New issues on the agenda: how different are dynamics between nascent and mature subsystems?

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Abstract

The Advocacy Coalition framework is developed for mature subsystems. The core hypotheses say that actors coordinate actions based on joint beliefs, and mainly of so-called (policy) core beliefs. They thus build advocacy coalitions while sharing core beliefs and to some extent also preferences on secondary aspects, such as policy instruments. But does this belief hierarchy between core and secondary beliefs also hold true in the context of nascent subsystems? To answer this question, we investigate four new issues on the political agenda: hydraulic fracturing, pesticide risks, antimicrobial resistance, and food waste. Some of them are absorbed by an existing and mature, others create their own and nascent subsystem. We investigate thus differences in beliefs and coordination within and across those cases.

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Introduction

There exists more and more literature applying the Advocacy Coalition Framework (ACF) and being interested in so-called "nascent" policy subsystems (Wiedemann and Ingold 2022; Lemke et al. 2023; Nohrstedt et al. 2023; Ingold et al., forthcoming). A policy subsystem is said to be the primary unit of analysis and it embraces a topical area, a territorial scope, and a configuration of actors interested in the topical area, who join advocacy coalitions and try to influence policy outputs (Jenkins-Smith et al. 2018). In contrast to mature policy subsystems where actors, their beliefs and structures are well developed, a nascent subsystem is in an immature stage where most actors do not yet have well defined and formed beliefs, and therefore coalitions might emerge but do not yet have well defined boundaries. Some authors talk about coalitions of convenience in that context (Strich 2015).

It is actually difficult to describe nascent subsystems. There is some common understanding that those subsystems tackle "new issues" (Lemke et al. 2023; XX). But research about nascent subsystems shows also very ambiguous and heterogeneous results such as more or less maturity in actors participation, more or less belief congruence among actors, and more or less coordination (Sabatier and Brasher 1993; Sabatier and Jenkins-Smith 1999; Zafonte and Sabatier 2004; Beverwijk et al. 2008; Bandelow and Kundolf 2014; Wiedemann and Ingold 2022). This is also why coalition building, conflicts within and across coalitions and policy production can be more or less advanced (Fidelman et al. 2014; Ingold et al. 2017; Ingold et al. forthcoming).

Usually, researchers tend to know in advance that they are dealing with a nascent subsystem (and not "discovering one" while doing research). This is because the issue is new on the political agenda, there is no clearly defined jurisdiction yet where to tackle the issue, or there is not policy output yet (Ingold

et al. forthcoming). The literature actually describes two situations when a new issue arrives on the public or political agenda (Sabatier and Brasher 1993; Sabatier and Jenkins-Smith 1993): the new issue is either absorbed by an existing subsystem, or there is a new subsystem built around the new issue. We guess that actually only the second situation is the one of a nascent subsystem. In this context we ask:

What is the difference in actors, their beliefs and coordination when tackling a new issue that is absorbed by an existing subsystem in contrast to the situation where the new issues "produces" a new subsystem?

To answer this question we investigate four different new issues, absorbed by or emerging within an existing subsystem, or potentially producing their own subsystem: hydraulic fracturing, pesticide risks, antimicrobial resistance, and food waste. We keep the institutional setting constant and investigate the regulation of those issues in Switzerland. But the first issue is tackled at a regional, whereas the other three at the national level. Based on elite survey research, we investigate the actors, their beliefs and the coordination among them. We are interested in the coherence of actors beliefs between policy core ideologies and more instrumental so-called secondary aspects.

Results will inform us how new issues are tackled in policy processes and if issues that are absorbed in existing subsystems are potentially leading to less change and learning if those that create a new subsystem. We also learn more about dynamics among actors and within subsystems.

Literature on nascent subsystems, new issues, beliefs and coordination

In very early ACF research, there was already this idea of nascent subsystems with very little history (Sabatier and Brasher 1993; Sabatier and Jenkins-Smith 1993). This literature mainly emphasizes two situations that are based on "inside dynamics." Either, a nascent subsystem can be a spin-off of an established one because some subsystem actors are dissatisfied with some of the issue aspects being continuously ignored or not framed the way they would expect. These unsatisfied actors might try and start to create an own subsystem around the new issue. Or, and this is the second situation, the issue might be re-conceptualized and thus kept within the existing subsystem. This second situation is describing what probably happens in most of the mature subsystems over time. These subsystems have to tackle also new issues and need to adapt to them. The tendency that old belief structures and coordination patterns are reproduced are very likely (Sabatier and Jenkins-Smith 1993).

More recent research on the ACF has also emphasized "outside dynamics". So this is when an issue emerges outside a subsystem at first place (Ingold et al. 2018; Fidelman et al. 2014). But also there, it is still the possibility that the issue then gets absorbed by an already existing subsystem, or creates its own. So from these two "starting positions" (outside or inside dynamics) and whether the issue is

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finally tackled within a mature or "creating" a nascent subsystems, four different situations are possible.

Table 1. New issues absorbed in nascent and mature subsystems

	New issue from inside a subsystem	New issue from outside
Mature subsystem	Kept (1a)	Absorbed (2a)
Nascent subsystem	Spin-off (1b)	Nascent (2b)

Before formulating expectations about the four cases or situations (1a, 1b, 2a, 2b, see Table 1) outlined, we first introduce some ACF key principles and components.

The ACF is generally interested in three key components: the emergence and maintenance of advocacy coalitions, policy change and policy-oriented learning (Nohrstedt et al. 2023). In nascent subsystems, policy outputs are usually not yet produced and beliefs not well established why change and learning are of less relevance. This is why we are here interested in coalitions and their two "basic ingredients" that are joint beliefs and coordination.

The policy core are the translation of the deep core, and thus ideologies and worldviews (such as market freedom; individual liberty; or the value of nature) to a specific policy field and subsystem. Secondary aspects are then more instrumental and concern for example things such as policy measures, monitoring or implementation techniques. So for mature subsystems the ACF expects that coalition members show more stability in policy core than in secondary beliefs. We further expect however, that this stability on core beliefs is rather than secondary aspects is more pronounced in mature than nascent subsystems.

> (Expectation 1 on belief overlap): In situations where a new issue is kept within or absorbed by a mature subsystem (1a and 2a), we expect more overlap between policy core and secondary beliefs, than in situations where the new issue creates a nascent subsystem (1b and 2b).

So the belief hierarchy of the ACF also assumes a "logic of translation" and thus a certain coherence within an actors' and a coalition's belief system. So it is this argument that deep core beliefs translate in policy core beliefs, and that policy core beliefs translate in secondary aspects. To give an example: when an actor defends market freedom as a deep core belief, this actor also wants climate change regulation to follow the principle of market freedom (policy core), why this actor then very probably

also prefers voluntary measures and soft regulation over command and control instruments (secondary aspects). We expect belief coherence between policy core and secondary aspects being stronger in the mature than the nascent situations.

> (Expectation 2 on belief coherence): In situations where a new issue is kept within or absorbed by a mature subsystem (1a and 2a), we expect more belief coherence between policy core and secondary beliefs, than in situations where the new issue creates a nascent subsystem (1b and 2b).

We could even go one step further and say that in terms of belief overlap and belief coherence, we expect the following order (decreasing): 1a, 2a, 1b, 2b. Here, 1b should be more in line with traditional ACF hypotheses because the coalitions or belief clusters in the spin-off, as Sabatier and Jenkins-Smith (1993) expected, might mirror the pre-existing groups, whereas in situation 2b, there is not any or no clear "reference category" from a former or neighboring subsystem. And in 1a might be more overlap and coherence than in situation 2a, as the issue and thereby also issue understanding already grew within the existing subsystem structures. For an accurate test of this order, more than the four cases at our disposition here would be necessary.

Another well studied hypothesis is the belief homophily hypothesis saying that actors with similar beliefs tend to coordinate their actions. Translated to the ACF, this does mean nothing else than within coalition coordination might be bigger than across coalition coordination (Ingold and Fischer 2015; Calanni et al 2015). And this should be truer for policy core beliefs, when remembering that the ACF assumes more stability in policy core than secondary beliefs. Again, this hypothesis was developed and mostly tested in mature subsystem contexts and we expect beliefs, as they are more fragmented and less clear in nascent subsystems, shaping less coordination patterns and following less the belief hierarchy in nascent subsystem situations.

