The difference between general and ecological direct payments is to be found in the terms of payment. If a farmer fails to fulfil the requirements of proof of ecological performance, or only fulfils them in part, his general direct payments are lowered. On the other hand, he receives no ecological direct payments at all if he fails to fulfil all the requirements of the associated regulations.

Table 5.1 illustrates the two categories of cross compliance: Farms must provide an ecological performance to the extent of x. The costs of observing this requirement amount to C, direct payments amounting to y are granted for the performance of the service. Additional (environmental) services are rewarded with a payment z. If the requirements are not fulfilled, payments are cut by the factor α.

Table 5.1. **Definition of cross compliance measures**

Policy type	Net income with compliance (doing x or more)	Net income without compliance (not doing x)
Red Ticket	$y - C$	$(1 - \alpha)y$
Green Ticket	$z - C$	0

y: Payments to agriculture.
C: Costs of observing environmental requirements.
z: Support in case of fulfilment of an additional environmental requirement.
α: Reduction of payment in case of non-observance of the requirements: $(1 > \alpha > 0)$.
Source: Christensen (2000, p. 8).

Based on the cross compliance system, it is possible to draw conclusions regarding the anticipated participation of farms in the programmes:

● Payments linked to production: the less dependent a payment is on production, the more likely a farmer is to react to the ecological requirements.

● Amount of the direct payment in relation to the costs of participation: a farm's participation costs are the sum of the minimum proceeds resulting from production, the additional expenditure arising from the fulfilment of the regulations and the transaction costs. If the direct payment exceeds the farm's participation costs, it is economically worthwhile for the farm to participate in a programme. On the other hand, if the opposite applies, participation leads to a loss of income and is therefore not worthwhile.

Requirements for eligibility for general direct payments

General direct payments cover area payments, payments for grazing livestock units, payments for livestock husbandry under difficult conditions and slope payments. Three types of condition are valid for eligibility of these direct payments:

● General type of requirements: only those farm managers who run a private farm and have their place of residence in Switzerland are entitled to receive direct payments. Farms owned by the State, the cantons, the boroughs or legal entities receive no direct payments. In addition, farms which overstep the regulations stipulating the highest permissible number of livestock units do not receive any direct payments either.

● Proof of ecological performance is another principal requirement for receiving direct payments and forms a link between agricultural and environmental policy targets.

Proof of ecological performance consists of five elements (BLW, 2004):

● animal-friendly husbandry of livestock and observance of animal protection laws;

● balanced nutrient/fertiliser balance sheet;

● adequate share of ecological compensatory areas;

● regulated crop rotation;

● suitable soil conservation measures from arable zone up to and including mountain zone I;

● limited choice and regulated use of crop treatments and consideration of pollution thresholds and forecasts.

Structural and social requirements: structural requirements cover the criteria size of farm, minimum labour requirement, on-farm workforce and age of the farm manager. In addition, general direct payments are limited according to the size of the farm, the number of animals as well as income and assets. Figure 5.2 illustrates the grading according to size of farm and numbers of livestock.

Figure 5.2. **Grading of contributions according to area and number of livestock**
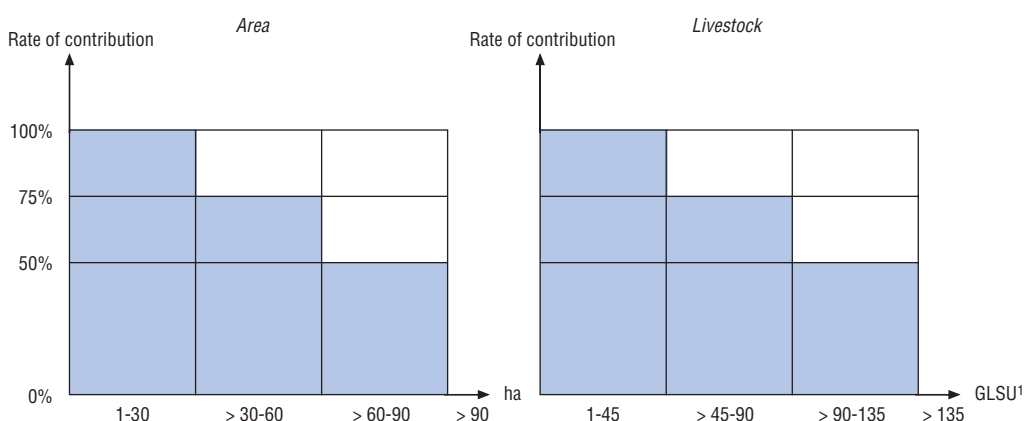
1. Grazing livestock unit (GLSU).

Source: Agricultural Report (BLW, 2003b).

In addition to proof of ecological performance and observance of general structural and social stipulations, eligibility to receive direct payments also depends on adherence to regulations specific to agriculture as defined in the laws on water protection, pollution control, nature conservation and protection of rural landscape. If a farmer contravenes these laws, he is not only fined but direct payments made to him can also be withheld. Furthermore, as of 2007 eligibility for the receipt of direct payments also depends on proof of basic professional training in agriculture.

Requirements for receipt of ecological contributions

Ecological contributions cover payments for ecological compensation, the extensive production of cereals and rapeseed as well as for organic farming. As a whole, the requirements for eligibility for these direct payments can be regarded as utilisation restrictions. As discussed above, these contributions are designed to compensate for the yield losses and extra outlay arising from participation.

Fertiliser and utilisation restrictions (due date for mowing) are, for example, relevant in the case of extensive meadowland and fallow, while the prohibition of growth regulators, fungicides or insecticides plays a role in the extensive production of cereals and rapeseed. The cultivation of high-standing trees or the maintenance of hedges or dry-stone walls is also rewarded by ecological direct payments.

Eligibility for receipt of contributions for organic farming is subject to the fulfilment of the stipulations of the Federal bio-regulations, whereby the salient point is that the entire farm must be run according to the guide-lines for organic farming. In particular, these include the prohibition of the use of mineral fertilisers, the foregoing of the use of all forms of chemical additives, and the observance of more stringent animal husbandry regulations.

Requirements for receipt of ethological contributions

Ethological contributions cover payments for particularly animal-friendly housing systems (BTS) and turning the animals outdoors on a regular basis (RAUS):

- An animal housing system is regarded as particularly animal-friendly when it consists of several areas where the animals are kept free in groups, when there is an adequate source of daylight and the animals have suitable opportunities to rest, move about and

occupy themselves according to their natural behaviour patterns. Stipulations for the various types of livestock are set down in a special regulation for particularly animal-friendly housing systems.

● Regular turning out means that grazing livestock are turned out on meadowland for at least 26 days per month during the vegetation period and that they are outdoors on at least 13 days per month during the winter season. Pigs must be able to go outdoors on at least three days per week. Rabbits and poultry must have the opportunity to go outdoors every day. In this case too, further stipulations for the individual types of animal are set down in a regulation.

Development of direct payments and participation in programmes

By way of an introduction to the development of the direct payments granted and participation in the various programmes, Figure 5.3 illustrates the most important types of direct payment and the changes they have undergone since 1993. Contributions for summer pasturing and payments for the cultivation of arable land are not included in this diagram:

Figure 5.3. **Development of the Swiss direct payment system**
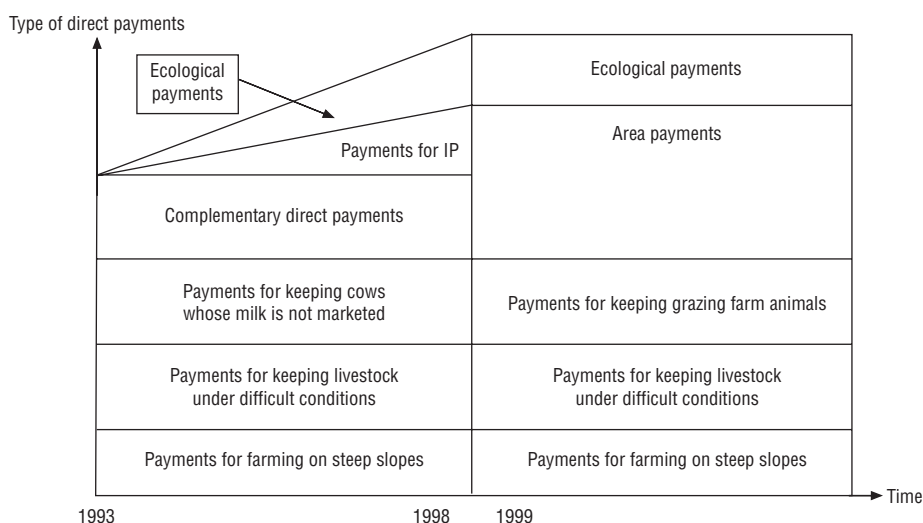
IP = Integrated production.
Source: Direct payments to agriculture 1998 (BLW, 1998, p. 61).

There has been a marked decline in the importance of market support in Switzerland due to the agricultural reform and the development of the direct payment system under which price and income policies are no longer interdependent. Prior to 1992, the share of market support in the total PSE (Product Support Estimate) was 78% and still amounted to 58% in 2002 (OECD, 2004). On the other hand, direct payments have become much more important (Rieder *et al.,* 2003). This is illustrated in Figure 5.4, which shows the development of the direct payments granted from 1993 onwards. In addition to the rise in total payments, the change of system in the year 1999 can be seen quite clearly.

A main feature of the new agricultural law was the coupling of direct payments to the fulfilment of proof of ecological performance. At the same time, the complementary direct payments, IP contributions and a part of the payments for organic farming were converted into area payments. Thus, the decline in the contributions for organic farming is a result of the system; however, the development of organic farming was not affected by the change of system.

Figure 5.4. **Development of direct payments since 1993**

Legend:
- Payments for summer pasturing
- Payments for turning animals outdoors regulary
- Payments for extensive cereal and rapeseed cultivation
- Payments for ecological quality
- Payments for farming on steep slopes
- Payments for integrated crop production
- Area payments
- Payments for organic crop farming
- Payments for green fallow
- Payments for ecological compensation
- Complementary direct payments
- Payments for keeping livestock under difficult conditions
- Payments for keeping grazing farm animals
- Payments for animal housing systems

Source: Table 5.2.

By the year 2001, there was a slight decline in contributions for the keeping of livestock under difficult production conditions. This can be explained by the fact that the number of farms entitled to these payments fell due to farmers leaving this sector. However, as the remaining farms usually keep more animals than the maximum entitlement limit of 15 LSUs, as a rule it was not possible to disburse more payments in spite of the increasing area involved. After 2002, when the limit for contributions for the keeping of livestock under difficult conditions was raised from 15 to 20 LSUs per farm, a total of roughly 80 000 additional LSUs (+17%) became eligible for payments, which explains the marked expansion of these contributions.

Table 5.2. **Development of direct payments between 1993 and 2002 (in CHF 1 000)**

Direct payments[1]	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
General direct payments											
Area payments (since 1999)	0	0	0	0	0	0	1 163 094	1 186 770	1 303 881	1 316 183	1 317 956
Complementary direct payments (until 1998)	610 724	779 802	794 815	888 757	872 324	825 113	0	0	0	0	0
Payments for integrated crop production (until 1998)[2]	41 550	69 652	156 412	417 223	500 925	460 020	0	0	0	0	0
Payments for keeping grazing farm animals	119 207	99 330	101 790	96 970	93 383	91 863	254 624	258 505	268 272	283 221	287 692
Payments for keeping livestock under difficult conditions	266 535	266 894	268 278	265 965	261 918	259 119	255 882	251 593	250 255	289 572	287 289
Payments for farming on steep slopes	109 147	99 297	98 860	98 620	98 070	95 110	105 207	106 790	106 686	105 862	106 154
Total of general direct payments	**1 147 163**	**1 314 975**	**1 420 155**	**1 767 535**	**1 826 620**	**1 731 225**	**1 778 807**	**1 803 658**	**1 929 094**	**1 994 838**	**1 999 091**
Ecologically motivated payments											
Payments for ecological compensation	31 919	48 696	66 596	79 211	87 665	90 673	100 674	108 130	118 417	122 347	124 927
Payments for ecological quality	0	0	0	0	0	0	0	0	0	8 934	14 638
Payments for green fallow[3]	3 054	5 695	8 109	12 695	19 494	24 613	17 652	17 150	0	0	0
Payments for extensive cereal and rapeseed cultivation	58 168	65 486	48 500	39 600	47 570	45 700	35 135	33 398	32 526	31 938	31 255
Payments for organic crop farming[4]	3 945	5 702	14 096	39 266	47 501	44 077	11 637	12 185	23 488	25 484	27 135
Payments for turning animals outdoors regulary	5 387	7 007	8 833	31 798	44 370	56 421	72 688	83 370	121 421	131 655	140 106
Payments for animal housing systems	0	0	0	6 055	9 523	12 641	21 002	24 748	34 034	39 029	43 257
Total of ecologically motivated payments	**102 473**	**132 586**	**146 134**	**208 625**	**256 123**	**274 125**	**258 788**	**278 981**	**329 886**	**359 387**	**381 318**
Payments for summer pasturing	30 750	46 630	47 830	66 910	66 553	66 885	67 571	81 238	80 524	89 561	91 381
Total	**1 280 386**	**1 494 191**	**1 614 119**	**2 043 070**	**2 149 296**	**2 072 235**	**2 105 166**	**2 163 877**	**2 339 504**	**2 443 786**	**2 471 790**

1. According to direct payment regulation; measures prior to 1999 are subject to subsequent measures.
2. Belonged to ecological contributions, after the introduction of proof of ecological performance, IP payments were disbursed *via* area payments.
3. Expiring regulation of 1999-2000.
4. From 1999, the contribution for organic farming is lower as a part of it was converted into general area payments.
Source: 1993 to 1998: Report on the disbursement of direct payments (BLW, various years); 1999 to 2003: Agricultural Reports (BLW, various years).

