

Coping with Climate Change: Integrating Adaptation into Forestry in Switzerland

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Abstract

Governments throughout the world recently addressed adaptation as a second key strategy to tackle climate change. Integrating climate change adaptation according to the idea of Environmental Policy Integration (EPI) thereby attracted the attention of practitioners and academics. It is argued that the integration of climate change adaptation policies faces similar challenges as the integration of environmental policy in the past. Basically, adaptation is also a cross-cutting issue challenged by the institutional fragmentation of policy-making. Accordingly, this task is challenged by different and sometimes conflicting sectoral policies as well as the relationships between and the roles of various actors at multiple levels.

The paper argues that policy integration – either environment or adaptation – must be understood as policy change. Following the approach developed by Adam and Kriesi (2007), the potential for such a policy change is determined by the power distribution and the type of interaction in the policy sector concerned. Firstly, a typology of potential for policy change is presented. Secondly, this typology is connected with three basic types of policy integration. Finally, the direction of integration is determined by the actor's central position in the policy-process.

Methodologically, network approach developed by Serdült and Hirschi (2004) is applied. This actor-process-event approach (APES) links the participating actors with the different stages of the policy process. In a second step these data are analyzed with Social Network Analysis tools to assess the role, power, and authority of each actor. Empirically, the paper analyzes forestry in Switzerland which has undergone two revisions recently. Preliminary results suggest that policy integration – understood as a policy change – in the case of adaptation and environment depend on the power distribution and the type of interaction in a policy subsystem. Power and authority of the actors accountable for adaptation and environmental issues determine the degree of integration of climate change adaptation and EPI.

1 Introduction

The growing concerns on unavoidable and more pronounced impacts of climate change as well as the failure of mitigation policies established now *adaptation to climate change* – which was initially perceived as fatalistic – as a second key strategy in climate policy (Biesbroek et al. 2010; Massey and Bergsma 2008). As climate change is expected to have a severe impact on a broad variety of key human socio-economic activities, adaptation to climate change basically addresses every policy sector at every level, therefore, making it a cross-sectional and cross-scale issue (European Commission 2009).

To meet such climate change related challenges in complex and fragmented political settings, the idea of Climate Change Policy Integration (CPI) according to the idea of Environmental Policy Integration (EPI) recently started to attract academics (Ahmad 2009; Henstra and McBean 2009; Mickwitz et al. 2009a; Roche Kelly 2009; Swart et al. 2009; Van Bommel and Kuindersma 2008) as well as policy-makers (e.g. European Commission 2008). The basic argument is that the integration of climate change policies faces *very similar challenges* as the integration of environmental policy in the past. Like environmental policy, climate change policy is cross-sectional (or transversal) that is it interacts with other institutionally separated policies by affecting the same target areas (Mickwitz and Kivimaa 2007). To make interacting policies more effective – that is increasing synergies and reducing goal-conflicts and mutual negative impacts – it is argued that they have to be integrated horizontally. Furthermore, policy integration addresses the vertical dimension within one sector. This refers to different policy levels and the (optimal) allocation of authority, resources, and jurisdictions. The vertical dimension refers to different elements of the same policy sector as such as strategies, programs, measures or instruments within or across levels. These issues and challenges have already been addressed in the EPI-literature as well as in the literature of multi-level governance (e.g. Hooghe and Marks 2003), policy coordination (e.g. Peters 1998) and public policy analysis and evaluation (e.g. Knoepfel et al. 2007).