> (Expectation 3a on within-cluster coordination): In situations where a new issue is kept within or absorbed by a mature subsystem (1a and 2a), we expect more within than across belief cluster coordination.

> (Expectation 3b on within-cluster coordination): In situations where the new issue creates a nascent subsystem (1b and 2b), we expect within and across belief cluster coordination as equally strong or weak.

> (Expectation 4a on belief hierarchy and coordination): In situations where a new issue is kept within or absorbed by a mature subsystem (1a and 2a), we expect that coordination patterns follow the belief hierarchy and are more pronounced in the policy core belief than the secondary aspect clusters.

(Expectation 4b on belief hierarchy and coordination): In situations where the new issue creates a nascent subsystem (1b and 2b), we expect that coordination patterns do not necessarily follow the belief hierarchy and can be as pronounced in the secondary aspect clusters as in the policy core belief clusters.

Cases

We test our expectations with four cases of new issues arriving on the political agenda. Each of them is shortly presented hereafter.

So pesticide risk reduction in Switzerland is regulated at the national level. It is a complex issue because even if mainly targeting pesticides applied in agriculture, there are man public agencies as sectors involved such as the health sector, environmental and water protection, agriculture, and food security. The issue of pesticides and their registry is in general not new, and many substances are regulated under the chemical act and its ordinances. But within the agricultural policy subsystem, it was then newly discussed under the label of "pesticide risk reduction". The elaboration of a new and unique action plan on plant protection as well as updates in many different legal texts were subsequently discussed. So pesticide risk reduction is an issue that emerged within an existing mature subsystem of agricultural policymaking (Cell 1a in Table 1b).

Hydraulic fracturing is a new technique to explore and exploit unconventional oil and gas in the underground. Very prominently applied in some US American states, for example (Heikkila and Weible 2016), the issue arrived on the cantonal (and thus regional) agenda in Switzerland during the last decade. While in other countries the issue either created an own subsystem or was absorbed in the energy subsystem (Weible and Heikkila 2016), in Switzerland it was absorbed in the respective cantonal subsystem on natural resources and underground regulation. We investigate here the case in the canotn of Neuchâtel and this case is an example for 2a in Table 1b.

Antimicrobial resistance (AMR) is a new issue that emerged in the mature subsystem of water protection. But regulating AMR under the water protection act and its related ordinances was insufficient in the eyes of some of the subsystem actors. This is why they re-framed the issues and created a spin-off, thus an own nascent subsystem on AMR regulation that, besides water, includes much more also the health and medical aspects of the issue. So AMR is in Cell 1b in Table 1b.

Last but not least, we investigate the new issue of Food Waste. Food Waste is again a very cross-sectoral issue that could have been tackled in many different existing subsystems like agricultural production and policymaking, natural resources protection, sustainability, etc. Maybe also because of

a lack of a proper national subsystem on sustainable food and food systems in Switzerland, at least at the time when the issue of Food Waste came on the political agenda, Food Waste "created" its own nascent subsystem. This is situation 2b in Table 1b.

Table 1b. The four empirical issues categorized

	New issue from inside a subsystem	New issue from outside
Mature subsystem	Kept (1a) *Pesticide risk reduction*	Absorbed (2a) *Hydraulic fracturing*
Nascent subsystem	Spin-off (1b) *AMR*	Nascent (2b) *Food Waste*

Data and methods

Actor identification in all four cases followed the traditional combination of positional, decisional, and reputational approaches (Knoke et al. 1996). The positional approach identifies actors with (decision-making, formal, or political) competences on the issue (such as the Federal Chancellery almost always involved in Swiss national law-making processes). For the decisional approach, the process of the new issue arriving on the political agenda was split in different stages and phases (for example a research project on the issue; public attention in media; or a hearing organized by a parliamentary committee). A list of actors was compiled with all those organizations who appeared in those different stages. The decisional approach is a particular challenge for new issues as there is not much history of a subsystem and issue yet. So to complete the decisional approach, and in the cases of AMR and pesticide risk reduction, where a subsystem already existed, former elite studies on the agricultural and water protection policy subsystems were taken into consideration (Metz et al. 2021; Metz 2015). This was obviously not possible for Hydraulic fracturing and for Food Waste, why the third approach, the reputational approach, also applied to all 4 cases, became particularly relevant. So the compiled list of actors from the positional and decisional approaches is presented to 2-4 experts in each field. They could further add, but also delete actors from the list. At the end, an actor had to appear at least two times in the decisional process, or appear on two of the lists (decision, positional, or reputational) to make it into our analysis.

The final list of actors, their acronyms and actor type categories are outlined in Appendix 1 for all four cases.

To gather data, an elite survey was conducted in all four cases: surveys were sent out electronically in the winter of 2014 (fracking) and the summer/fall of 2022 (pesticide risk reduction, Food Waste and AMR). Response rates were satisfactory, reaching 85percent (47 out o 54) for pesticide risk reduction, 54 percent (22 of 41 actors) in the case of fracking, and 71.2 percent (47 of 66 actors) and 62.7 percent (37 of 59 actors) for food waste and AMR, respectively.

To identify policy core beliefs and secondary aspects in a nascent subsystem, we rely on the ACF literature (for policy core beliefs, see Sabatier, 1998) and on empirical ACF research of familiar subsystems in the same jurisdiction or of the same subsystem in other jurisdictions and countries. This last procedure is designed mainly to compensate for a lack of knowledge and documentation about potential beliefs and secondary aspects, such as policy instruments to regulate the new issue.

Potential policy core beliefs for oil and gas regulation in Neuchâtel were deduced from policy core beliefs investigated in energy policy in Switzerland (Fischer, 2015) as well as from other fracking cases (e.g., see Heikkila et al., 2018). To identify the policy core beliefs for food waste in Switzerland, we proceeded in a similar manner and consulted studies on food waste (Beretta & Hellweg, 2019) as well as waste management in Switzerland (Duygan et al., 2018). For AMR regulation in Switzerland, policy core beliefs were deduced from studies investigating micro-pollutants in waters (Herzog, 2020; Schaub, 2021) as well as existing literature on AMR regulation in Germany (Vogeler et al., 2022). And finally policy core beliefs in Swiss pesticide risk reduction were deduced from earlier ACF applications to the Swiss agricultural sector (Metz et al. 2021, 2019).

Secondary aspects include policy instruments to regulate pesticide risk reduction, fracking, food waste, and AMR. For pesticide risk reduction, we relied on the portfolio of policy instruments outlined in both, the Swiss Action Plan for Plant Protection (AP PPP) and the Parliamentary Initiative (the Pa.Iv. 19.475). For oil and gas regulation in Neuchâtel, we included a range of instruments that regulate the underground, and these were deduced from legal documents and environmental regulations in Switzerland. For food waste, we consulted the recent action plan for the reduction of food waste (Federal Council, 2022), as well as a position paper from the World Wildlife Fund (WWF) and Interface (Landis & Heimann, 2021). Last but not least, for the regulation of AMR, we deduced measures from the existing political strategy for antimicrobial resistances (Federal Council, 2015).

Policy core beliefs and secondary aspects of all four cases are outlined in Appendix 2.

The four surveys also included a question on coordination among actors around the specific policy issue. More concretely, in each survey, participants were asked to indicate "with whom the coordinated actions" (be it information exchange in the case of fracking, and collaboration for the rest of the surveys) during the exact period of the investigated policy process.

Measuring Key Variables

To identify belief clusters of actors sharing policy core beliefs and/or secondary aspects, we have calculated dissimilarity (Euclidian distances) of actors' positions toward the set of core beliefs and secondary aspects, separately. This results in a matrix of dissimilarity/distance: The cell between two actors indicates how distant they are in terms of core beliefs and secondary aspects. The bigger the number between two actors, the higher their disagreement on both dimensions. Zero would indicate complete congruence on all core beliefs and secondary aspects between two actors. Based on this dissimilarity matrix, cluster analyses (k-means clustering in R) clustering actors with small belief distances were computed. For a better visualization, the belief clusters are then displayed as heatmaps where every single belief of each actor is outlined.