Table 5.3. **Development of area and livestock participation under the measures between 1993 and 2002**

	Units	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Total area[1]	ha	1 061 840	1 061 840	1 061 840	1 082 490	1 075 728	1 075 405	1 071 899	1 072 492	1 071 130	1 069 770	1 067 055
Total livestock units (LU)[2]	LSU	1 375 831	1 375 831	1 330 282	1 336 189	1 307 714	1 303 255	1 304 285	1 299 512	1 310 346	1 305 363	1 287 028
General direct payments												
Area payments (since 1999)	ha							1 021 945	1 029 899	1 028 877	1 023 819	1 027 321
Complementary direct payments (until 1998)	ha	1 020 858	1 001 300	957 014	968 545	971 233	976 422	0	0	0	0	0
Payments for integrated crop production (until 1998)[2]	ha	179 152	298 297	364 414	646 282	784 562	833 530	0	0	0	0	0
Payments for keeping grazing farm animals	Cows/LU	68 061	68 726	71 566	72 630	73 560	74 999	289 467	298 112	311 283	329 702	336 891
Payments for keeping livestock under difficult conditions	GVE	503 211	480 923	477 506	473 877	463 354	456 466	455 177	450 313	452 093	529 908	525 163
Payments for farming on steep slopes	ha	309 693	242 503	239 795	238 239	235 170	234 810	232 020	233 219	233 020	231 069	230 577
Ecologically motivated payments												
Payments for ecological compensation	ha	69 393	74 099	78 139	94 039	103 919	107 892	107 298	111 851	117 302	119 729	121 010
Payments for ecological quality	ha	0	0	0	0	0	0	0	0	0	15 552	26 921
Payments for green fallow[3]	ha	1 104	2 003	2 804	4 805	6 841	8 245	0	0	0	0	0
Payments for extensive cereal and rapeseed cultivation	ha	72 960	81 858	80 370	79 467	95 612	91 402	87 761	83 577	81 576	80 140	78 425
Payments for organic crop farming	ha	18 908	21 223	28 350	53 982	66 885	72 466	78 454	82 822	93 565	102 802	110 134
Payments for turning animals outdoors regulary	LU	91 412	117 952	146 283	254 759	355 513	434 550	538 667	618 000	690 939	742 993	793 517
Payments for animal housing systems	LU	0	0	0	94 145	139 707	171 462	225 434	265 236	310 139	345 763	384 969
Payments for summer pasturing	LU	302 403	301 416	310 184	315 632	310 965	306 203	297 015	312 477	308 418	291 610	315 156

1. *Source*: Statistical surveys and assessments; 1993 and 1994 no data (= Utilised Agricultural Area (UAA) for 1995).
2. *Source*: Statistical surveys and assessments; 1994 no data (= value as per 1993).
3. Expiring regulation of 1999-2000, as per 1999 the respective areas are no longer published.
Source: 1993 to 1998: Report on the disbursement of direct payments (BLW, various years), 1999 to 2003: Agricultural Report (BLW, various years).

Between 1993 and 2003, the direct payments disbursed have risen from CHF 1.28 billion to CHF 2.47 billion (see also Table 5.2). In 2003, general direct payments accounted for the largest share, namely 80.9%, of these payments. The financial importance of ecological and ethological contributions is relatively small (15.4%) by comparison. With the exception of the adaptation of payments for keeping livestock under difficult production conditions already mentioned above, general direct payments have not risen any further since 1999. On the other hand, ecological and ethological contributions still show a slight increase, which can be explained by the fact that there is a steady rise in the number of farms taking part in the programmes (Figure 5.5 and Table 5.3).

Figure 5.5 shows the development of the shares of area and LSUs which farms put into programmes for general direct payments. Figure 5.5 is based on the data presented in Table 5.3, whereby contributions for grazing livestock units replace those for farmers who keep cows but do not produce traded milk. Thus, a considerably larger number of animals (roughly 200 000 LSUs, see Table 5.3) is eligible for these payments. Furthermore, the increase in payments since 1999 may also be attributable to the rising number of withdrawals from milk production. This assumption is supported by the increasing number of LSUs participating as shown in Table 5.3.

Figure 5.5 shows clearly that in 2003, area payments were granted for 96% of the total agricultural land in Switzerland. At the same time this means that the criteria for proof of ecological performance are observed on these areas, *i.e.* the managers of these areas can provide this proof. In 2003, a total of 57 397 farms, or roughly 89% of all the farms in Switzerland, fulfilled the conditions for the receipt of area payments. As a result of the system itself, the shares held by other contributions is lower since, given the objectives foreseen under the programmes, neither every type of animal nor the entire agricultural area are eligible to receive payments.

Figure 5.6 depicts the development of ecological direct payments. The number of participants in the RAUS (outdoors) and BTS (particularly animal-friendly housing) programmes is still rising strongly and accounts for significant shares – 62% (RAUS) and 30% (BTS). The lower share held by the BTS programme results from the higher requirements on the buildings involved. Those farms that already have buildings which fulfil the programme's criteria (housing with outdoor yard) are eligible to participate, while the remaining farms are obliged to invest in their animal housing if they wish to take part.

Organically worked areas held a share of about 10% in 2003. Switzerland has a total of 65 866 farms of which 6 186 or 9.4 % are worked according to the principles of organic farming. This puts Switzerland in the lead compared to rest of Europe and is attributable largely to marked growth at the beginning of the 1990s.

On the other hand, ecological compensatory areas and extensive cereal cultivation hold a modest share. With regard to ecological compensatory areas, it must be mentioned that in order to qualify for direct payments farms must put a percentage of their area into the ecological compensation programme, namely 5% as per 1997, and 7% from 1998 onwards. Independently of these limits, contributions for services in the ecological compensation sector are reimbursed by specific payments. In 2003, payments for extensive meadowland and for high-standing fruit trees represented the most important elements of ecological compensation, accounting together for about 70% of the payments disbursed for ecological compensation.

Figure 5.5. **Development of the area and LSU shares
in the general direct payment programmes**

- Per cent of LU with payments for keeping grazing farm animals
- Per cent of total area with payments for farming on steep slopes
- Per cent of LU with payments for keeping livestock under difficult conditions
- Per cent of total area with payments for integrated crop production
- Per cent of total area with complementary direct payments
- Per cent of total area with area payments

Source: Table 5.3.

Figures 5.5 and 5.6 illustrate clearly the differing effects over time of the Red and Green Ticket Approaches. While in most cases Red Ticket measures exhibit constant participation at a high level, Green Ticket measures are generally characterised by rising participation. After a certain time, this stabilises at a steady level, as it is not beneficial for those farms which already participate to commit more land or animals to the programme or to go in for the programme.

Figure 5.6. **Development of area and LSU shares in programmes for ecological and ethological direct payments**

5.3. Estimation of policy-related transaction costs
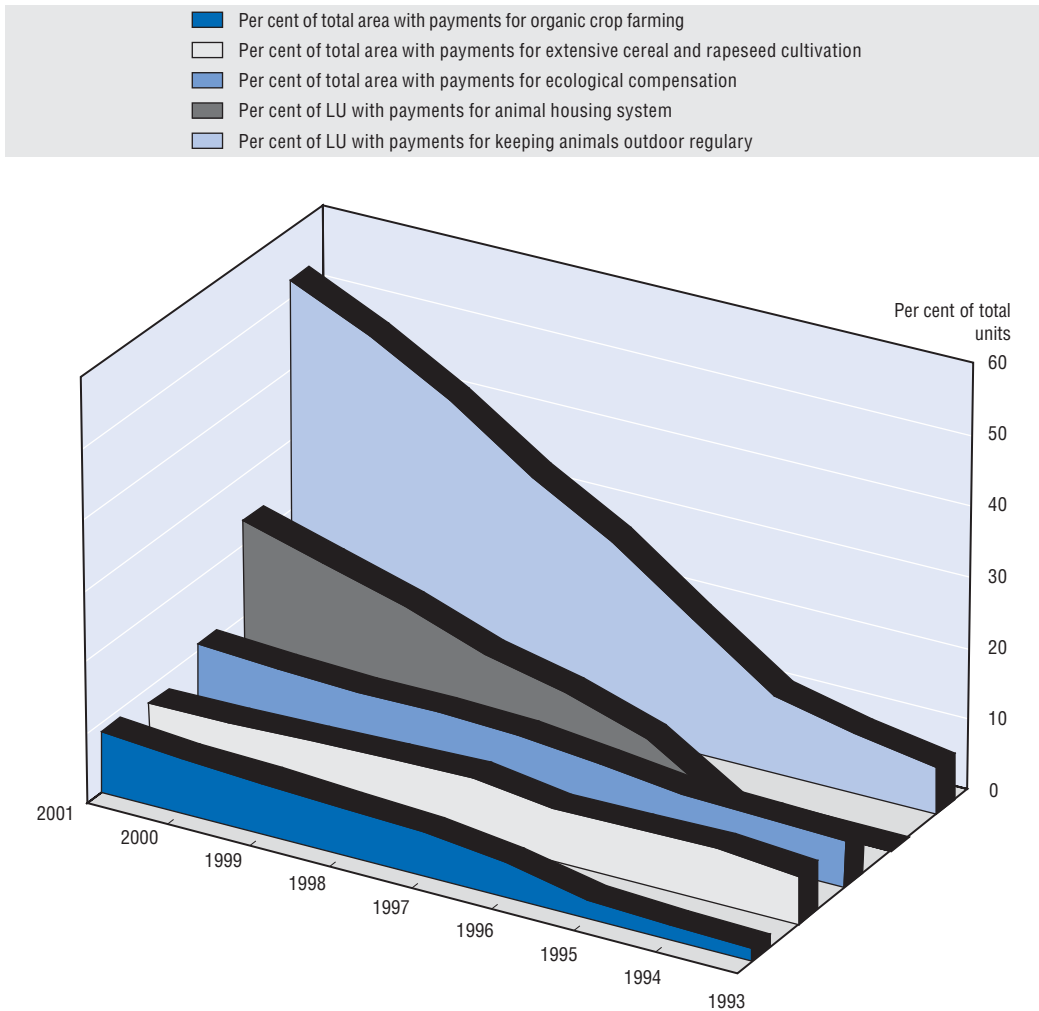
Source: Table 5.3.

5.3. Estimation of policy-related transaction costs

This section deals with the most important fundamentals which serve as a basis for the estimation of transaction costs. The general concept of the assessment is first presented. The organisational implementation of the Swiss direct payment system is then described and the two case study of Cantons, Grisons and Zurich are introduced. The last two sub-sections outline the actual procedure for the calculation of transaction costs at the various administrative levels and the key figures used for interpreting direct payments.

General concept for the calculation of policy related transaction costs

By way of an introduction to the origins of the calculation concept, Figure 5.7 depicts a general system for the implementation of political measures – in this case direct payments – with the actors and their interrelationships. Each actor receives or passes on

Figure 5.7. **Flowchart and processes in a general implementing and monitoring system**
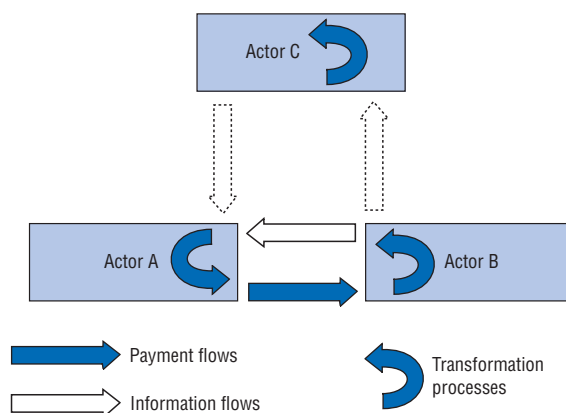
information or money. In order to perform these actions, the actors need an internal transformation process: information is received, processed and passed on, the flow of money or of payments is generated.

Each arrow and process illustrated here is relevant to the transaction costs, whereby there is a fundamental difference between transport costs and transformation costs. This is illustrated in Figure 5.8. In addition, we differentiate between transport costs for information flow and the flow of money (direct payments).

Figure 5.8. **PRTC in a general implementing and monitoring system**
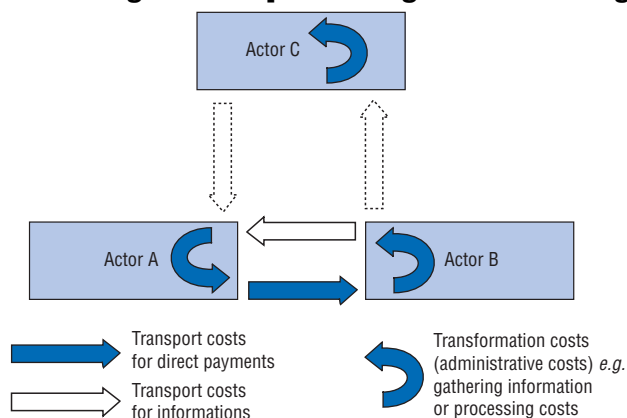
PRTCs (in or outflow) arise for each actor at each arrow; it is not apparent who pays the costs.