Whereas the integration of the *mitigation dimension* of climate change policy can be seen as a sub-category of EPI, the integration of the adaptation dimension seems to raise new questions on PI in general and EPI in particular. On the one hand the recently growing literature on ‘adaptation policy’ or ‘adaptive governance’ also stresses the complex interplay between

authorities at different government levels, and the important role of science and information (e.g. Brunner and Lynch 2010) and recently published national adaptation strategies agree that adaptation is a multi-sectoral and multi-level task affecting a broad variety of public and private actors. Because of these similarities with the ‘environmental problem’ it was concluded that adaptation strategies and measures must be integrated at multiple governmental levels and in multiple existing sector policies according to the concept of EPI (Ahmad 2009; Biesbroek et al. 2010; European Commission 2009). On the other hand, the adaptation dimension rises new questions. For example the adaptation literature puts more emphasis on the importance of local knowledge and stakeholders lacking the (institutional) capacities to effectively address adaptation (Brunner and Lynch 2010; Ingold, Balsiger, and Hirschi 2010). Additionally, the uncertainty and complexity for adaptation policy is higher than in the case of environmental issues (IPCC 2007). Furthermore, currently no government planned or established an ‘adaptation sector’ so far (Mickwitz et al. 2009a). Consequently, the responsibility for developing a national adaptation strategy was in most cases transferred to ‘environmental ministries’.

Accordingly, this article asks which concepts from EPI could be applied or have to be modified to foster the integration of adaptation strategies and policies into existing policy sectors. The basic research question thus reads as follows:

What concepts and frameworks have been developed and applied in EPI research so far, and how can they be devolved to the increasing importance of integrating adaptation strategies and policies into existing key socio-economic sectors?

To answer these questions, the paper firstly reviews the main body of theoretical and practical literature on EPI. However, as recently most research concluded that despite ‘30 years of EPI’ the success has been very limited, attention is turned to the factors inhibiting and blocking EPI-implementation even though its general political support. To understand this ‘gap’ of word and deeds, I will argue, that PI and EPI have to be understood as a matter of policy change in the policy sectors concerned. The processes and outcomes in these sectors are determined by the institutional characteristics as well as strategic actions and interactions by actors as such as individuals, interest groups and organizations in the policy networks (Adam and Kriesi 2007; Carter 2007; Hanf and Jansen 1998). The different constellations of actors and institutions across countries as well as policy sectors are hypothesized to explain the variations in EPI more

generally. To analyze the structure of these processes a network approach is taken to explain varying degrees of policy integration in general and of EPI and API in particular.

Subsequently, this approach is exemplified in Swiss land use policies. As analyzing past and current land use policies in Switzerland can provide scientifically valuable and practically relevant information on the conditions, processes and modes of adaptation strategies to cope with changing climate conditions in highly climate sensitive and exposed regions with complex political settings the article presents first results from recent policy-making in forestry in Switzerland. Finally, a preliminary summary is given on crucial aspects for integrating adaptation and environmental issues and an outlook for further steps is given.

2 Environmental Policy Integration

2.1 The Cross-Sectoral Nature of Environmental Problems

When governments established environmental ministries or agencies to tackle environmental problems in the early 1970s it soon became obvious that the *interdependency of environmental problems* demands for taking into account broader public policies to address them effectively (Carter 2007). The ‘artificial’ institutional fragmentation of policy-making which is reflected in an administrative fragmentation did not take into account these interdependencies and the cross-sectoral nature of environmental problems. To address the interdependency of environmental problems the idea of EPI was developed. The basic idea of EPI is that environmental policy objectives must be integrated into *key socio-economic sectors* as such as energy, transport, agriculture or industry to mitigate effectively the negative environmental impacts of these sectors. But besides the cross-sectoral nature of environmental problems, the fragmentation reinforces traditional ‘special interest’ approach to public policy. This ‘traditional’ approach hinders effective environmental policy making by giving privileged access for business and producer groups (Carter 2007). Various considerations have been made on how strengthen the environmental goals against the resistance of traditional ‘iron triangles’.