Belief overlap: Based on the cluster analysis introduced above, we observe whether actors cluster similarly on policy core beliefs and on secondary aspects. An indicator for this "belief agreement among peers" is the simple overlap in cluster membership between the clusters based on core beliefs and secondary aspects. Expectation 1 is confirmed if this overlap is stronger for the two mature in contrast to the nascent subsystems.

Actors' belief coherence: The ACF states that core beliefs translate into secondary aspects of some sort (Sabatier & Jenkins-Smith, 1993). Therefore, there must be at least an implicit logic between a policy core belief (e.g., the degree of state intervention prioritized to tackle a new issue) and the secondary aspect of choice (e.g., policy instrument to regulate the new issue). A concrete procedure for the operationalization of this is not yet given in the current version of this paper. The idea here would be to calculate correlations between policy core and secondary beliefs. We would, very probably, a priori and based on own and expert knowledge, define, what coherence means: so what type of policy core beliefs would logically link to secondary aspects and which ones not. Expectation 2 is confirmed if this overlap is stronger for the two mature in contrast to the nascent subsystems.

In order to test Expectations including coordination, we simply calculated the densities, thus the number of observed coordination ties compared to all possible ties within and across the belief clusters. The higher the number, the denser the coordination network within or across each cluster.

Within-cluster coordination: Expectation 3a is confirmed if coordination within belief clusters is denser than coordination across belief clusters. Expectation 3b is confirmed if coordination within belief clusters is not systematically denser than coordination across belief clusters.

Belief hierarchy and coordination: Expectation 4a is confirmed if coordination within policy core belief clusters is denser than coordination within secondary aspect clusters. Expectation 4b is confirmed if

coordination within policy core belief clusters is not systematically denser than coordination within secondary aspect clusters.

Results and Discussion

We first show for each of the four cases the heatmaps for the respective policy core beliefs and secondary aspects clusters. We then outline coordination densities within and across belief clusters.

Figures 1 and 2 display three clusters in pesticide risk reduction. The core belief clusters separate the actors into three distinct groups: pro-ecology, pro-health and a rather mixed group with actors such as the center parties and the Agricultural Agency (BLW) or the State's Secretariate for the Economy (Seco). Interestingly, the biggest cluster here is the one having clear preferences in framing the pesticide issue as a health issue (with 23 actors). The pro-ecology cluster, in terms of secondary aspects, then splits into those who prefer regulatory interventions, and those preferring a policy mix. But as illustrated in the table in Appendix 3, besides the pro-ecology cluster, there is no clear distribution pattern from the policy core clusters into the three secondary aspects clusters: the multi-criteria and the pro-health clusters distribute in all three secondary clusters (policy mix, pro regulatory, pro voluntary). But when comparing with former analysis of Swiss agricultural policy (Metz et al. 2021), the distribution into the three secondary aspects clusters seems to follow well existing conflict lines and actor types.

In the fracking case, and based on policy core beliefs, a set of 6 actors from the left-green spectrum of political actors (green NGOs, and left and green parties) is separated from the rest of the 22 actors. By contrast, the structure based on secondary beliefs separates an even smaller set of actors (four) from the rest and includes all those actors opposed to a fracking ban. Note that minority cluster 2 (four organizations) in secondary aspects has no actor overlap with minority cluster 2 (six organizations) (see also Appendix 3). The six actors of the pro-ecology cluster in the fracking case do not subsequently build their own "pro-ban" cluster based on secondary aspects. They are absorbed in the large cluster of actors being in favor of a range of fracking restrictions and regulatory measures. The same holds true for the four actors opposed to a ban on exploring and exploiting fracking: they share their core beliefs with the very large and heterogenous policy core belief cluster 1 and are not able (yet) to build their own advocacy coalition with coherent policy core *and* secondary beliefs.

In the AMR subsystem, the clustering of policy core beliefs creates one small cluster 2, of 7 actors, against the rest. But like Food Waste, the prioritization of policy core beliefs is very similar between clusters 1 and 2. The smaller cluster 2 prioritizes animal welfare and citizens security to a greater degree than cluster 1 does. A more nuanced picture is shown when looking at the cluster analysis of the secondary aspects: Again, a very small number of actors (5) is clustered against the rest (cluster 2).

They include the farmers' association (SBV), different sub-associations related to meat production (Suisseporc and Proviande), and the pharmaceutical industry as well as veterinary medicine (pharmaSuisse and GST). They are strongly opposed to any market regulation or the introduction of market-based instruments.

In the food waste subsystem, 15 actors cluster together against the rest based on policy core beliefs. The policy core belief structure is actually very homogenous between the two clusters (see figures 7 and 8). However, the smaller cluster 2 (15 mainly economic and liberal organizations) exclusively prefers ecological compatibility and economic effectiveness for the regulation of the food waste sector. The larger cluster 1 (32 organizations) further prioritizes social equity and supply security. The clustering based on secondary aspects related to food waste regulation shows a more equally distributed repartition: 21 actors in cluster 1 and 26 actors in cluster 2. The types of actors are very diverse in both clusters, perhaps with a tendency that in the larger cluster 2, more pro-ecology actors are represented that prefer a wide portfolio of policy instruments to address food waste. When turning to the table in Appendix 3, the overlap between policy core belief clusters and secondary aspects clusters is even smaller for AMR and food waste than pesticide regulation and fracking. This suggests a confirmation of Expectation 1 that belief cluster overlap is stronger for issues absorbed in a mature subsystem than those issues creating their own nascent subsystem.

The analysis for testing Expectation 2 on belief coherence is not done yet.

Figure 1 Policy core belief clusters pesticide risk reduction
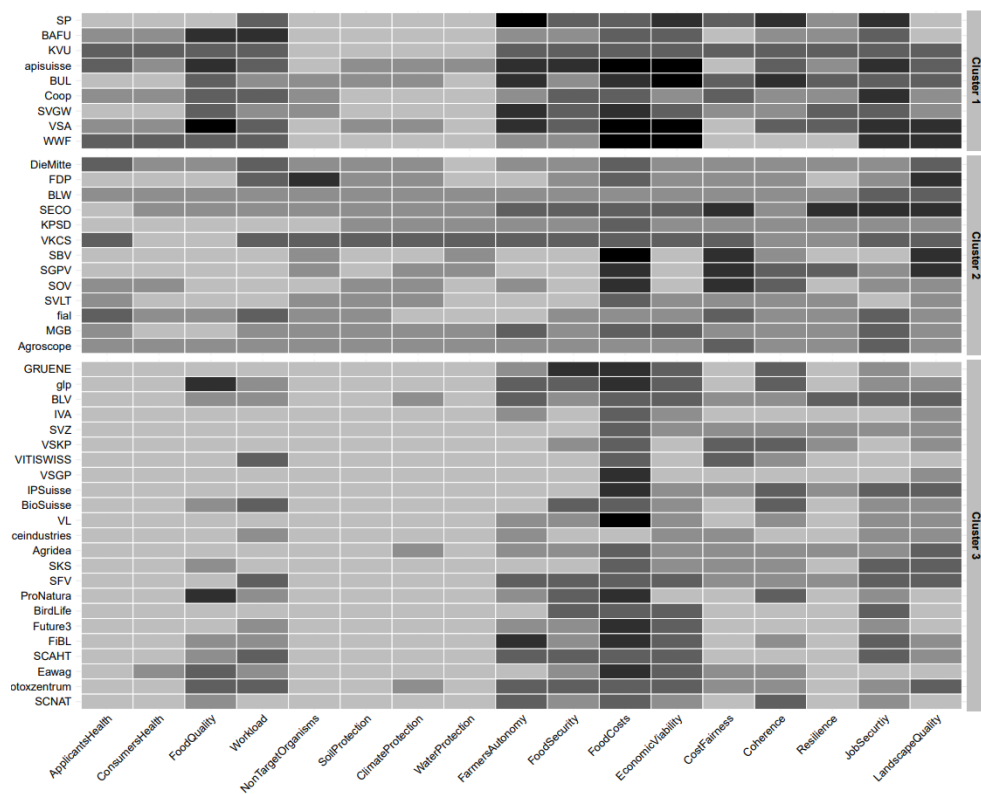