The multilevel measures of the direct payment system give a further dimension to the system shown in Figure 5.8, whereby interrelationships also exist between the processes and flows of the individual measures. For example, the control of the proof of ecological performance applies to several measures.

Each actor within the system generates costs; that is, both transformation costs and transport costs. The party who generates these costs must not necessarily be the one who has to pay for them. This applies in particular to private actors or corporate bodies who invoice their services (costs) to other actors (*e.g.* private control organisations).

Given this general knowledge of the system, the following basic information is essential for determining transaction costs:

- knowledge regarding the relevant participating actors;
- knowledge regarding the political measures;
- knowledge regarding the interrelationship between the actors in the context of the individual measures;
- knowledge regarding the transformation processes of the actors in the context of the individual measures; and
- knowledge regarding who pays the costs.

This knowledge forms the basis for the definition of cost centres which contain information regarding who pays the costs (T), who generates the costs, *i.e.* actor (V) and political measures (M), or which facilitates differentiation between these parties.

Thus, a specific cost centre K related to a measure can, in general, be referred to as K_{TVM}. The cost centre is defined by a function of the cost-generating process and structure characteristics.

K_{TVM} = f (processes, structure characteristics)

If all the cost centres can be obtained according to this principle, it is possible to tabulate the results (Table 5.4). The required results can be derived by simple additions *via* the respective indices.

Table 5.4. **Illustration of the general concept of PRTC acquisition by cost centres**

Measure M	Payer 1	Payer 2	
	Actor 1	Actor 2	Actor 3
M1			K_{T2V3M1}
M2			
M3			

There are two different methods with which the specific cost centres K_{TVM} can be determined.

Bottom-up or input method:

The bottom-up method represents a direct evaluation of the cost function, whereby every structure and process characteristic (factors) generates costs. The respective costs are attributed to each factor.

K_{TVM} = f(F)

f(F) = Sum(a_i * F_i) whereby a_i = costs and F_i = factors

The use of the bottom-up method on its own is only possible for cost centres for which all the cost-generating factors (inputs) and their costs are known. However, this is not always the case. This problem does not arise with the top-down method.

Top-down or output method:

In the case of the top-down approach, the transaction costs of a certain measure are calculated on the basis of the overall costs of a payer. It is often easier to determine a sum for cost centres than the costs of an individual measure. For example, a payer's overall costs may be known through the budget position of a public institution, while

their distribution between cost centres is not available. The top-down approach deals with this distribution by dividing a fixed output, such as the State's total implementation costs, between the cost centres. However, this demands precise knowledge of the processes which generate this output.

The first step involves the allocation of an institution's overall costs to the various processes. In the second phase, assumptions can be made regarding the distribution of these partial costs between the cost centres (Table 5.5).

Table 5.5. **Procedure for the top-down method**

1st Step	
$V_1 = C$	C = absolute sum of transaction costs of actor V_1
$V_1 = Sum(a_i * V_1)$	with $sum(a_j) = 1$ and $a_j * V_1$ = costs for process P_i
	a_j = evaluation of partial expenditure/partial costs for process P_i
2nd Step	
$P_i = Sum(a_{V1Mi} * P_i)$	with $sum(a_{V1Mi}) = 1$ and $sum(a_{V1Mi} * P_i) = a_j * V_1$ = costs for process P_i
	a_{V1Mi} = evaluation

For example, the overall costs for implementation in Canton Grisons are known. A part of these costs are generated by the number of farms, regardless of their farming practices and participation in measures. The evaluation of this share corresponds to the evaluation of a_i in Step 1. The value a_{V1Mi} must be evaluated in Step 2 in order to allocate these partial costs P_i to the measures. Two variants for this evaluation are presented later in this section.

The values for K_{TVM} can be evaluated with statistical methods using a time series analysis for one payer or a cross-section analysis involving similar payers (*e.g.* Huber, 1998; or Mann, 2001). Good values for C and sufficient data points are both essential for the calculation of useful results. To a large extent, the relevant bases for calculation for the Swiss direct payment system are lacking or can only be acquired at great cost.

As opposed to statistical evaluations, the allocation of costs to the various cost centres can also be realised on the basis of assumptions. Detailed knowledge of the implementation and control processes is a prerequisite for fixing these assumptions. Furthermore, the effects of the assumptions reached can be tested and the results delimited within a reasonable scope by means of variant calculations (for both methods).

Organisation of the implementation of the Swiss direct payment system (processes)

The implementation of the Swiss direct payment system is subject to the terms of the federal direct payment regulation DZV (SR 910.13). The actors and their duties are described in Section 4 of this regulation, as illustrated in the columns (Figure 5.9). The lines show the principal elements of implementation, while the arrows indicate the relationship between the actors. These combine in the white fields to show the actors' main processes. The costs of these processes flow into the evaluation of the transaction costs. These processes are described in detail in Section 5.4 which presents the procedure for the evaluation of transaction costs at the various administrative levels.

Basically, the implementation of the direct payment system involves three groups of actors: farmers or farms, the cantons and the state.

Figure 5.9. **Actors and processes in the implementation of the Swiss direct payment system**

	Farm	Boroughs	Canton	State
Data determination and control	Fill in forms Records	Determination and control of structural data plus field controls of ecological requirements	Electronic data acquisition and control	Data acquisition and control
		Control organisations		
Control of requirements	Farm controls	Farm controls	Verification of eligibility for direct payments, control	Supervisory controls
Disbursement and implementation of sanctions			Payments of DPs to farmers and imposition of penalties in case of deficiencies	Disbursement to the Cantons
Other tasks			Advisory services for control organisations Information office	Reporting Advisory service for the Cantons

Farmers are integrated into the implementation process in three ways: they must complete application forms for the respective direct payment; they must keep appropriate records of their activities on the farm over the year to provide a basis for the controls and they play an active role when the controls take place on the farm.

The cantons are the most important executive institution. They organise data determination, on-farm controls requirements, verify eligibility to receive direct payments, impose penalties in case of deficiencies, and disburse the direct payments to the farmers. At the same time, they are a link in the chain of communication between legislators and the individual providing the service (farmer). The cantons are free to out-source part-sectors, such as controls or data determination, to other actors. In most cantons, the boroughs are involved in the fields of data determination and imposing ecological requirements (*e.g.* control of due date for mowing ecologically compensatory areas). In some cantons (*e.g.* Zurich), on-farm controls (fulfilment of proof of ecological performance, RAUS, BTS) are carried out by private organisations. Control of organic farming is out-sourced to private organisations in all cantons.

The Ministry of Agriculture (BLW) is the highest instance and as such has the task of supporting and controlling implementation at the cantonal level. In addition, the Ministry disburses the contributions to the cantons and reports on implementation.

Case studies

The description of the relevant processes reveals that the cantons play a leading role in the implementation and control system. to a large extent, cantons have the authority to decide for themselves on the manner in which they perform their duties. Accordingly, different patterns have developed with regard to implementation. This applies in

particular to the degree of out-sourcing of the control organisations. In addition, there are minor differences in the organisation of data determination. Due to the differing systems employed by the Cantons, the transaction costs for the whole of Switzerland can only be obtained if every Canton is included in the investigation.

In this case study, the investigation is limited to two case studies of the cantons Grisons and Zurich. The control systems utilised by theses cantons differ in that in Grisons the canton runs the control office, while in Zurich it is completely out-sourced to the private organisation Agrocontrol. In addition to these organisational differences, the two cantons are ideal for the case study as they are relatively large and their farming practices cover most types of farm and agricultural zones. Table 5.6 presents a comparison of the Cantons Zurich and Grisons based on organisational and structural criteria.

Table 5.6. **Organisational and structural differences of the case study cantons**

	Canton Grisons	Canton Zurich
Organisation		
Control office	Cantonal control office	Agrocontrol (Farmers' Union)
Data acquisition and field controls	Boroughs	Boroughs
Electronic data acquisition	Canton	By students
Structural characteristics		
Number of boroughs with agriculture	207	169
Number of farms with direct payments	2 745	3 657
% organic farms	50.1%	12.9%
% farms in mountainous area	92.4%	11.4%
% organic farms in mountainous area	53.9%	23.6%
Average size of farms eligible to receive direct payments	19.13 ha	19.41 ha
Total direct payments	167 Mio. CHF	141 Mio. CHF
Direct payments per farm	60 838 CHF	38 556 CHF
Direct payment/ha exploitable surface area	3 180 CHF	1 986 CHF

Source: Own surveys plus AGIS-Data Bank (BLW, 2003a).

Overall, while Canton Grisons has fewer farms, the average size of the farms which are eligible to receive direct payments is practically identical. In Canton Zurich there are far less organic farms and farms situated in mountainous areas. The share of organic farms is larger in mountainous areas, in particular in Canton Zurich. Roughly CHF 167 million are disbursed in the form of direct payments in Canton Grisons, not counting summer pasture contributions and contributions under the terms of the ecological quality regulation. Canton Zurich receives about CHF 140 million. Thus, per farm and per hectare agricultural land, Canton Zurich only accounts for a little over 60% of the payments received by Canton Grisons. This is mainly due to the lower arable share, the higher rates for mountainous areas and the lower importance of dairy farming in Canton Grisons.

In order to evaluate the transaction costs for the case studies, it is essential that the transaction costs at farm level of all the farms within both cantons are included. The same applies to the costs incurred by the boroughs and cantons. On the other hand, at the State level, the transaction costs for the chosen cantons must be isolated from the total expenditure on the implementation of direct payments.

Procedure for calculating policy-related transaction costs

General summary of procedure

In this case study, the estimation of transaction costs and their allocation to the individual measures differ for each actor. However, a common element is that every farm within a canton is assigned a cost share pertaining to each actor. The values K_{TVM} are calculated for each farm and are then added again to compile the transaction costs per actor.

Depending on the data available, an actor's overall or partial costs are calculated using either the top-down or bottom-up procedure. Every actor exhibits cost items which even experts find difficult to allocate directly to a specific measure. In this case, Step 2 of the top-down procedure is applied, whereby two different methods are used to determine the values a_{VM}.

Variant "Participation":

In the case of the "Participation" variant, a farm's participation or non-participation in a measure is the only relevant factor for allocation to the measures. For example, if a farm takes part in all the measures, the costs of completing the direct payment form are distributed evenly over all the measures.

> $a_{VM} = 1/sum(M) * M$; whereby M = 1 if a farm participates in measure M and M = 0 if it does not participate in measure M.

Variant "Direct payment share":

> On the other hand, in the case of the "Direct payment share" variant, the costs are distributed over a farm according to the direct payment shares of the measures.
>
> a_{VM} = direct payments (M)/sum(direct payments) of the individual farm

The following sections are devoted to describing the procedure for calculating and allocating costs to the measures for all the actors involved. In conclusion, the process is summarised formally in Table 5.7.

Procedure at farm level

Figure 5.10 illustrates the processes which are relevant for calculating transaction costs at farm level, whereby labour costs are the main element. Labour expenditure relating to the individual processes is estimated by means of expert interviews and multiplied by pre-set labour costs. The influence of uncertainties in these estimations is tested by means of variant calculations using different labour costs (CHF 0 to 25 per hour).

The costs are calculated for each individual farm. In the case of certain items, a farm's participation/non-participation in a measure (*e.g.* record of time outdoors for the RAUS programme) is decisive. If this applies, the respective cost share is allocated directly to a measure. On the other hand, in the case of other items, it is only relevant if a farm receives direct payments or if the costs are related to structural characteristics of the farm. These costs are allocated to the measures according to the variants mentioned earlier in this section.