2.2 EPI in Practice

Although not labeled as EPI, the concept of integrating environmental objectives into other sectors has been discussed since that time among practitioners and academics in environmental policy as a strategy for effective *environmental protection* and *enhancing sustainable*

development against the institutional fragmentation in policy-making (Briassoulis 2005c; Jacob, Volkery, and Lenschow 2008; Lafferty and Hovden 2003; Persson 2004).¹ Since the Stockholm Conference in 1972 this basic idea was central in many discussions in environmental policy. It was reemphasized by the Brundtland Report in 1987, became a basic principle in the Environmental Action Plans of the European Communities and the European Union, and was strongly recommended by the OECD and Agenda 21. Meanwhile various attempts have been made to integrate environmental issues into sectoral policies and to overcome the institutional fragmentation. So most Western countries introduced the idea of EPI somehow in national environmental policy making. Recently the concept of EPI has become more central in environmental policy-making (Carter 2007).

Even though differing in scope and approach the evaluation of these attempts is rather negative. After a ‘history’ of EPI of now more than 30 years the general achievement is disillusioning and EPI is mostly considered as a failure so far. The general observation is that the principle, policies and declarations are in place. But as it is the case for sustainable development, EPI largely remained on the rhetorical level and lacks implementation (Nilsson, Eckerberg, and Persson 2007). Or to put it in another way: words differ from deeds. Furthermore, most environmental departments report further need for coordination and integration which for so far mainly remained on poorly institutionalized ‘communication’ or ‘reporting’ (Carter 2007). However, the ‘failure’ of EPI is often linked by the comparatively weak positions of environmental departments in policy-making and especially the inherent conflict with (still) prioritized economic ministries and interests (Carter 2007). Despite its at least disputable success EPI remains a key strategy in environmental policy-making and is widely accepted concept among policy-makers and researchers.

2.3 EPI, What Does it Mean?

EPI became broadly discussed topic especially since the early 1990s among researches. Since then a plethora of publications has established EPI as a field of intensive research (Nilsson, Eckerberg, and Persson 2007) and is strongly connected to the broader discussion of

¹ The advent of the concept of EPI can be dated back to the *Stockholm Conference* in 1972. The European Communities adopted the basic idea in their first Environmental Action Plan (EAP) in 1973 emphasizing that for effective environmental protection the environmental consequences must be considered in all “technical planning and decision-making processes”.

environmental governance (Jänicke and Jörgens 2006).² By being both a political strategy to enhance environmental objectives as well as an academic research topic and concept EPI (still) suffers from not having a clear and widely accepted definition (Ahmad 2009; Briassoulis 2005b; Persson 2007). Although being unsatisfactory from a scientific perspective and lacking implementation, this fuzziness of the concept had also the advantage that a commitment among politicians has been achieved very easily. In that way, EPI ‘suffers’ and ‘benefits’ from the same problems as sustainable development.

So after more than three decades of EPI discussion and research, “EPI, what does it mean?” is – unfortunately – a typical starting point in introductory chapters of articles and books on EPI. As this was crucial for defining a new field of research (Collier 1994; Underdal 1980), the issue of defining PI and EPI persists (Briassoulis 2005b; Persson 2004). In the next section I resume the main points of defining PI and EPI respectively.

Policy Integration

The first attempt to clarify the concept of PI was by Underdal (1980). Underdal’s point of departure is a system characterized by strong interactions. Such an *interaction system* is characterized by a significant exchange of ‘externalities’ and is likely to generate proposals for some kind of coordination and attempts to reach joint decisions regarding the conduct of interdependent activities. Then an integrated policy means “*a policy where the constituent elements are brought together and made subjects to a single, unifying conception*” (Underdal 1980, 159). Furthermore, Underdal (1980, 162) defines a perfectly integrated policy “*as one where all significant consequences of policy decisions are recognized as decision premises, where policy options are evaluated on the basis of their effects on some aggregate measure of utility, and where the different policy elements are consistent with each other. In other words, a policy is integrated to the extent that it recognizes its consequences as decision premises, aggregates them into an overall evaluation, and penetrates all policy levels and all government agencies involved in its execution*”. However, this tells us little about the processes by which PI takes place as well as about how integration can be achieved.