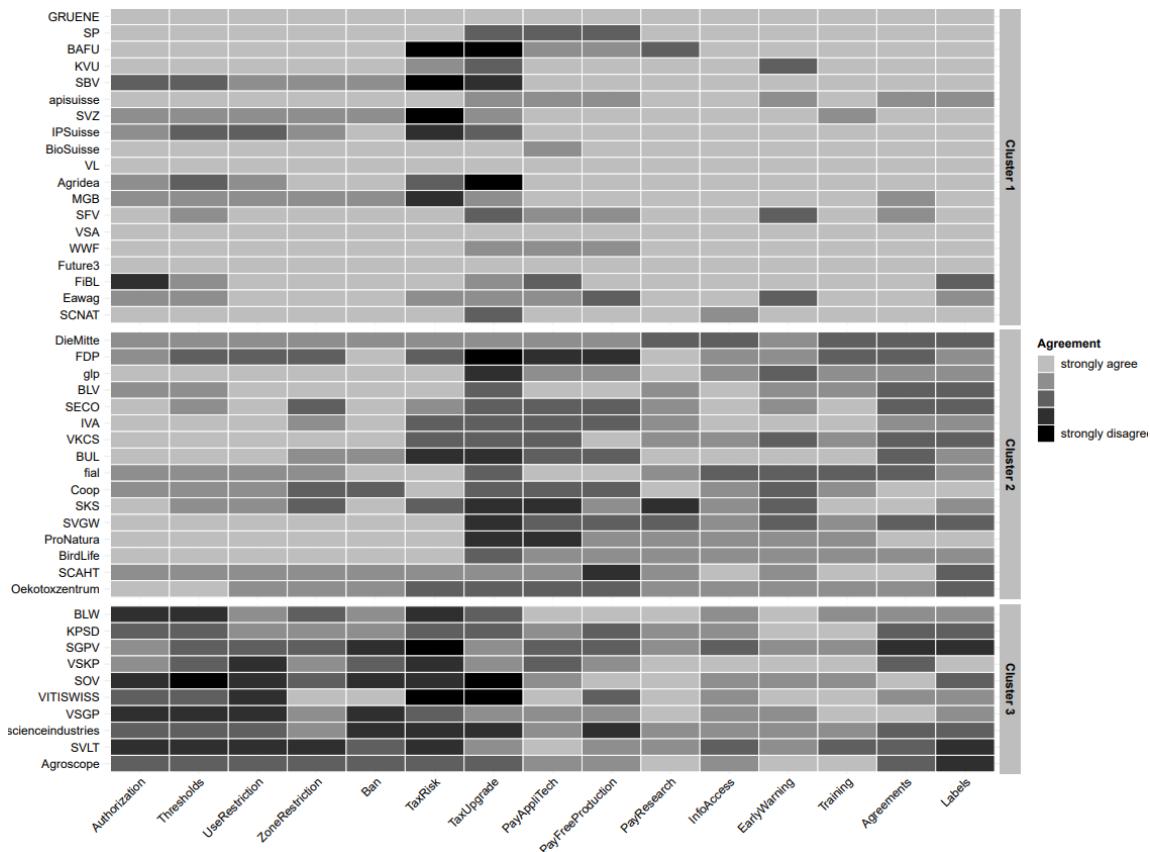Figure 2 Secondary aspects clusters in pesticide risk reduction

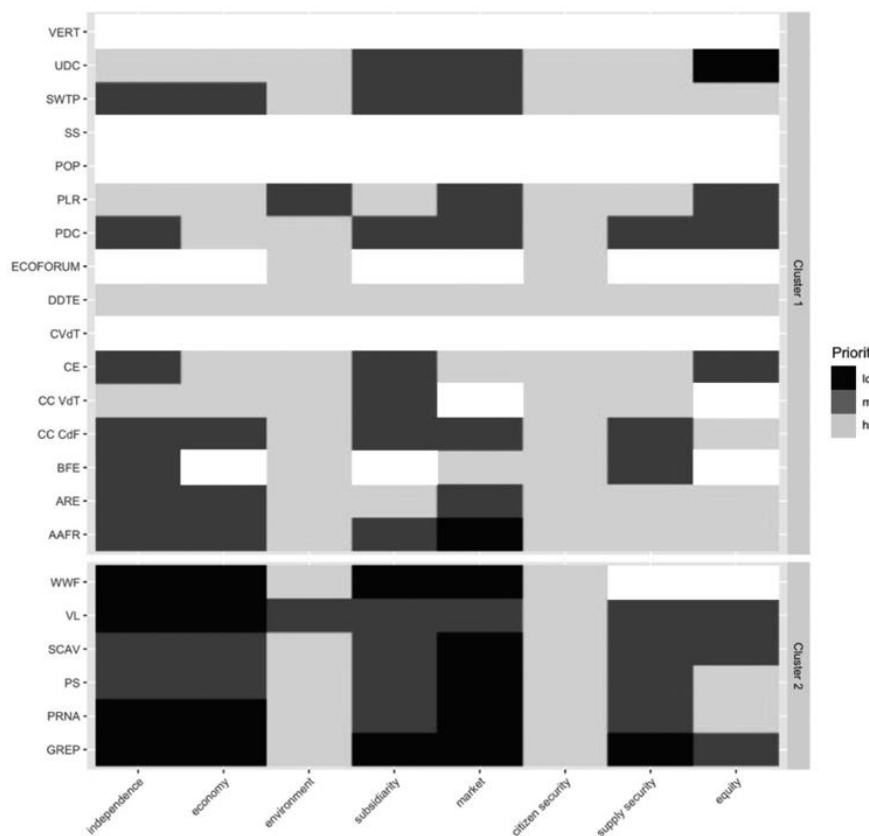Figure 3 Policy core belief clusters in hydraulic fracturing

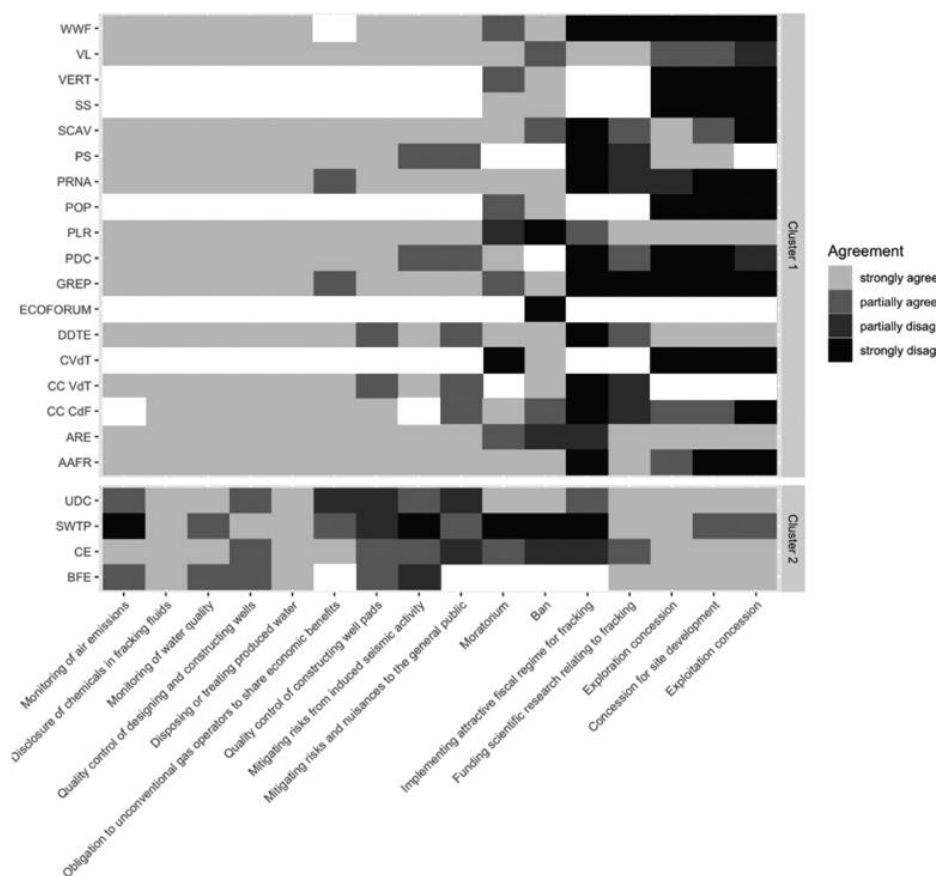Figure 4 Secondary aspect clusters in hydraulic fracturing