Table 5.7. **Procedure for cost allocation to the individual farms and measures**

Level	Actor	Cost factors in CHF	Distribution key – $K_{Mi} = a_{VMi} *$ cost factor	Explication for the cost assignment to the individual farm
State	State	Cost factor Canton	/K/BK	Allocation *via* number of Cantons and number of farms per Canton
		Cost factor farm	/BET	Allocation *via* number of farms in CH
		Cost factor measure	/MET/a_{Vmi}	Allocation *via* number of farms participating in CH
		Cost factor implementation quality	*A_i/BK	Allocation *via* quality characteristics of the Canton and number of farms in the Canton
Canton	Canton	Cost factor farm	/BET	Allocation *via* number of farms in the Canton
		Cost factor measure	/MET/a_{Vmi}	Allocation *via* participating farms in the Canton
		Cost factor not assignable	/BET	Allocation *via* number of farms in the Canton
Borough	Borough	Fixed costs borough	/BET	Allocation *via* number of farms in the borough
		Cost estimate per farm		No allocation necessary
		Cost factor measure	/MET*/a_{Vmi}	Allocation *via* participating farms within the borough
Canton	Control organisation PEP	Cost factor farm		Fixed lump sum per direct payment farm (BP)
		Cost factor measure		Fixed rate per participation in measure (A)
Farm	Bio Inspecta	Cost factor farm – BP	/a_{VMi} *BIO for i = organic farming with condition $K_{Mi} >= 0$	No allocation necessary
		Cost factor measure – A	/a_{VMi} *BIO for i = organic farming with condition $K_{Mi} >= 0$	No allocation necessary
	Farm	Cost factor farm		No allocation necessary
		Cost factor measure	/a_{Vmi}	No allocation necessary
PRTC of a measure Mi in a case study Canton			Column sum *via* farms	
PRTC of a case study Canton			Column sum *via* farms and measures	

Ai = Distribution key – implementation quality for Canton i
a_{VMi} = Key for allocation to measure Mi
BA = Type of farm – BIO or PEP with BIO + PEP = 1
BET = Sum of the farms at a level (first column of Table 5.7)
BK = Sum of the farms in the case study Cantons
K = Sum of all Cantons
KM_i = Partial costs of an actor for measure M_i (partial costs of K_{TVM})
MET = Sum of the farms at a level, which participate in measure Mi
ÖLNET = Number of PEP farms at a level (first column)

Figure 5.10. **Processes taken into consideration at farm level**
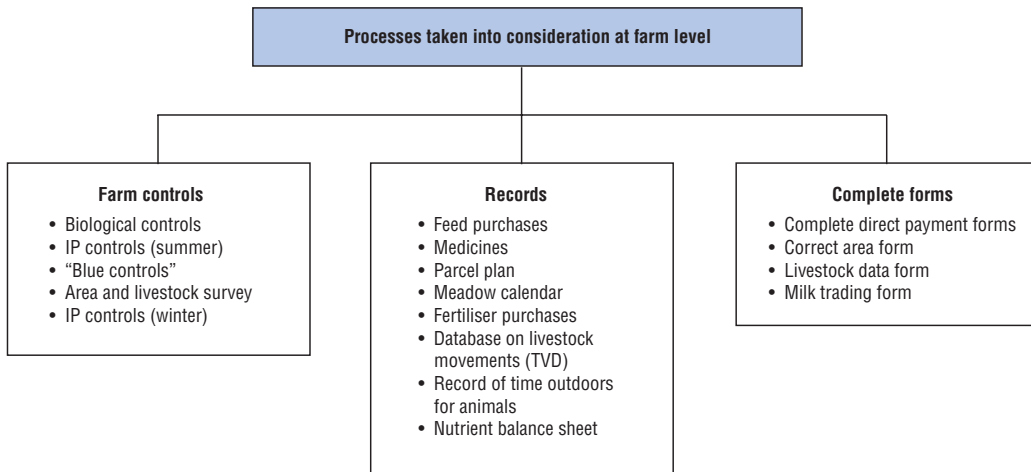
Procedure at control organisation level

Control organisations taken into account are presented in Figure 5.11. The costs arising from the respective controls are assigned to each individual farm on the basis of its structural data. In the case of organic farms, the rates of the control organisation for organic farms (Bio Inspecta) are applicable. Costs for any subsequent checks or reductions (*e.g.* loyalty bonus) are not taken into consideration as these are attributable to the farm management and not to the direct payment system. In addition, costs and controls associated with the certification of products are not taken into account (*e.g.* wine cellar controls).

In Canton Zurich, the rates of the control organisation (Agrocontrol) are applicable for both PEP farms (proof of ecological performance) and organic farms. The details provided by Agrocontrol (overall costs) serve as the test value. In Canton Grisons, the overall costs of the control organisation are known. As is customary, each PEP farm is charged a lump sum.

Figure 5.11. **Control organisations taken into consideration**
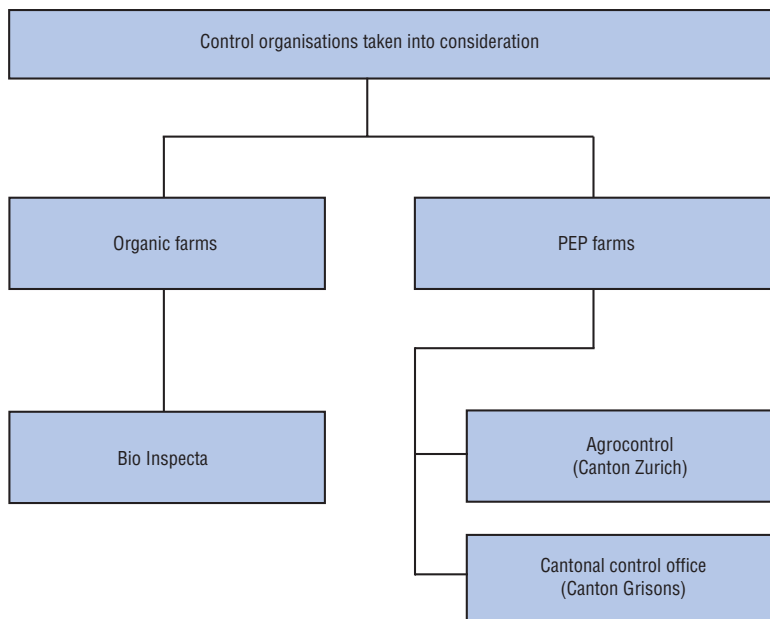
In addition, the following assumption is reached in relation to the allocation of control costs to measures: the difference between organic controls and PEP controls is assigned to the measures for organic farming. The remaining costs are distributed according to the variants described earlier in this section.

Procedure at the borough level

Basically, the tasks of the boroughs in the cantons covered by this investigation do not differ. However, while these tasks are set down in a duty roster in Canton Zurich, the boroughs in Canton Grisons are free to carry out these duties at their own discretion. As a result, there are no uniform implementation processes in Canton Grisons. Therefore, two different variants are considered in Canton Grisons. The processes are assigned to labour expenditure and costs on the basis of surveys. Finally, the more expensive, but more widespread variant was chosen.

Canton Zurich has an expenditure estimate for arable land sites. An average estimate of 3 hours per farm and year is assumed for each farm. Costs for further training of the site manager and expenses are added to this. These are estimated for the calculation of the transaction costs.

If a direct assignment of partial costs is not possible, both Cantons carry out allocation to measures in accordance with the two recognised variants presented in this section.

Procedure at the cantonal level

The costs of the cantons are obtained by means of questionnaires covering the following aspects:

● registration of the departments and persons involved, whereby the labour expended by all staff for the implementation of direct payments is recorded;

● registration of the gross wage costs of the individual employees, the department's infrastructure costs and the costs of purchased services;

● determination of the influence values on the labour expenditure (cost factors).

Some of these costs are assigned directly to the measures on the basis of the information obtained from the survey (Figure 5.12). In addition, there are cost items which can be attributed to the number of farms, or which can be regarded as fixed costs. These latter are not connected to the number of farms or the farms' participation in direct payment programmes.

Costs which cannot be assigned directly and the costs of the cost factor "number of farms" are allocated according to two recognised methods.

Procedure at the state level

Cost determination at State level is carried out in the same way as for the cantons, namely by means of a questionnaire. Labour expenditure of the staff involved in implementation and the associated costs, infrastructure costs and the costs of purchased services are likewise determined at State level. The factors which define the total cost expenditure (Figure 5.13) differ slightly from those which apply to the cantons. In this case too, there are cost shares which can be attributed directly to a farm's participation in certain measures and costs which must be allocated.

The number of farms and the number of cantons in Switzerland are responsible for a part of the costs. The quality of implementation as performed by the Cantons is a further cost factor. A canton with high quality implementation generates fewer costs at state level

Figure 5.12. **Cost factors at the cantonal level**
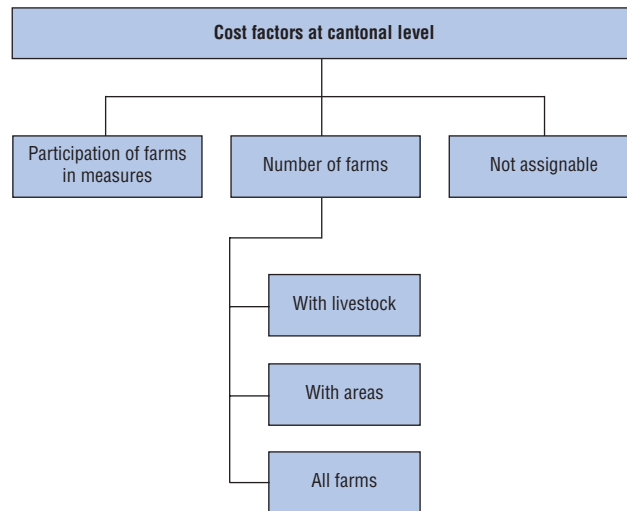
Figure 5.13. **Cost factors at state level**
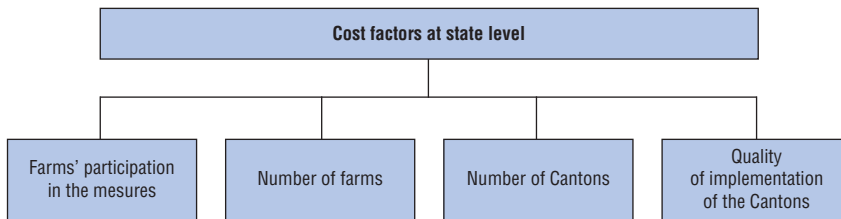
than a canton with a lower quality implementation. The following procedure is used to determine the relevant cost shares of the cantons in the State's costs:

● Cost shares which can be attributed directly to measures are assigned directly to the farms and measures via the participation of the farms.

● In the case of the cost factor "number of farms", the Canton's cost share is calculated on the basis of the number of farms (number of farms Canton/number of farms Switzerland).

● The same cost share is assigned to all Cantons on the basis of the cost factor "number of Cantons".

A canton's share in the cost factor "quality of implementation of the cantons" is determined by the share of the farms queried in relation to the number of farms eligible for direct payments. This procedure is based on the assumption that, geographically speaking, the share of incorrectly run farms in Switzerland is evenly distributed. If the number of farms queried by a canton exceeds the Swiss average, this is regarded as evidence of high quality implementation. Consequently, this canton is expected to generate fewer costs for the state than a canton with a lower number of queried farms.

The cantons' shares in the costs at state level which are determined in this way are allocated to the measures (in the same way as the costs of the cantons).

Overview of the procedure

Table 5.7 presents a formal overview of the chosen procedure for all actors.

Example: A part of the costs incurred by the boroughs are fixed costs (cost factor "fixed costs borough"). A part of these costs is allocated to each farm (cost factor "borough/BET"). In this case, BET is the number of farms in a borough. This sum is assigned to the measures M_i with the factors a_{VMi}. The result of a_{VMi} depends on the variants presented in the last sub-section of Section 5.4.

This results in the following function for cost centre K_{Mi} for the borough's fixed costs for every farm: $K_{Mi} = a_{VMi}$ * cost factor borough/BET.

Key figures of policy-related transaction costs

Transaction costs are presented as key figures in order to facilitate comparison with other cantons or investigations. Three key figures are used:

- PRTC per CHF of direct payment as indicator for the efficiency of fund transfer.
- PRTC per relevant unit (per hectare or LSU) to describe the cost function dependent on the factors land, land utilisation and number of animals.
- PRTC per farm as a measure for the average total costs of a participating farm.

5.4. Results of estimations in Cantons Grisons and Zurich

In this section, the estimated transaction costs of the Swiss direct payment system for the Cantons Grisons and Zurich are identified and interpreted. The influence of assumptions and variants on the transaction costs is also discussed. The results of both case studies are presented according to the same pattern:

- Discussion of the basic variant: the transaction costs are allocated to the different cost centres on the basis of the variant "Participation". On-farm labour costs are calculated at CHF 20 per hour.
- Assessment of the influence on transaction costs of the assumptions reached *via* the variant calculations.

Then follow the analysis and discussion of the cost differences exhibited by the two cantons and the structural and organisational factors which are relevant to the costs.