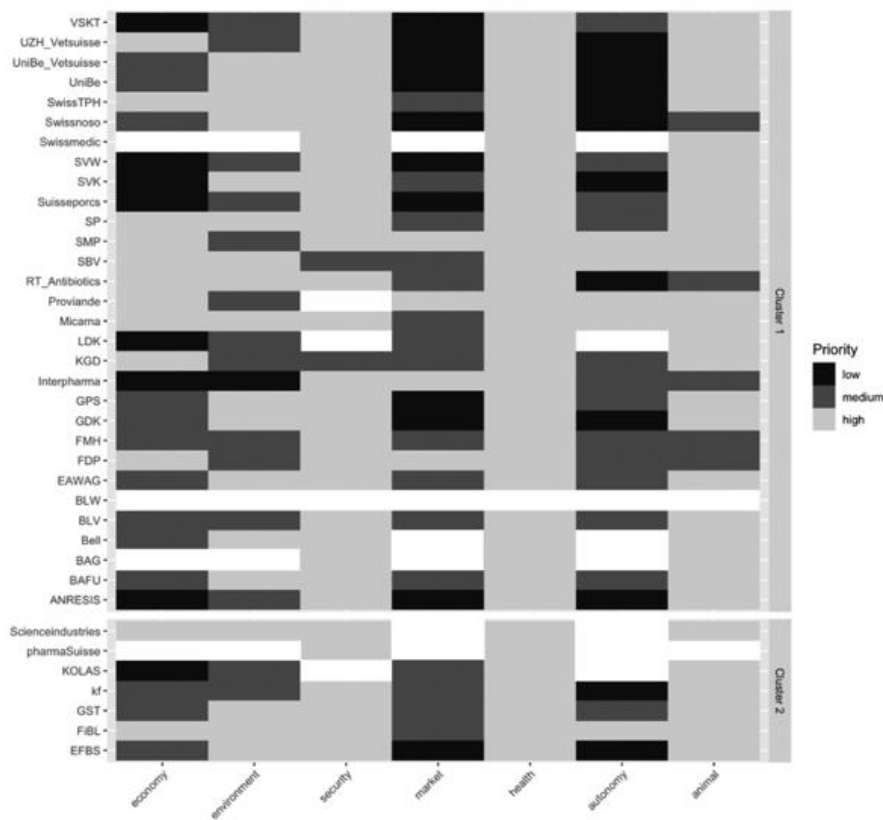Figure 5 Policy core belief clusters in AMR
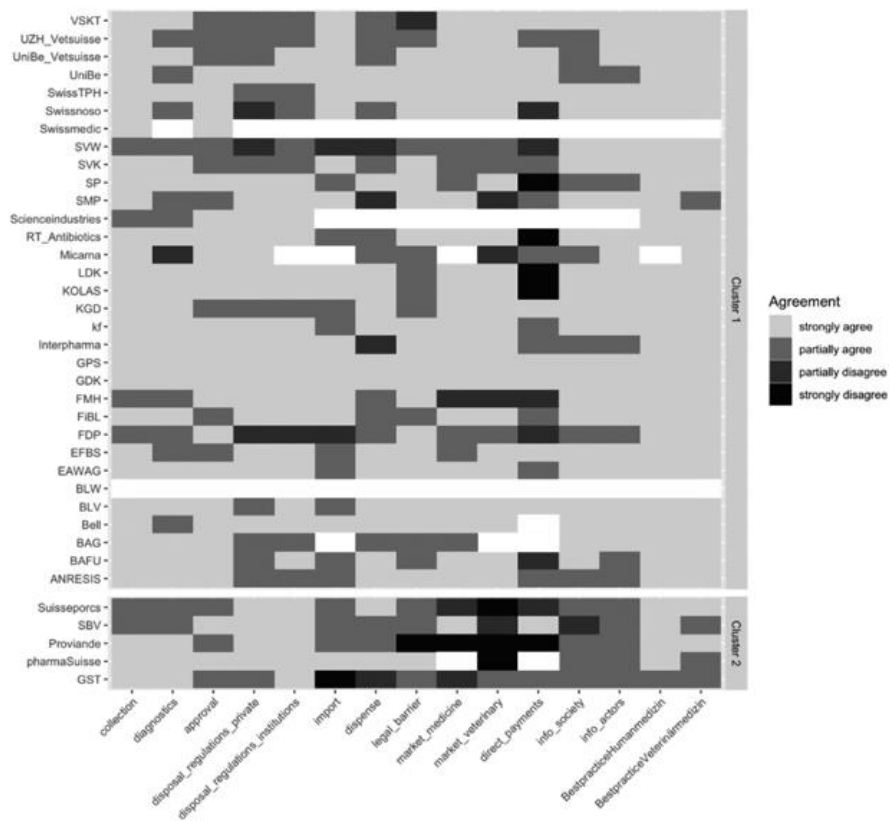

Figure 6 Secondary aspect clusters in AMR
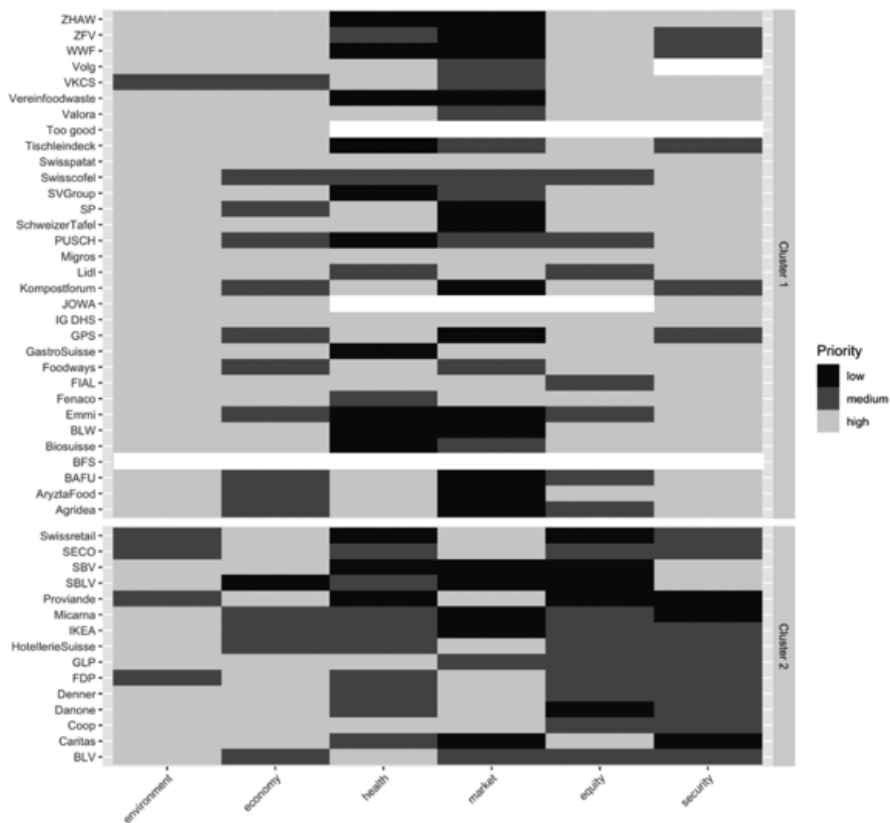
Figure 7 Policy core belief clusters in Food Waste
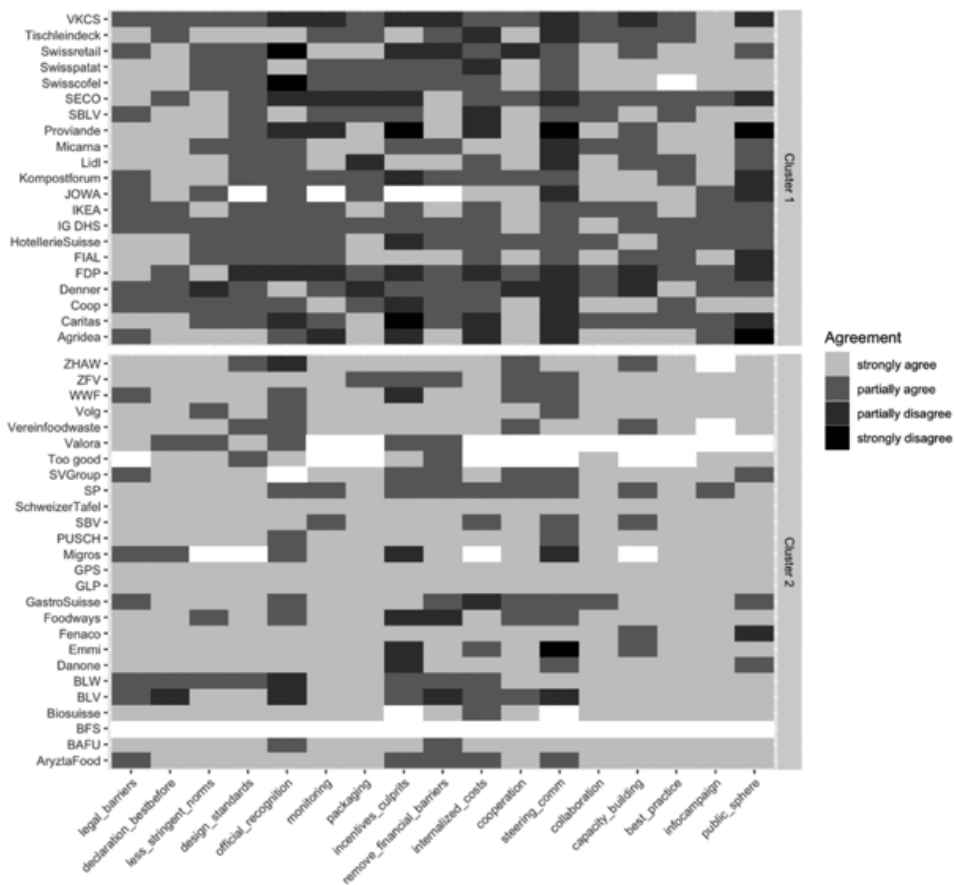

Figure 8 Secondary aspect clusters in Food Waste

Table 2a. Within- and across-cluster densities in pesticide risk reduction

		Densities in coordination		
Pesticide Risk Reduction		Cluster 1	Cluster 2	Cluster 3
Policy core beliefs (PCB)	Cluster 1	**0.35**	0.15	0.21
	Cluster 2	0.15	**0.22**	0.16
	Cluster 3	*0.21*	0.16	0.16
Secondary aspects (SA)	Cluster 1	**0.25**	0.16	0.20
	Cluster 2	*0.16*	0.13	0.11
	Cluster 3	0.20	0.11	**0.40**

Table 2b. Within- and across-cluster coordination densities for Fracking, Food Waste and AMR

		Densities in coordination	
Fracking		Cluster 1	Cluster 2
Policy core beliefs (PCB)	Cluster 1	**0.34**	0.27
	Cluster 2	0.20	**0.27**
Secondary aspects (SA)	Cluster 1	0.30	**0.36**
	Cluster 2	0.13	*0.58*
Food waste		Cluster 1	Cluster 2
PCB	Cluster 1	**0.29**	0.20
	Cluster 2	*0.25*	0.17
SA	Cluster 1	0.20	**0.24**
	Cluster 2	0.21	*0.30*
AMR		Cluster 1	Cluster 2
PCB	Cluster 1	**0.19**	0.14
	Cluster 2	0.11	**0.14**
SA	Cluster 1	**0.16**	0.14
	Cluster 2	0.24	**0.35**

For any of the four cases, there is a clear coordination pattern within and across belief clusters. Fracking maybe follows the most "traditional" belief hierarchy pattern that within-cluster coordination is stronger for policy core beliefs than secondary aspects. The clearest pattern in terms of within cluster

coordination (in contrast to across cluster coordination) is found in the AMR case, where densities are always higher within than across clusters. But our expectations 3 and 4 would say that hierarchy and within-cluster patterns should be clearer for issues absorbed by mature subsystems than those creating a nascent subsystem. And this is not the case.

Conclusions

We analyzed four new issues that arrived on the political agenda: pesticide risk reduction, hydraulic fracturing, antimicrobial resistance, and food waste. The first two issues were subsequently absorbed by mature subsystems. And at least one of them, the pesticide risk reduction, resembles a rather typical routine in mature subsystems when new issues emerge within the subsystem.

We expected belief hierarchy and coherence (between policy core beliefs and secondary aspects) being more pronounced for issues absorbed in mature subsystems than those creating a nascent subsystem. We could so far generally confirm these expectations.

However, we also expected coordination within clusters following the belief (hierarchy) pattern. But we could not observe more coordination within clusters than between clusters, also not within mature subsystems. The question arises if new issues can fragment also already established coordination lines and shake up the belief homophily hypotheses. Or if coordination patterns within and across belief clusters and coalitions are anyhow not as established as assumed by the literature.

More comparative research and further investigations are needed. This is very much work in progress.

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Appendix 1: List of actors

Actors' List Fracking Neuchâtel

Actor Acronym	Full actor name	Category 1= Pol-admin; 2= Industry; 3= NGO;4=Science
AAFR	Friends of Farm Roberts Association	3
ARE	Federal Office for Spatial Development	1
BFE	Federal Office of Energy	1
CC CdF	City Council of Chaux-de-Fonds	1
CC VdT	City Council Val-de-Travers	1
CE	Celtique Energie Ltd.	2
CVdT	Collectif Val-de-Travers	3
DDTE	Department of spatial development and the environment	1
ECOFORUM	Umbrella organization for the Protection of the Natural Heritage of Neuchâtel	3
GREP	Greenpeace Neuchâtel	3
PDC	Christian Democratic People's Party	1
PLR	FDP. The Liberals	1
PS	Social Democratic Party	1
POP	Swiss Party of Labour	1
PRNA	Pro Natura Neuchâtel	3
SCAV	Cantonal office of consumption and veterinary	1
SS	Solidarity	1
SWTP	Federal Office of Topography Swisstopo	1
UDC	Swiss People's Party	1
VERT	Green Party	1
VL	Green Liberal Party	1
WWF	WWF Neuchâtel	1