Policy-related transaction costs in Canton Grisons

Transaction costs in the basic variant (Canton Grisons)

Table 5.8 shows the transaction costs of direct payments for Canton Grisons according to the basic variant. The costs of implementation and controls relating to general direct payments are shown in the upper section, while those relating to ecological direct payments and ethological contributions are presented in the lower section. The transaction costs are allocated not only to the parties who generate them, but also to the measures and payers. At farm level, the costs are also subdivided into the sectors controls, records and forms. When considering the payer, it must be borne in mind that up until 2002, Canton Grisons subsidised a part of the costs of the control organisation for organic farms and the cantonal control office (an overall total of CHF 160 000 per year). These subsidies are not taken into account in Table 5.8. In addition, the total costs of the

Table 5.8. **Transaction costs in Canton Grisons (basic variant)**

CHF

Payer	State	Canton	Boroughs	Farm					Total	Share paid by authorities
Actor	State	Canton	Boroughs	Control organisations for organic farms	Control organisations for PEP farms	Records	Forms	Farm c ontrols	Total	Share paid by authorities
Policy										
Area payments	9 156	104 887	45 403	25 180	29 096	138 677	26 059	14 575	393 032	159 445
Payments for keeping grazing farm animals	8 597	95 893	41 582	24 711	24 886	127 291	23 721	13 268	359 950	146 073
Payments for keeping livestock under difficult conditions	8 666	95 895	41 581	24 756	24 846	128 838	23 721	13 268	361 572	146 142
Payments for farming on steep slopes	8 546	94 577	40 951	24 556	24 454	124 445	23 423	13 101	354 052	144 073
Payments for ecological compensation	9 012	113 789	44 610	24 960	28 316	139 634	25 569	14 301	400 190	167 411
Payments for extensive cereal and rapeseed cultivation	911	19 960	4 128	1 961	2 714	19 654	2 277	1 273	52 877	24 998
Payments for organic crop farming	5 951	71 610	19 382	355 904	0	51 067	11 132	58 970	574 017	96 944
Payments for animal housing systems	2 311	40 288	10 194	8 647	3 593	33 061	5 728	6 939	110 761	52 793
Payments for turning animals outdoors regulary	7 411	102 470	35 789	24 850	18 150	153 696	20 326	31 144	393 835	145 669
Total Actor	60 560	739 369	283 622	515 524	156 055	916 363	161 955	166 839	3 000 287	1 083 550
Total Payer	60 560	739 369	283 622	1 916 736						

Table 5.9. **Key figures of transaction costs in Canton Grisons (basic variant)**

CHF

	Total PRTC	Sum of payments	PRTC per payment (%)	Units		PRTC per unit	Sum of farms	PRTC per farm
Policy								
Area payments	393 032	62 736 704	0.63	52 299	ha	7.52	2 740	143.44
Payments for keeping grazing farm animals	359 950	29 834 828	1.21	36 445	LSU	9.88	2 631	136.81
Payments for keeping livestock under difficult conditions	361 572	38 667 105	0.94	40 254	ha	8.98	2 635	137.22
Payments for farming on steep slopes	354 052	14 041 723	2.52	32 079	ha	11.04	2 587	136.86
Payments for ecological compensation	400 190	5 925 862	6.75	14 556	ha	27.49	2 711	147.62
Payments for extensive cereal and rapeseed cultivation	52 877	319 048	16.57	798	ha	66.26	271	195.12
Payments for organic crop farming	574 017	5 893 005	9.74	28 617	ha	20.06	1 388	413.56
Payments for animal housing systems	110 761	1 330 812	8.32	13 765	LSU	8.05	746	148.47
Payments for turning animals outdoors regulary	393 835	7 839 470	5.02	43 702	LSU	9.01	2 350	167.59
Total	3 000 287	166 588 557	1.80	52 509	ha	57.14	2 745	1 093.00

public actors are listed in the last column of the table (sum of the state, canton and borough levels). The following findings can be derived from the composition of the transaction costs for Canton Grisons:

● The overall costs of implementing the direct payment system amount to roughly CHF 3.0 million. Public authorities pay about one third of the transaction costs, the farmers pay the remainder.

● About two thirds of the transaction costs paid by public authorities devolve upon the cantons, while the boroughs are liable for 26% of this sum. On the other hand, the share paid by the state amounts to just about 5%.

● Organic farming contributions account for the largest share of the transaction costs, namely about 20%, whereby the controls carried out by Bio Inspecta generate roughly 60% of this amount.

● The records kept by the farms generate just about one third of the total transaction costs, whereby BTS measures, Extenso contributions and organic farming occasion considerably less costs compared to the other measures.

The values for key figures of transaction costs can be calculated on the basis of Table 5.8. The results of the key figures are shown in Table 5.9:

● The overall share of transaction costs in the direct payments disbursed amounts to 1.8%. According to the basic variant, area payments exhibit the greatest efficiency with regard to fund transfer, followed by other Red Ticket measures, TEP (Payments for keeping livestock under difficult conditions), LSU contributions (Payments for keeping grazing farm animals) and slope payments. From this point of view, Extenso contributions (Payments for extensive cereal and rapeseed cultivation) and payments for organic production do considerably less well.

● The key figure of transaction costs per relevant unit reveals the sum of the implementation and control costs generated by a unit when participating in a measure. In relation to the total area involved, transaction costs of about CHF 57 per hectare occur in Canton Grisons. From this point of view, the area-specific Green Ticket measures appear to be of great value, while Red Ticket measures and ethological contributions are less useful. This is mainly due to the fact that the absolute costs of the measures are divided practically equally. Since a considerably higher number of farms take part in Red Ticket measures and ethological programmes, these incur less costs per unit than measures with a lower participation.

● If the transaction costs of a measure are allocated to the farms involved, it can be noticed straight away that organic farming contributions occasion high costs. This is due to the higher control costs paid by the farms. As a whole, these costs amount to an average of roughly CHF 1 093 per farm and year.

Influence of the choice of method and assumptions on transaction costs (Canton Grisons)

When interpreting and allocating transaction costs in the basic variant, the question arises regarding the influence on the results of the choice of method and the assumed labour costs or the estimated labour expenditure. In order to answer this question, Table 5.10 shows the key figures of the basic variant with different distribution ratios and labour costs.

Table 5.10. **Influence of the choice of method and labour costs on the key figures of the transaction costs in Canton Grisons**

CHF

	Units	Scenario								
		Baserun			Influence of labour costs			Share of direct payments		
		PRTC per payment (%)	PRTC per unit	PRTC per farm	PRTC per payment (%)	PRTC per unit	PRTC per farm	PRTC per payment (%)	PRTC per unit	PRTC per farm
Policy										
Area payments	ha	0.63	7.52	143.44	0.01	0.16	3.05	0.86	10.35	197.48
Payments for keeping grazing farm animals	GVE	1.21	9.88	136.81	0.03	0.21	2.91	0.21	1.69	23.39
Payments for keeping livestock under difficult conditions	ha	0.94	8.98	137.22	0.02	0.19	2.93	0.52	4.95	75.59
Payments for farming on steep slopes	ha	2.52	11.04	136.86	0.05	0.23	2.90	−1.10	−4.81	−59.65
Payments for ecological compensation	ha	6.75	27.49	147.62	0.14	0.58	3.09	−4.90	−19.95	−107.12
Payments for extensive cereal and rapeseed cultivation	ha	16.57	66.26	195.12	0.34	1.36	4.01	−11.11	−44.41	−130.78
Payments for organic crop farming	ha	9.74	20.06	413.56	0.10	0.20	4.21	−0.97	−1.99	−41.09
Payments for animal housing systems	GVE	8.32	8.05	148.47	0.16	0.15	2.84	−5.42	−5.24	−96.72
Payments for turning animals outdoors regulary	GVE	5.02	9.01	167.59	0.12	0.22	4.16	−2.46	−4.40	−81.90
Total	ha	1.80	57.14	1 093.0	0.04	1.11	21.29	0.00	0.00	0.00

In Table 5.10 the influence of labour costs is shown as the range by which the key figures change when the assumed costs are raised or lowered by one franc. At the same time, these changes correspond to a 5% variation in the labour expended on the farms, for all processes, while labour costs remain unchanged. Table 5.10 shows quite clearly that the choice of the farms' labour costs or expenditure only has a slight influence on the key figures: a 5% increase in labour expenditure or a pay rise of CHF 1 per hour result in an overall increase of CHF 1.11 in total transaction costs per hectare of agricultural land. On the whole, the assumed labour costs have a much stronger influence on the PRTC of Green Ticket measures. In particular, an increase in labour costs leads to above-average changes in transaction costs in the case of contributions for ecological compensation (CHF 0.58) and extensive cultivation (CHF 1.36).

The results relating to the transaction costs per CHF 1 of direct payments (PRTC per payment) and to the transaction costs per farm (PRTC per farm) show that a change in labour costs only has a slight influence on the key figures. The rise in labour costs discussed above leads to an increase in costs of CHF 21 per farm or 0.04% for each franc disbursed for direct payments.

If those cost items of the measures which cannot be allocated are assigned by means of the variant "Direct payment shares", the key figures change in accordance with the third upper column of Table 5.10. However, since in this case it is only the allocation which is altered, the key figures of the respective measure change but not the results relating to the total transaction costs (bottom line of the table).

In the first instance, allocation of costs by means of the variant "Direct payment shares" raises the transaction costs of those measures with high direct payment shares (area payments, RGVE and TEP contributions). On the other hand, transaction costs sink in the case of measures with a lower share of the direct payments disbursed. By and large, the key figures are distributed evenly with this allocation. However, there is little change regarding the measures associated with organic farming contributions as the costs of these measures can, to a large extent, be allocated directly. Changes in transaction costs are illustrated again in Figure 5.14, whereby deviations of the costs per relevant unit compared to the basic variant are indicated.

Complementary to the key figures, the shares of the individual measures in the total transaction costs are illustrated in Figure 5.15, whereby the darker lines represent the basic variant, the lighter lines the "Direct payment shares" variant. For each, one variant is presented without labour costs and one with CHF 25 labour costs.

The path of the graphs shows that the share of organic farming contributions in the total PRTC is the only one to be influenced significantly by labour costs. The higher they are, the lower this share. This is mainly due to the relatively high fixed cost share of the organic farming controls. On the other hand, the choice of method has a marked effect on the distribution of the transaction costs. If the costs which cannot be allocated directly are divided according to direct payment shares ("Direct payment shares" variant) a considerably higher share is attributable to the measures associated with area payments, TEP and RGVE contributions. The opposite applies to the situation related to slope payments, contributions for ecological compensation, BTS and RAUS which have low shares in total direct payments.

Figure 5.14. **Influence of the variants on the key figures PRTC per relevant unit (Canton Grison)**
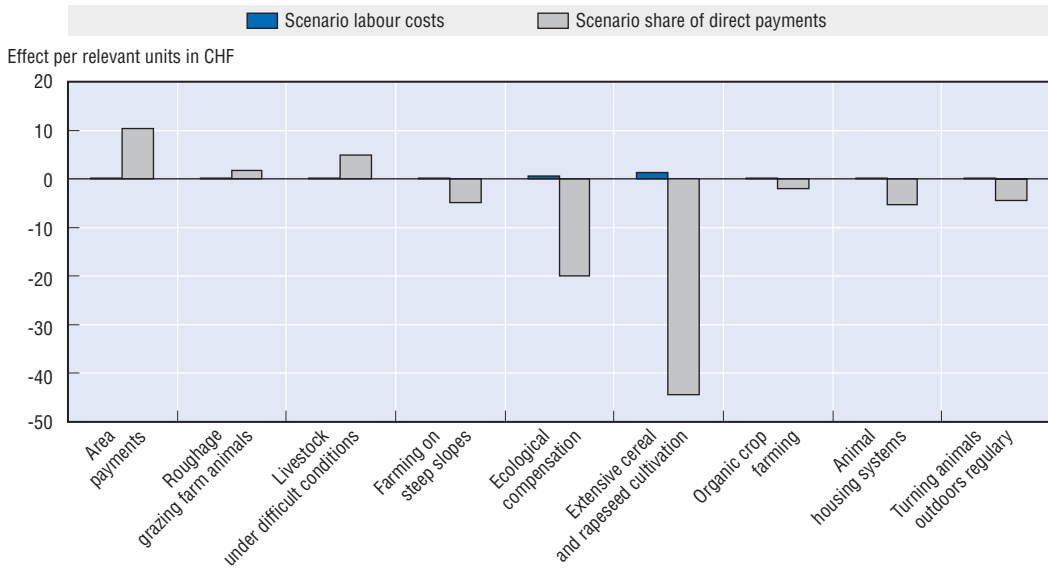
Figure 5.15. **Influence of the variants on the distribution of the PRTC according to measures (Canton Grisons)**
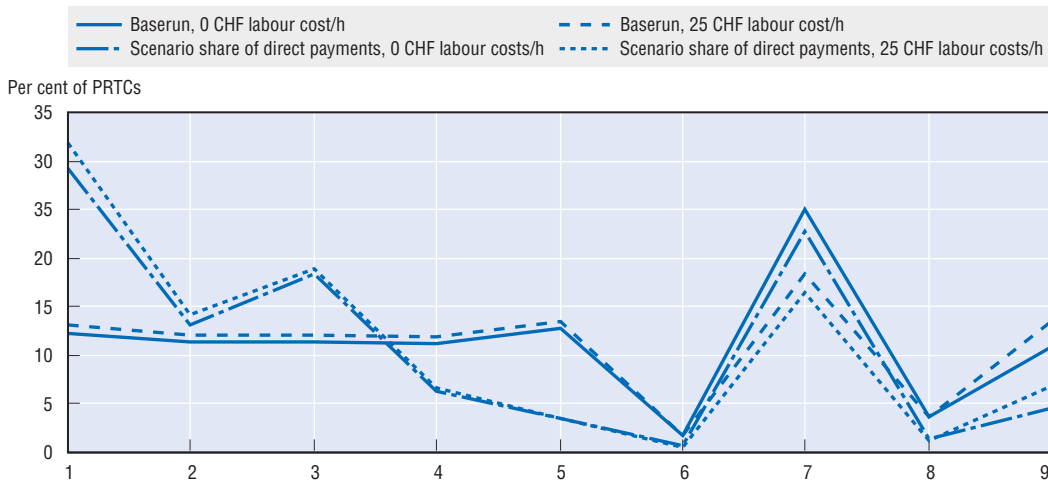
1. Area payments.
2. Payments for keeping grazing farm animals.
3. Payments for keeping livestock under difficult conditions.
4. Payments for farming on steep slopes.
5. Payments for ecological compensation.
6. Payments for extensive cereal and rapeseed cultivation.
7. Payments for organic crop farming.
8. Payments for animal housing systems.
9. Payments for turning animals outdoors regularly.