Actors' List Food Waste

Actor Acronym	Full actor name	Category 1= Pol-admin; 2= Industry; 3= NGO;4=Science
Agridea	Consulting of cantonal agricultural servics	1
AryztaFood	Aryzta Food Solutions Switzerland	2
BAFU	Federal Office for the Environment	1
BFS	Federal Statsitical Office	1
Biosuisse	Biosuisse	2
BLV	The Federal Food Safety and Veterinary Office	1
BLW	Federal Office for Agriculture	1
Caritas	Caritas	3
Coop	Coop Group	2
Danone	Danone Group	2
Denner	Denner Group	2
Emmi	Emmi Group	2
FDP	Free Democratic Party of Switzerland	1
Fenanco	Fenanco	2
FIAL	Federation of Swiss Food Industries	2
Foodways	Foodways Consulting GmbH	2
GastroSuisse	Gastro Suisse	2
GLP	Green Liberal Party	1
GPS	Green Party of Switzerland	1
HotellerieSuisse	Hotellerie Suisse	2
IG DHS	Interest group retail trade Switzerland	2
IKEA	IKEA Switzerland	1
JOWA	JOWA AG	1
Kompostforum	Kompostforum	3
Lidl	Lidl Switzerland	2
Micarna	Micarna SA	2
Migros	Migros Group	2
Proviande	Sector organization of the Swiss meat industry	2
PUSCH	Stiftung praktischer Umweltschutz Schweiz	3
SBLV	Swiss Farmers' Association	2
SBV	Schweizerischer Bäuerinnen- und Landfrauenverband	2
SchweizerTafel	Swiss Table -non profit	3
SECO	State Secretariat for Economic Affairs	1
SP	Social Democratic Party	1
SVGroup	SV Group	2
Swisscofel	Swiss Association of Fruit, Vegetable and Potato Trade	2
Swisspatat	Swiss potatoes interbranch organization	2
Swissretail	Association of retail trade companies	2
Tischleindeck	Tischlein deck dich	3
Too good	Too good to go	3
Valora	Valora Group	2
Vereinfoodwaste	Foodwaste association	3
VKCS	Association of Cantonal Chemists Switzerland	1
Volg	Volg Group	2
WWF	World Wildlife Fund Switzerland	3
ZFV	ZFV Group	2
ZHAW	Zurich University of Applied Sciences	4

Actors' List AMR

Actor Acronym	Full actor name	Category 1= Pol-admin; 2= Industry; 3= NGO/health;4=Science
ANRESIS	Swiss Centre for Antibiotic Resistance	4
BAG	Federal Office of Public Health	1
BAFU	Federal Office for the Environment	1
Bell	Bell Group	2
BLV	The Federal Food Safety and Veterinary Office	1
BLW	Federal Office for Agriculture	1
EAWAG	Swiss Federal Institute of Aquatic Science and Technology	4
EFBS	Swiss Expert Committee for Biosafety	4
FDP	Free Democratic Party of Switzerland	1
FiBL	Research Institute of Organic Agriculture	4
FMH	Swiss Medical Association	3
GDK	Conference of Cantonal Health Directors	1
GPS	Green Party of Switzerland	1
GST	Swiss Veterinary Society	3
Interpharma	Association of Switzerland's research-based pharmaceutical	3
kf	Consumers' forum	3
KGD	Swiss Calf Health Service	3
KOLAS	Swiss conference of Cantonal Agriculture Services	1
LDK	Conference of Cantonal Agricultural Directors	1
Micarna	Micarna Group	2
pharmaSuisse	Swiss Pharmacists Association	2
Proviande	Proviande	2
RT_Antibiotics	Round Table Antibiotics	1
SBV	Swiss Farmers' Association	2
Scienceindustries	Business Association Chemistry Pharma Life Sciences	2
SMP	Swiss Milk Producers	2
SP	Social Democratic Party	1
Suisseporcs	Swiss Asssociation of Pig Breeders and Producers	2
SVK	Swiss Association for Small Animal Medicine	3
SVW	Swiss Association for Ruminant Health	3
Swissmedic	Swiss authority responsible for the authorization and supervision of therapeutic products	1
Swissnoso	National Center for Infection Prevention	1
SwissTPH	Swiss Tropical and Public Health Institute	4
UniBe	University of Bern	4
UniBe_Vetsuisse	University of Bern, Vetsuisse faculty	4
UZH_Vetsuisse	University of Zurich, Vetsuisse faculty	4
VSKT	Swiss Association of Cantonal Veterinarians	1

Actors' List Pesticide Risk Reduction

Actor acronym	Full actro name	Category 1= Pol-admin; 2= Industry; 3= NGO/health;4=Science
Agridea	Swiss Association for the Development of Agriculture and Rural Areas	4
Agroscope	Swiss excellence centre for agricultural research	4
apisuisse	Umbrella organization of the Swiss beekeeper associations	2
BAFU	Federal Office for the Environment	1
BioSuisse	Association of Swiss Organic Agriculture Organizations	2
BirdLife	Swiss Bird Protection Association	3
BLV	Federal Food Safety and Veterinary Office	1
BLW	Federal Office for Agriculture	1
BUL	Advisory Service for Accident Prevention in Agriculture	4
Coop	Coop Group	2
Die Mitte	The Centre	1
Eawag	Swiss Federal Institute of Aquatic Science and Technology	4
FDP	FDP The Liberals	1
fial	Federation of Swiss Food Industries	2
FiBL	Research Institute of Organic Agriculture	4
Future3	Association for a Switzerland without Synthetic Pesticides	3
glp	Swiss Green Liberal Party	1
GRÜNE	Swiss Green Party	1
IP-Suisse	Swiss Association of Integrated Producing Farmers	2
IVA	Intercantonal Association for Employee Protection	1
KOLAS	Conference of the Agricultural Offices of Switzerland	1
KPSD	Cantonal of the Cantonal Plant Protection Services	1
KVU	Conference of the Heads of the Environmental Offices of Switzerland	1
MGB	Migros Cooperative	2
Oekotoxzentrum	Swiss competence centre for applied, practice-oriented ecotoxicology	4
ProNatura	Swiss Nature Conservation Organization	3
SBV	Swiss Farmers' Union	2
SCAHT	Swiss Centre for Applied Human Toxicology	4
scienceindustries	Business Association Chemistry Pharma Life Sciences	2
SCNAT	Swiss Academy of Sciences	4
SECO	State Secretariat for Economic Affairs	1
SFV	Swiss Fishery Association	2
SGPV	Swiss Grain Producers Association	2
SKS	Foundation for Consumer Protection	3
SOV	Swiss Fruit Association	2

SP	Swiss Social Democratic Party	1
SVGW	Swiss Gas and Water Association	2
SVLT	Swiss Association for Agricultural Technology	2
SVZ	Swiss Sugar Beet Growers Association	2
Vision Landwirtschaft	Association for sustainable, economically strong, multifunctional rural agriculture in Switzerland	3
VITISWISS	Swiss Association for Sustainable Development in Viticulture	2
VKCS	Association of Cantonal Chemists of Switzerland	1
VSA	Association of Swiss Wastewater and Water Protection Professionals	2
VSGP	Association of Swiss Vegetable Producers	2
VSKP	Association of Swiss Potato Producers	2
WWF	World Wide Fund for Nature Switzerland	3

Appendix 2: List of policy core beliefs and secondary aspects

Fracking
Policy core beliefs
Economic efficiency
Environmental compatibility
Market competitiveness
Federal subsidiarity
Citizens' security
Social equity
Security of supply
Independency from other countries
Secondary aspects
Monitoring of water quality
Monitoring of air emissions
Disclosure of chemicals in fracking fluids
Setbacks of wells from occupied buildings or natural features
Quality control of designing and constructing wells
Disposing of or treating produced water
Quality control of constructing well pads
Mitigating risks from induced seismic activity
Mitigating risks and nuisances to the general public caused by truck traffic, noise, and light from well site operations
Funding scientific research relating to environmental impacts of unconventional gas operations
Obligation of private fracking firms to share their gains with the local population
Exploitation concession
Exploration concession
Concession for site development
Moratorium
Ban
Food waste
Policy core beliefs
Economic efficiency
Environmental compatibility
Public health
Market competitiveness
Social justice
Security of supply
Secondary aspects
Reduction of legal hurdles for food donations
Optimize declaration of best-before dates
Relaxation and flexibilization of standards for agricultural products between players in agriculture, processing, and trade
Optimize design of industry standards and contract clauses to reduce avoidable food losses
Official recognition of farms in their commitment to combat food waste
Establish monitoring of data collection methods
Optimize packaging and forms of sale
Use financial incentives to motivate waste producers to minimize waste
Internalize the costs of surpluses and by-products
Eliminate financial barriers to the implementation of innovative ideas from business and civil society

Cooperation and exchange of actors along the value chain

Introduce a steering group to ensure coordinated cooperation on the part of the public sector
Promote collaboration on food donations with relevant organizations

Expand industry-specific offerings for education and training

Publicize best practices in gastronomy

Education and awareness-raising measures to make relevant information and measures on the subject of food waste known