Policy-related transaction costs in Canton Zurich

Transaction costs in the basic variant (Canton Zurich)

Table 5.11 shows the transaction costs generated for Canton Zurich by the direct payment system in relation to actors, measures and payers when the basic variant is applied. The structure of the table corresponds to Table 5.8 for the case study Grisons. When reviewing payers in Canton Zurich, it must be borne in mind that, as in the case of Canton Grisons, the Canton subsidises the costs of organic farming and proof of ecological performance controls with a total of about CHF 220 000 per annum. These subsidies are not taken into consideration Table 5.11. The composition of the transaction costs for Canton Zurich leads to the following deductions:

● The overall costs of implementing the direct payment system amount to about CHF 4 million. Local authorities pay roughly one quarter of the transaction costs and the remaining costs are covered by the farmers.

● About one half of the transaction costs paid by local authorities are incurred at cantonal level, while the boroughs are liable for 38%. On the other hand, the State's share amounts to just about 10%.

● Almost half (45.6%) of the total transaction costs are attributable to the farms' records.

● The largest share of the transaction costs (roughly 24% each) is attributable to area payments and ecological compensation. In the case of both these measures, the farmers' records account for about 50% of the costs.

● Green Ticket measures generate a total of 60% of the transaction costs.

Two aspects must be taken into account when interpreting transaction costs at borough level: *a)* In the calculations, it is assumed that the boroughs expend three hours per farm (ALN estimate: 2 to 3 hours per farm). On the other hand, if an expenditure of two hours is assumed, costs decrease by about CHF 120 000 or 29%; *b)* a survey carried out in Canton Grisons indicated that the boroughs expend approximately three hours per farm. Given the higher share of arable land in Canton Zurich, it is most probable that the expenditure of boroughs there is, in general, greater than in Grisons.

The values of the key figures of transaction costs can be calculated on the basis of Table 5.11. The results for Canton Zurich are shown in Table 5.12.

● As a whole, the share of transaction costs in the direct payments disbursed amounts to 2.8%. In the basic variant, area payments followed by the other Red Ticket measures exhibit the highest efficiency with regard to the transfer of funds. In this respect, contributions for extensive cultivation and animal housing payments are the least efficient;

● Taking the whole area in Canton Zurich into consideration, transaction costs per relevant unit result in transaction costs of roughly CHF 56 per hectare. From this point of view, area-specific Green Ticket measures and slope payments are particularly beneficial. On the other hand, contributions for keeping animals under difficult conditions, ethological and area payments exhibit low transaction costs per unit;

● In the first instance, contributions for organic farming do less well if transaction costs are assigned to those farms taking part in a measure. This is due to the higher control costs paid by the farms. Generally speaking, average costs amount to about CHF 1 078 per farm and year.

Table 5.11. **Transaction costs in Canton Zurich (basic variant)**

CHF

Payer	State	Canton	Boroughs	Farm					Total	Share paid by authorities
Actor	State	Canton	Boroughs	Control organisations for organic farms	Control organisations for PEP farms	Records	Forms	Farm controls	Total	Share paid by authorities
Policy										
Area payments	25 804	151 225	108 916	8 572	99 248	445 255	56 879	31 814	927 713	285 946
Payments for keeping grazing farm animals	10 130	57 569	41 313	5 269	37 257	171 047	21 800	12 193	356 578	109 012
Payments for keeping livestock under difficult conditions	3 643	19 923	13 958	2 523	11 869	61 744	7 719	4 317	125 695	37 523
Payments for farming on steep slopes	4 990	27 636	19 658	2 632	16 164	77 538	10 653	5 958	165 230	52 284
Payments for ecological compensation	26 188	153 419	111 305	8 517	99 968	472 806	57 673	32 258	962 135	290 912
Payments for extensive cereal and rapeseed cultivation	10 574	58 691	42 379	3 756	37 633	173 669	21 857	12 225	360 785	111 644
Payments for organic crop farming	2 140	9 305	6 585	151 862	0	14 026	3 546	15 397	202 862	18 031
Payments for animal housing systems	6 295	34 059	24 382	11 700	64 090	134 631	12 800	13 604	301 562	64 737
Payments for turning animals outdoors regulary	10 640	60 540	43 138	20 020	107 120	248 161	22 836	27 118	539 574	114 318
Total Actor	100 404	572 368	411 635	214 852	473 349	1 798 877	215 763	154 885	3 942 134	1 084 407
Total Payer	100 404	572 368	411 635	2 857 726						

Table 5.12. **Key figures of transaction costs in Canton Zurich (basic variant)**

CHF

	Total PRTC	Sum of payments	PRTC per payment (%)	Units		PRTC per unit	Sum of farms	PRTC per farm
Policy								
Area payments	927 713	93 458 643	0.99	69 710	ha	13.31	3 631	255.50
Payments for keeping grazing farm animals	356 578	13 259 231	2.69	15 546	LSU	22.94	1 819	196.03
Payments for keeping livestock under difficult conditions	125 695	3 994 000	3.15	12 694	ha	9.90	781	160.94
Payments for farming on steep slopes	165 230	2 423 925	6.82	5 284	ha	31.27	958	172.47
Payments for ecological compensation	962 135	12 749 724	7.55	9 011	ha	106.77	3 624	265.49
Payments for extensive cereal and rapeseed cultivation	360 785	2 546 774	14.17	6 395	ha	56.42	1 603	225.07
Payments for organic crop farming	202 862	2 092 912	9.69	6 749	ha	30.06	353	574.68
Payments for animal housing systems	301 562	2 616 491	11.53	24 855	LSU	12.13	1 166	258.63
Payments for turning animals outdoors regulary	539 574	7 586 914	7.11	42 660	LSU	12.65	1 956	275.86
Total	3 942 134	140 728 614	2.80	70 990	ha	55.53	3 657	1 077.97

Influence of the choice of method and assumptions on transaction costs (Canton Zurich)

The same procedure is used for classifying the basic variant for Canton Zurich as was chosen for Canton Grisons. Table 5.13 shows the key figures of the basic variant, the variants with modified labour costs as well as the variants for direct payment shares.

The costs of the labour costs variant are altered by CHF 1; the results show the influence of the alteration on the key figures. The results of Table 5.13 illustrate clearly that overall transaction costs rise by CHF 1.47 or 2.6% when labour expenditure increases by 5% or wages go up by CHF 1 per hour. On the whole, the choice of labour costs has the strongest influence on transaction costs for ecological compensation contributions (CHF 3.01 per unit) and payments for extensive cultivation (CHF 1.57 per unit). A rise in labour costs of CHF 1 per hour leads to an increase in transaction costs of roughly CHF 30 per farm.

Compared to the "labour costs" variant, the "direct payment share" variant has a much more pronounced influence on the key figures. However, it must be borne in mind that total transaction costs remain unchanged, as only the fixed items of implementation and control costs are allocated to the various measures according to a different key. When allocation takes place on the basis of direct payment shares, transaction costs related to area payments rise by about CHF 20 per hectare utilisable area, since they account for roughly two thirds of the total direct payments. On the other hand, transaction costs relating to other measures decrease, whereby there is a particularly marked decline in the costs of ecological compensation contributions and payments for extensive cultivation of cereals and oilseed.

To illustrate the results, the effects of both variants on the key figure PRTC per unit are shown in Figure 5.16. This figure also clearly demonstrates that changes in the key figures of the "direct payment share" variant are much more pronounced than in the case of the "labour costs" variant. The main reason for this is the fact that the "direct payment share" variant involves a shift away from the other measures towards area payments. As a result of this shift, transaction costs per franc of direct payments for all measures, with the exception of contributions for organic farming, are more or less evenly balanced. The value of the PRTC per unit key figure for area payments is similar to the value for organic farming contributions. Only the indicators for ecological compensation and payments for extensive cultivation are higher. The values for the other measures are significantly lower. The effect on the PRTC per farm indicator is even more striking. Area payments have the greatest value. Only the indicator for contributions for organic farming remains at a relatively high level; the values sink noticeably for the other measures.

To conclude the discussion of transaction costs in Canton Zurich, the shares of the individual measures in the overall transaction costs are illustrated in Figure 5.17. Once again, the darker lines indicate the basic variant, while the lighter line represents the "direct payment shares" variant. The influence of the choice of labour costs (CHF 0 to 25 per hour) is shown within the dark and light lines. Once again, the effects already discussed become apparent in the illustration:

● Only the share of the PRTC of the organic farming contribution measure is significantly influenced by the choice of labour costs. On the other hand, this share is hardly dependent on the choice of variant.

● The choice of the "direct payment share" variant results in a marked increase in the share of the PRTC related to area payments. The rest (with the exception of contributions for organic farming) decrease.

Table 5.13. **Influence of the choice of method and labour costs on the key figures of the transaction costs in Canton Zurich**

CHF

	Units	Scenario								
		Base run			Influence of labour costs			Share of direct payments		
		PRTC per payment (%)	PRTC per unit	PRTC per farm	PRTC per payment (%)	PRTC per unit	PRTC per farm	PRTC per payment (%)	PRTC per unit	PRTC per farm
Policy										
Area payments	ha	0.99	13.31	255.50	0.03	0.37	7.09	1.60	21.47	412.20
Payments for keeping grazing farm animals	LSU	2.69	22.94	196.03	0.07	0.63	5.40	−0.56	−4.75	−40.56
Payments for keeping livestock under difficult conditions	ha	3.15	9.90	160.94	0.09	0.28	4.50	−0.92	−2.90	−47.16
Payments for farming on steep slopes	ha	6.82	31.27	172.47	0.19	0.85	4.71	−4.44	−20.38	−112.44
Payments for ecological compensation	ha	7.55	106.77	265.49	0.21	3.01	7.49	−4.76	−67.31	−167.37
Payments for extensive cereal and rapeseed cultivation	ha	14.17	56.42	225.07	0.39	1.57	6.26	−11.60	−46.20	−184.31
Payments for organic crop farming	ha	9.69	30.06	574.68	0.08	0.23	4.49	−0.39	−1.21	−23.23
Payments for animal housing systems	LSU	11.53	12.13	258.63	0.29	0.31	6.58	−6.35	−6.68	−142.42
Payments for turning animals outdoors regulary	LSU	7.11	12.65	275.86	0.19	0.34	7.33	−2.66	−4.74	−103.33
Total	ha	2.80	55.53	1 077.9	0.07	1.47	28.73	0.00	0.00	0.00

The influence of the scenarios "Influence of Labour Costs" and "Share of Direct Payments" is given as the difference to the scenario "Base run".

Figure 5.16. **Influence of the variants on the key figures PRTC per relevant unit (Canton Zurich)**
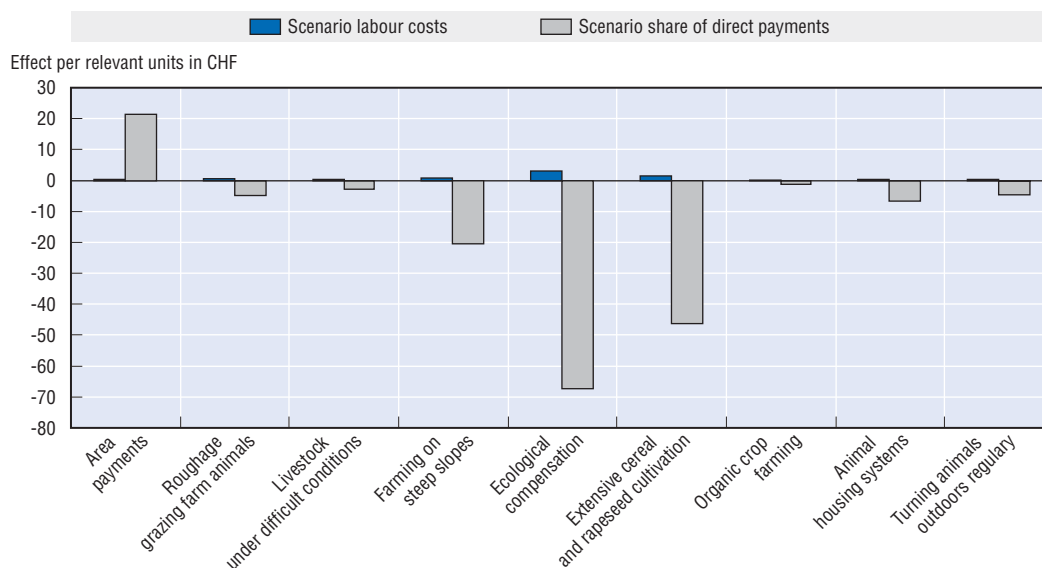
Figure 5.17. **Influence of the variants on the distribution of the PRTC according to measures (Canton Zurich)**
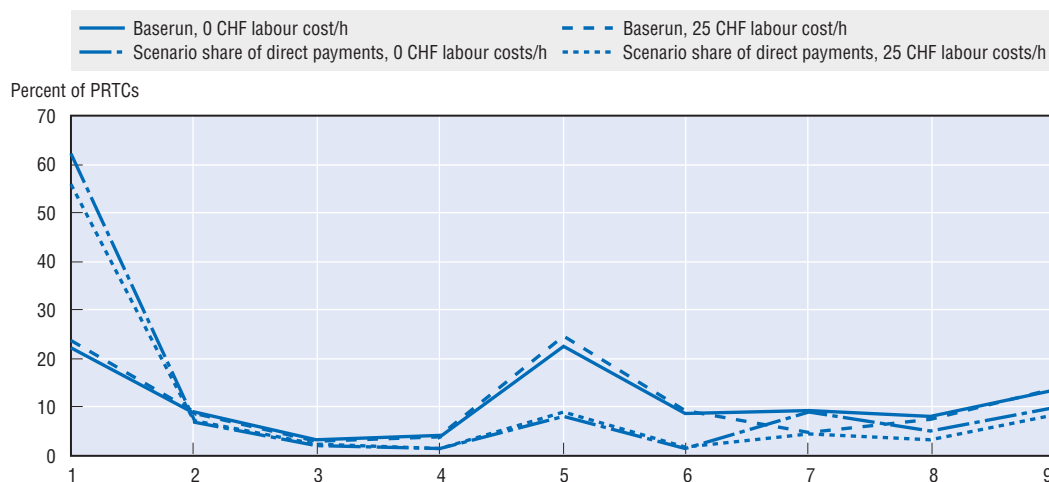
1. Area payments.
2. Payments for keeping grazing farm animals.
3. Payments for keeping livestock under difficult conditions.
4. Payments for farming on steep slopes.
5. Payments for ecological compensation.
6. Payments for extensive cereal and rapeseed cultivation.
7. Payments for organic crop farming.
8. Payments for animal housing systems.
9. Payments for turning animals outdoors regularly.

Differences between the case studies of Cantons Grisons and Zurich

The major differences relating to absolute transaction costs and key figures are discussed on the basis of the results obtained in the two case studies, whereby the differences as such are less important than their causes.

Table 5.14 illustrates the absolute cost differences between the Cantons Zurich and Grisons, whereby all values are to be understood as the difference of Canton Zurich as compared to Canton Grisons. In the case of positive deviations, the transaction costs in Canton Zurich are greater than in Canton Grisons. For example, the total costs for the boroughs in Canton Zurich are, absolutely, about CHF 128 000 higher than in Canton Grisons.

The major differences between the two cantons can be summarised in three points:

- On the whole, transaction costs in Canton Zurich are just about CHF 1 million higher. However, the difference is to a large extent due to the higher costs of the farms and the larger number of farms.

- The transaction costs covered by local authorities are identical. However, in the case study on Zurich, the costs generated at the canton level are lower than in Grisons while the costs of the boroughs in Canton Zurich are higher. In addition, the costs at the state level in Zurich are higher than in the case of Grisons which, among other things, can be explained by the larger number of farms.

- The deviations are relatively larger in the case of individual cost centres. This is due in part to methodological and system-specific reasons, as well as to structural and organisational differences between the Cantons. These are investigated in greater detail in the following.

Table 5.15 shows the key figures of the basic variant for the two case studies, as well as their differences.

A direct comparison of the key figures for the two case study areas leads to the following deductions:

- On the whole, Canton Zurich exhibits a lower degree of efficiency in the transfer of funds (PRTC per payment). Its overall transaction costs are one cent higher for each franc of direct payments disbursed. In Canton Zurich, transfer efficiency is lower for all measures, with the exception of payments for extensive cultivation (–2.4%) and organic farming contributions (–0.05%).

- Examination of the transaction costs of the participating units (PRTC per unit), reveals that Canton Zurich exhibits higher values everywhere, with the exception of payments for extensive cultivation (–9.85 CHF/ha). Costs relating to the total utilised area are slightly lower (–1.61 CHF/ha) in Canton Zurich.

- It is more expensive for farms to participate in measures (PRTC per farm) in Canton Zurich. This applies to all measures. However, generally speaking, the transaction costs generated by a farm which receives direct payments are, on average, about CHF 15 lower in Canton Zurich.

Analysis of factors influencing policy-related transaction costs

In this section the factors which influence transaction costs and the respective key figures are examined in greater detail. The influence factors are analysed on the basis of key figures for transaction costs obtained at farm level (basic variant; calculation according to Table 5.7). In order to avoid the methodological influences already discussed, the key figures of the transaction costs for the individual measures are no longer taken into account. Transaction costs are influenced by the following three factors:

- Factors relating to system and environment: In the first instance, system related influences involve the different direct payment rates which are based on agricultural

zones. In particular, these influence the key figure "PRTC per direct payment". At the same time, the different rates and also the prevailing natural conditions influence the participation of farms in measures. The organic farming, BTS (animal housing systems) and RAUS (letting animals outdoors regularly) measures are excluded from the environment related factors as these are not restricted to a specific location. Furthermore, it is assumed that the conditions are homogeneous within the agricultural zones.

● Structural factors: Farm size is the most important structural factor which has a primary influence on the transaction costs a farm has to meet. Participation in organic farming, BTS and RAUS measures are regarded as further structural factors as they are not dependent on location. However, farm-specific structural indicators such as open arable land or areas devoted to special crops are not taken into consideration since, in addition to the orientation of the farm, these are primarily dependent on its location and are thus related to prevailing environmental conditions.

● Organisational factors: The organisational differences in implementation and controls between Cantons Grisons and Zurich are regarded as organisational factors. In addition to the factual organisational differences (differing "cost factor farms" for public authorities, different rates for control costs) the different fixed costs of the public authorities are also taken into account here.

Linear regression models are used to investigate the influence of these factors on the key figures of transaction costs at farm level. The purpose is not so much to obtain an exact quantification but rather to arrive at a qualitative determination of the influence factors. The influence factors are covered by the following variables.

System and environment related influences:

Zone i: Dummy variables for the zone location of a farm

Structural influences:

ALL_LN: Size of farm (in acres)

BIO: Dummy variable for organic farming

Raus: Dummy variable for participation in RAUS measure

BTS: Dummy variable for participation in BTS measure

Organisational influences:

Canton: Dummy variable for cantonal location (1 = Canton Zurich)

This results in the following general linear regression model:

$$\text{Transaction costs per farm} = C + a * \text{Canton} + b_i * Z_i + c * \text{BIO} + d * \text{Raus} + e * \text{BTS} + f * \text{ALL\_LN} + u$$

The model parameters can be interpreted as follows:

● Constant C: average transaction costs for proof of ecological performance; the costs of the Green Ticket measures are covered by the dummy variables.

● Parameter a: cost difference between the Cantons due to different organisation of controls and implementation.

Table 5.14. **Differences between the cantons with regard to absolute transaction costs**
(Deviation of Canton Zurich compared to Canton Grisons)

CHF

Payer	State	Canton	Boroughs	Farm					Total	Share paid by authorities
Actor	State	Canton	Boroughs	Control organisations for organic farms	Control organisations for PEP farms	Records	Forms	Farm controls	Total	Share paid by authorities
Policy										
Area payments	16 649	46 338	63 513	−16 607	70 152	306 578	30 820	17 238	534 681	126 500
Payments for keeping grazing farm animals	1 533	−38 324	−269	−19 442	12 370	43 756	−1 921	−1 074	−3 372	−37 061
Payments for keeping livestock under difficult conditions	−5 023	−75 972	−27 624	−22 233	−12 977	−67 095	−16 003	−8 951	−235 876	−108 618
Payments for farming on steep slopes	−3 556	−66 941	−21 293	−21 924	−8 289	−46 907	−12 770	−7 142	−188 822	−91 790
Payments for ecological compensation	17 176	39 630	66 696	−16 443	71 652	333 172	32 105	17 957	561 945	123 501
Payments for extensive cereal and rapeseed cultivation	9 663	38 732	38 251	1 795	34 920	154 015	19 580	10 951	307 907	86 646
Payments for organic crop farming	−3 811	−62 305	−12 797	−204 042	0	−37 041	−7 586	−43 573	−371 155	−78 913
Payments for animal housing systems	3 984	−6 229	14 188	3 053	60 497	101 570	7 072	6 665	190 801	11 943
Payments for turning animals outdoors regulary	3 230	−41 929	7 348	−4 830	88 970	94 465	2 511	−4 026	145 739	−31 351
Total Actor	39 844	−167 001	128 013	−300 672	317 294	882 514	53 808	−11 954	941 847	857
Total Payer	39 844	−167 001	128 013			940 990				

All values are to be understood as the difference of Canton Zurich compared to Canton Grisons. Values greater than zero represent higher transaction costs in Canton Zurich than in Canton Grisons.

Table 5.15. **Differences between the cantons with regard to the key figures**

CHF

	Units	Zurich			Grisons			Difference		
		PRTC per payment (%)	PRTC per unit	PRTC per farm	PRTC per payment (%)	PRTC per unit	PRTC per farm	PRTC per payment (%)	PRTC per unit	PRTC per farm
Policy										
Area payments	ha	0.99	13.31	255.50	0.63	7.52	143.44	0.37	5.79	112.06
Payments for keeping grazing farm animals	LSU	2.69	22.94	196.03	1.21	9.88	136.81	1.48	13.06	59.22
Payments for keeping livestock under difficult conditions	LSU	3.15	9.90	160.94	0.94	8.98	137.22	2.21	0.92	23.72
Payments for farming on steep slopes	ha	6.82	31.27	172.47	2.52	11.04	136.86	4.30	20.23	35.62
Payments for ecological compensation	ha	7.55	106.77	265.49	6.75	27.49	147.62	0.79	79.28	117.87
Payments for extensive cereal and rapeseed cultivation	ha	14.17	56.42	225.07	16.57	66.26	195.12	−2.41	−9.85	29.95
Payments for organic crop farming	ha	9.69	30.06	574.68	9.74	20.06	413.56	−0.05	10.00	161.12
Payments for animal housing systems	LSU	11.53	12.13	258.63	8.32	8.05	148.47	3.20	4.09	110.16
Payments for turning animals outdoors regulary	LSU	7.11	12.65	275.86	5.02	9.01	167.59	2.09	3.64	108.27
Total	ha	2.80	55.53	1 078.00	1.80	57.14	1 093.00	1.00	−1.61	−15.03

The values in the column "Difference" are to be understood as the difference of the key figures of Canton Zurich compared to Canton Grisons. Values greater than zero represent higher indicators for Canton Zurich than for Canton Grisons.

- Parameter b_i: cost differences according to zones.
- Parameters c, d, e: influence of participation in organic farming and ethological programmes (Green Ticket measures).
- Error term u: other influences, *e.g.* farm-specific influences.

PRTC per farm

The results of the regression for the total transaction costs per farm are shown in Table 5.16, whereby the regression involves all the farms in the two Cantons. By and large, the regression explains just about 80% of the variance in transaction costs per farm (R^2 = 0.797). The significance level of the coefficients reveals that all the variables used in the regression have a highly significant influence on transaction costs. On average, a farm which is eligible to receive direct payments in Canton Grisons in mountain zone 3 (Zone 53) generates transaction costs amounting to CHF 538. These costs represent average implementation and control costs for proof of ecological performance.

Table 5.16. **Influence factors on transaction costs per farm**

Dependant variable: Total PRTCs per farm

Model	Unstandardised coefficients		Standardised coefficients		
	B	Std Error	Beta	t	Sig.
Constant	538.0	6.3		85.8	0.00
Canton	−97.9	8.7	−0.143	−11.2	0.00
BIO	−49.6	5.1	−0.065	−9.8	0.00
RAUS	120.9	4.8	0.168	25.1	0.00
BTS	55.7	4.7	0.075	11.9	0.00
Zone 11	82.1	10.7	0.098	7.7	0.00
Zone 21	95.7	9.9	0.088	9.6	0.00
Zone 22	106.7	10.8	0.117	9.9	0.00
Zone 41	117.0	11.0	0.092	10.6	0.00
Zone 51	42.1	12.0	0.025	3.5	0.00
Zone 52	50.1	10.8	0.029	4.7	0.00
Zone 54	−34.9	6.3	−0.037	−5.5	0.00
All_LN	0.2	0.0	0.822	140.8	0.00

Organisational influences (cantonal location) amount to roughly CH 98. On average, the transaction costs generated by a farm in Canton Zurich are just about CHF 100 lower compared to a farm in Canton Grisons.

Costs vary compared to the basic value of CHF 538 (farm in Grisons in Zone 53) by CHF −35 to CHF 117 depending on the zone in which a farm is located. Farms in zones which are less favourable for agricultural production (especially mountain zones) exhibit lower costs.

The results of the regression indicate that participation in the Green Ticket measures RAUS and BTS raises costs while, on average, the costs generated by organically run farms are lower. The fact that organic farms exhibit lower costs than PEP farms is due to lower requirements regarding the keeping of records. This reduces the farm-specific expenditure of organic farms and, on average, offsets the higher control costs.

On average, costs increase by CHF 0.24 per or by CHF 24 per hectare in relation to the utilised agricultural area of a farm.

If the payers of PRTC per farm, namely the farm and public authorities, are considered separately the following can be observed:

- Compared to the costs incurred by the farms, those arising for public authorities are virtually independent of zones and are thus not affected by factors related to the system or environment.

- On the other hand, the costs incurred by the farms are, to a large extent, independent of cantonal location.

- The factual fixed costs of the farms amount to about CHF 164 per farm (for Zone 53). The total fluctuation range associated with this value lies between CHF –31 (Zone 54) and CHF 105 (Zone 41). The remainder of constant C (roughly CHF 373) in Table 5.16 represents the fixed costs plus the costs arising for the public authorities from the number of farms. This is spread over the farms.

- Farms taking part in the organic farming measure generate slightly higher costs for public authorities. On the other hand, these farms have lower transaction costs.