Anchor the avoidance of food waste in public procurement

Antimicrobial resistances

Policy core beliefs

Economic efficiency

Environmental compatibility

Public health

Market competitiveness

Autonomy of agriculture

Animal welfare

Citizens' security

Secondary aspects

Comprehensive, nationally standardized survey of antibiotic resistance in human and veterinary medicine

Comprehensive, nationally standardized diagnostics of antibiotic resistance in human and veterinary medicine

Optimize drug approval for antibiotics to incentivize development of new antibiotics

Disposal regulations for antibiotics in private households

Disposal regulations for antibiotics in human medical institutions

Import regulations for products that can lead to the spread of antibiotic resistance in Switzerland

Optimize the dispensing of antibiotics to private individuals and farmers (e.g., individual dispensing of antibiotics)

Removal of legal barriers regarding access to anonymized data for research on antibiotic resistance

Optimize design of market mechanisms and incentive systems in human medicine to reduce incentives for excessive antibiotic consumption

Optimize design of market mechanisms and incentive systems in the veterinary sector to reduce incentives for excessive antibiotic consumption

Direct payments to farmers to implement measures for the reduction of antibiotic resistance

Raise awareness in society through government information campaigns

Raise awareness among stakeholders through government information campaigns

Promote best practices for antibiotic prescribing in human medicine

Promote best practices for antibiotic prescribing in veterinary medicine

Pesticide Risk Reduction

Policy core beliefs

High (health) protection of users, downstream workers, passers-by

High (health) protection of consumers

High food quality

Low workload in agriculture

High protection of non-target organisms

High soil protection

High climate protection

High water protection

High autonomy of farmers

High level of food security

Low food costs

High economic viability

High cost fairness

High international coherence

High food system resilience

High landscape quality

High job security

Secondary aspects

Advancement of the pesticide approval process (e.g., through additional requirements for pesticide products or the further development of the risk assessment of pesticides)

New threshold values for pesticide residues in water, soil, or food (e.g., new cumulative or additional ecotoxicological threshold values)

Stricter use regulations for pesticides regarding the application, storage, and disposal of pesticides

Identification of inflow areas of relevant ground waters as zones with special measures for the protection of water quality (e.g., conditional use of pesticides)

Ban of particularly problematic pesticides

Steering taxes on pesticides depending on the environmental and health risks
of the pesticides

Co-financing the technical upgrading of drinking water catchments by polluters

Direct payments to promote low-emission application techniques

Direct payments to promote pesticide-reduced or pesticide-free production

Financial support for research on alternative pestcicide management systems, production systems, and protective measures

Improved access to information on pesticide risks and protective measures

Expansion of the national early warning service for monitoring and forecasting
the occurrence of pests

Expansion of the advisory services and obligation to provide further training for pesticide users

Industry agreements with bulk buyers (e.g., regarding quality standards, or the minimum share of resistant varieties, and label products)

Labels for pesticide-reduced or pesticide-free foods for identification and traceability of agricultural production and quality criteria

Advancement of the pesticide approval process (e.g., through additional requirements for pesticide products or the further development of the risk assessment of pesticides)

Appendix 3: Cluster overlap between Policy Core Beliefs and Secondary Aspects

Pesticide Risk Reduction

		Cluster 1	Cluster 2	Cluster 3
Pesticide Regulation	Policy core belief clusters	**Pro-ecology (9)** SP, BAFU, KVU, apisuisse, BUL, Coop, SVGW, VSA, WWF	**Multi-criteria (13)** Die Mitte, FDP, BLW, SECO, KPSD, VKCS, SBV, SGPV, SOV, SVLT, fial, MGB, Agroscope	**Pro-health (23)** GRUENE, glp, BLV, SVZ, VSKP, VITISWISS, VSGP, IPSuisse, BioSuisse, VL, scienceindustries, Agridea, SKS, ProNatura, BirdLife, Future3, FiBL, SCAHT, Eawag, Oekotoxzentrum, SCNAT
	Secondary aspects clusters	**Policy mix (19)** GRUENE, SP, BAFU, KVU, SBV, apisuisse, SVZ, IPSuisse, BioSuisse, VL, Agridea, MGB, **SFV,** VSA, WWF, Future3, FiBL, Eawag, SCNAT	**Pro regulatory (16)** Die Mitte, FDP, glp, BLV, SECO, **IVA,** VKCS, BUL, fial, Coop, SKS, SVGW, ProNatura, BirdLife, SCAHT, Oekotoxzentrum	**Pro voluntary (10)** BLW, KPSD, SGPV, VSKP, SOV, VITISWISS, VSGP, scienceindustries, SVLT, Agroscope

		Cluster 1	Cluster 2
Fracking	Policy core belief clusters	**Diverse actors cluster (16)** AAFR, ARE, BFE, CC CdF, CC VdT, CE, CVdT, DDTE, ECOFORUM, PDC, PLR, POP, SS, SWTP, UDC, VERT	**Pro-ecology cluster (6)** GREP, PRNA, PS, SCAV, VL, WWF
	Secondary aspects clusters	**Pro-ban cluster (18)** **AAFR, ARE, CC CdF, CC VdT, CVdT, DDTE, ECOFORUM, GREP, PDC, PLR, POP, PRNA, PS, SCAV, SS, VERT, VL, WWF**	**Pro-exploration cluster (4)** BFE, CE, SWTP UDC
Food waste	Policy core belief clusters	**Supply security cluster (32)** Agridea, AryztaFood, BFS, Kompostforum, Swisspatat, VKCS, ZFV, SVGroup, Valora, JOWA, SP, Volg, GPS, Swisscofel, GastroSuisse, Lidl, Emmi, FIIAL, WWF, Biosuisse, BAFU, Fenaco, SchweizerTafel, PUSCH, VereinFoodwase, Too good, Migros, Foodways, IG DHS, BLW, Tischleideck, ZAHW	**Environment-economy cluster (15)** IKEA, SBLV, Proviande SECO, **Danone**, Denner HotellerieSuisse, Caritas FDP, Micarna, **GLP** Swissretail, **SBV**, Coop, **BLV**
	Secondary aspects clusters	**No market-based cluster (21)** **Agridea, Kompostforum Swisspatat, VKCS, JOWA Swisscofel, Lidl, FIAL IG DHS, Tischleindeck,** IKEA, SBLV, Proviande, SECO, Denner, HotellerieSuisse, Caritas, FDP, Micarna, Swissretail, Coop	**Integrative action against FW cluster (26)** AryztaFood, BFS, ZFV SVGroup, Valora, SP Volg, GPS GastroSuisse, Emmi, WWF Biosuisse, BAFU, Fenaco SchweizerTafel, PUSCH VereinFood Waste Too good, Migros Foodways, BLW, ZHAW, **Danone, GLP, SBV, BLV**
AMR	Policy core belief clusters	**Diverse actors cluster (30)** Bell, GPS, RT_Antibiotics, SVK, EAWAG, FDP, Proviande, SwissTPH, SVW, Swissnoso, Micarna,	**Security-animal welfare cluster (7)** Kf, EFBS, Scienceindustries FiBL, GST, KOLAS, pharmaSuisse

		FMH, SMP, UniBe, KGD, SP, ANRESIS, BAFU, UZH_Vetsuisse UniBe_Vetsuisse, GDK, Suisseporcs, SBV, BAG, BLV, Interpharma, Swissmedic, BLW, VSKT, LDK	
	Secondary aspects clusters	**Integrative action to regulate AMR (32)** **Bell, GPS, RT_Antibiotics, SVK, EAWAG, FDP, SwissTPH, SVW, Swissnoso, Micarna, FMH, SMP, UniBe, KGD, SP, ANRESIS, BAFU, UZH_Vetsuisse UniBe_Vetsuisse, GDK, BAG, BLV, Interpharma, Swissmedic, BLW, VSKT, LDK,** Kf, EFBS, Scienceindustries FiBL, GST, KOLAS	**No market regulation cluster (5)** Proviande, Suisseporc, SBV, GST, pharmaSuisse

Note: Actors with the same color stay together in the same belief cluster (policy core and secondary beliefs). See Appendix 1 for actor acronyms and full names.