PRTC per unit

The PRTC per unit key figure is generated by dividing the total transaction costs of a farm by its area. This means that the key figure depends notably on the size of the farm since the fixed cost share is spread over a greater area in the case of larger farms. On the other hand, variable costs (about CHF 24/ha) are attributed to the indicator as a fixed sum (due to the division by the area).

The effect of farm size on transaction costs per area unit is illustrated in Figure 5.18 for farms with an area of between 10 and 60 ha. The estimated inverse function (PRTC per $a = c_0 + c_1 / ALL\_LN + u$) explains about three quarters of the variance of the transaction costs per area unit (R^2: 0.732).

Generally speaking, the size of the farm does not exhibit any special dependence on the influence factors. Therefore basically, the statements relating to the PRTC per farm key figure can be applied to the interpretation of the PRTC per unit key figure (exception: area dependence). However, the dependencies discussed in relation to the PRTC per farm key figure are lower for the PRTC per unit than the scales of size shown in the Figure.

Figure 5.18. **PRTC per unit of area depending on farm size**
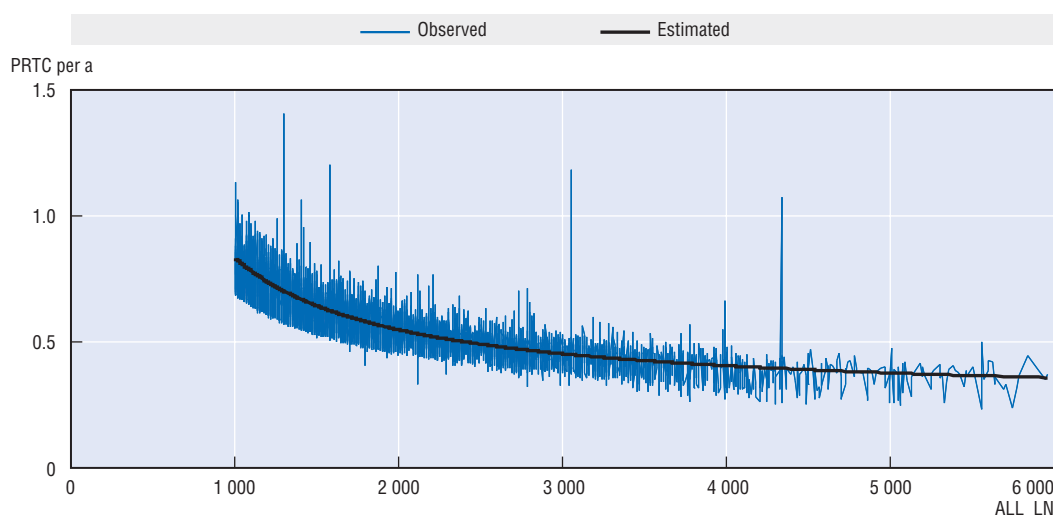
PRTC per direct payment

The PRTC per direct payment key figure is obtained by dividing a farm's absolute transaction costs by its total direct payments. On the one hand, the amount of the direct payments depends markedly on the direct payment system (different rates for different zones), and on the other hand is also subject to environmental conditions (*e.g.* intensities for grazing LSU payments) and farm management and orientation (*e.g.* share of ecological compensatory areas). Farm size also has a great influence as all direct payments are linked either directly or indirectly to the land area involved. In addition, the rates of certain payments are reduced depending on the size of the farm (*e.g.* reduction of area payments for farms with over 30 ha; see Figure 5.2). Determination of the amount of a farm's direct payments (Table 5.17, R^2 = 0.831) confirms the importance of system and environment related influences. Farms at higher altitudes (Zones 51 to 54) receive noticeably larger direct payments than farms in the lowlands (*e.g.* Zone 11) due to specific measures designed to benefit mountain areas. Since the additional services of Green Ticket measures are subject to special payments, participation in these programmes leads to a significant increase in direct payments.

Table 5.17. **Dependency of direct payments per farm**

Dependant variable: Direct payments per farm

Model	Unstandardised coefficients		Standardised coefficients		
	B	Std error	Beta	t	Sig.
Constant	18 067.4	496.8		36.4	0.00
BIO	5 396.8	401.6	0.084	13.4	0.00
RAUS	4 061.4	382.0	0.066	10.6	0.00
BTS	7 954.1	370.2	0.127	21.5	0.00
All_LN	18.4	0.1	0.739	135.3	
Zone 11	–21 556.3	509.9	–0.304	–42.3	0.00
Zone 21	–20 338.8	584.4	–0.220	–34.8	0.00
Zone 22	–21 721.1	517.0	–0.282	–42.0	0.00
Zone 41	–17 716.3	645.0	–0.163	–27.5	0.00
Zone 51	–13 035.2	793.1	–0.091	–16.4	0.00
Zone 52	–7 691.5	814.9	–0.052	–9.4	0.00

An understanding of the influence values on the PRTC per farm reveals clearly that zone location and participation in organic farming measures have a special influence on transfer efficiency. Farms which are otherwise identical exhibit higher transfer efficiency when they take part in organic farming measures or are situated in a zone at a higher altitude. Since cantonal location has no influence on the direct payments disbursed by the State, farms in Canton Zurich exhibit better transfer efficiency than otherwise identical farms in Canton Grisons due to their lower transaction costs. The change in additional PRTC in relation to additional direct payments is decisive when assessing the transfer efficiency of the other influences, namely farm size, BTS and RAUS.

The importance of individual influences for transfer efficiency can be examined separately if the farms selected for investigation exhibit the highest possible degree of homogeneity with regard to the other influences. The results are only relevant and significant in the case of zonal influences. Therefore, it must be assumed that the farm

management and orientation (*e.g.* different branches or ecological area shares) and farm-specific conditions also have a marked influence on transfer efficiency.

On the whole, the sum of the transaction costs and their controlling factors have very little influence on transfer efficiency. It is rather farm management and orientation as well as the direct payment system which are decisive for the determination of the sum of the total payments granted to a farm.

5.5. Conclusions

The transaction costs of the Swiss direct payment system are estimated using the methods presented in this chapter. In this way, implementation and control costs are obtained for the various levels, namely the state, cantons, control organisations, boroughs and farms. While the costs arising for public authorities and control organisations can be determined with exactitude, there are uncertainties on the farms themselves with regard to labour expenditure for keeping records and completing forms as well as for labour costs. The influence of these uncertainties on total transaction costs is assessed by means of sensitivity analyses in order to test the validity of the estimated costs.

Transaction costs amounting to roughly CHF 3.0 million and CHF 3.9 million are estimated for, Grisons and Zurich, respectively. Table 5.18 shows the average transaction costs per farm, per hectare utilised area and per franc of direct payments granted for the two cantons. In both cantons, implementation and control costs amount to roughly CHF 1 100 per farm. In Canton Grisons, public authorities pay just about 37% and in Canton Zurich 30% of this sum. Transfer efficiency varies between 1.8% and 2.8%, whereby the superior efficiency in Canton Grisons is due primarily to higher direct payments.

Table 5.18. **Estimation of transaction costs for the case study cantons**

	Total PRTC	PRTC paid by authorities	PRTC per farm	PRTC per hectare	PRTC per direct payment
Grisons	3.0 Mio. CHF	1.1 Mio. CHF	1 094 CHF	55.5 CHF	1.8%
Zurich	3.9 Mio. CHF	1.1 Mio. CHF	1 078 CHF	57.1 CHF	2.8%

Absolute transaction costs and the key figures are influenced by various factors. In the case of the key figures, this applies in particular to the allocation of transaction costs to individual measures and the associated methodological uncertainties. This is due to the fact that only a small part of the processes which are relevant to the costs can be allocated directly to the measures. Therefore, statements concerning transaction costs and their influence factors which are based on cost comparisons between the individual measures must be viewed with certain reservations. However, total transaction costs do not depend on this allocation. The influence factors which are more decisive for the amount of the transaction costs are:

● farm size;

● farm's participation in green ticket measures;

● organisational differences between the cantons and consequently the location of the farm within one canton or the other;

● orientation of the farm;

● environmental influences.

The sum of the transaction costs per participating unit depends primarily on the size of the farm. Bigger farms can spread the fixed cost share of their transaction costs over a larger area and therefore generate lower transaction costs per hectare.

On the other hand, transfer efficiency (PRTC per direct payment) depends largely on influences related to the system and the environment, plus the farm's orientation and the associated direct payments. In this case, the factual transaction costs only play a subordinate role and the direct payments disbursed per farm are far more significant.

Eligibility to receive direct payments is linked to precise regulations at farm level. This means that transaction costs are transparent for the farmers and, in addition to the individual capabilities of the farm manager, can be attributed directly to the processes stipulated by the State. Consequently, a farm's costs can only be reduced if the regulations and processes are optimised in relation to the desired quality and the costs of the farm.

There must be a direct relationship between the allocation and interpretation of transaction costs and the respective direct payments programmes and agricultural policy target system. Two different aspects must be considered:

● If the direct payment system is viewed as a system for die provision of those services defined for agriculture under the terms of the Federal Constitution, then transaction costs can be interpreted as part of the costs of quality assurance within this system. The largest part of these costs is attributable to controls of the regulations governing eligibility to receive payments. In the case of general direct payments, these regulations cover fulfilment of proof of ecological performance (cross compliance) as well as special rules for payments for organic farming and ethological contributions. The direct payments granted also represent part of costs of remunerating agriculture for the provision of specific services. This remuneration amounts to about CHF 307 million over both cantons. The implementation and control of these services cost public authorities roughly an additional CHF 2 million, or 0.7% of the direct payments disbursed. Therefore, from the point of view of the public authorities, transaction costs can be regarded as very efficient. It is possible that there is a slight potential for a reduction of the costs incurred by public authorities, as can be seen from the differences between the cantons. Approaches to realise this potential without loss of quality involve far-reaching simplification of the processes and quality requirements.

● On the other hand, if the direct payment system is interpreted as a system purely designed for the transfer of income, then transfer efficiency can be improved by simplifying the system and, in particular, the regulations. However, this argument neglects to consider the public services which agriculture is bound to supply under the terms of the Federal Constitution and which will hardly be provided by means of a mere transfer of income. This applies in particular to quality-specific targets, the promotion of positive services and the avoidance of negative externalities in agricultural production. According to current agricultural legislation, these public goods are remunerated by means of direct payments, whereby a part of these payments serve to support agricultural incomes.

Regardless of the form of agricultural support (*e.g.* remuneration for services or price support), it can be assumed that the amount of the transaction costs is primarily attributable to the desired quality of the public goods, *i.e.* the multifunctional services provided by agriculture. This applies to both public authorities and the farms themselves. Given today's direct payment system, transaction costs can only be reduced significantly by adapting the quality requirements relating to the multifunctional services. Improvements in implementation and control efficiency demand simultaneous optimisation of transaction costs and the quality of the services, whereby these two dimensions have conflicting objectives.

References

BLW, Bundesamt für Landwirtschaft (1998), Direktzahlungen an die Landwirtschaft, Bericht der Hauptabteilung Direktzahlungen und Strukturen des BLW, Bern.

BLW, Bundesamt für Landwirtschaft (2003a), AGIS-Datenbank, Bern.

BLW, Bundesamt für Landwirtschaft (2003b.), *Agrarbericht 2003 des Bundesamtes für Landwirtschaft* (Agricultural Report 2003), Bern.

BLW, Bundesamt für Landwirtschaft (2004), *Ökologischer Leistungsnachweis* (Proof of ecological performance), Bern (*www.blw.admin.ch/rubriken/00453/index.html?lang=de*, Status as per 20 December 2004).

BLW, Bundesamt für Landwirtschaft (div. Jg.), *Agrarberichte des Bundesamtes für Landwirtschaft* (Agricultural Reports), Bern.

BLW, Bundesamt für Landwirtschaft (div. Jg.), *Direktzahlungen an die Landwirtschaft* (Report on the disbursement of direct payments), Berichte der Hauptabteilung Direktzahlungen und Strukturen des BLW, Bern.

Christensen, T. and H. Rygnestad (2000), Environmental Cross Compliance: Topics for Future Research, Frederiksberg (*www.foi.dk/Publikationer/wp/2000-wp/wp200001.pdf*, 22 December 2004).

European Environment Agency (2004), *Definition of Cross Compliance*, Copenhagen (*http://glossary.eea.eu.int/EEAGlossary/C/cross-compliance*, Status as per 15 November 2004).

Huber, P. (1998), Die Verwaltungskosten des Agrarsystems, Wien: AK.

Mann, S. (2001), "Zur Effizienz der deutschen Agrarverwaltung", *Agrarwirtschaft*, Vol. 50, issue 5, pp. 302-307.

OECD (2004), Agricultural Policies in OECD countries: At a Glance, OECD, Paris.

Rieder, P. (1998), *Auswirkungen eines EU-Beitritts auf die schweizerische Agrarpolitik und Landwirtschaft*, Schriftenreihe Institut für Agrarwirtschaft ETH Zürich 2/1998, Zürich.

Rieder, P., C. Flury and G. Giuliani (2003), *Estimation du soutien à l'agriculture: Alternative à la présentation traditionnelle de l'ESP*, Institut d'Économie Rural, groupe marché et politique, École polytechnique fédérale de Zürich, Zurich.

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