² The seminal article by Underdal dates back to 1980. Although dealing with *Policy Integration* (PI) more generally it refers to environmental issues (marine policy). The next references dealing with PI or EPI are Weale and Williams (1992) and Baldock et al. (1992) more than a decade.

Briassoulis goes one step further by distinguishing two general types of PI *incorporation* and *unification* (Briassoulis 2005b, p. 22). But this twofold categorization misses the part of *consolidation* understood as a process of *further integrating* already partially integrated elements. Such processes are well known in international relations theory, mainly in the case of regimes or the European Union (Wiener and Diez 2004). This additional dimension has the advantage of allowing the analyses of different elements within a policy, e.g. strategies, programs, measures and instruments.

Type	Unification/ Formation	Incorporation/ Enlargement	Consolidation
Characteristics	Formerly separated units form a new whole	Independent units are integrated into a preexisting unit	Further integration of already partially integrated elements
Policy Change	Major	Moderate	Low

Tab. 1: Typology of integration

This typology has an inherent consecutive hierarchy. That is, unification goes ahead of the other types. Once this has happened, both incorporation as well as consolidation is possible. However, these terms only describe one end of a continuum: *Unification* opposes *dissolution*, *incorporation* opposes *disentanglement*, and *consolidation* opposes *deconsolidation*. An important point to keep in mind, as PI and EPI for so far only recognized one direction of integration thereby forgetting the process of disintegration.

Type	Dissolution	Disentanglement	Deconsolidation
Characteristics	Formerly integrated units are dissolved in separate units	Units are ‘cut out’ of preexisting unit	Already partially integrated elements are further disintegrated
Policy Change	Major	Moderate	Low

Tab. 2: Typology of disintegration

2.4 Environmental Policy Integration – Three Key Perspectives

The more general discussion of PI leads now to question of the particularities of EPI. Basically, it means the *integration of environmental concerns* into other, non-environmental sectors with the goal to *prevent environmental damage and achieve sustainable development* (Collier 1994,

36). Besides this common understanding, scholars differ on several issues. Recent EPI-overviews identify three key debates in EPI in research (Briassoulis 2005a, 2005b; Carter 2007; Jordan and Lenschow 2008; Persson 2004, 2007). A *process*, a *normative/rational* and an *organizational* debate have been identified (Persson 2007). Although these three debates can be separated analytically, they are strongly interrelated, e.g. that organizational structures have a strong impact on processes or that the goal of a process has to be attended by normative considerations (Persson 2004).

The procedural approach

The procedural perspective sees EPI mainly as a set of tools or instruments by which sectors consider their environmental impacts (Collier 1994; Jordan and Lenschow 2008; Jordan and Schout 2006; Persson 2007). Hence, emphasis is put on the sectoral decision-making processes and how they can be made more rational or ‘greened’ within the *given organizational* structure (Persson 2004, 2007). These tools, instruments, or administrative techniques are superimposed by the central government into the sectoral decision-making processes. The most common instruments in that sense are environmental impact assessments (EIA), strategic environmental assessments (SEA), risk assessments or cost-benefit analyses (CBA) but also refers to ‘green budgeting’. Furthermore, the rules of decision-making are discussed in the procedural approach. The main issues are here the agenda-setting process (who set’s the formal agenda) and the role and timing of participation of environmental departments (Persson 2007).

EPI as rationale or norm

The basic distinction between the normative and the rational approach lies in the role of environmental concerns towards other sectoral goals. The rational approach aims at removing *inconsistencies, contradictions, gaps, or redundancies* within a given policy and between interdependent policies (Collier 1994; Peters 1998; Underdal 1980). The main concern of this approach is more rational policy-making by taking into account that policies are affected by decisions in various sectorally divided departments and agencies. To be consistent and effective, cross-cutting policy issues like the environment must be coordinated and dealt in collaboration with the sectors concerned. Mutual benefits and support of policies as well as ‘win-win situations’ are crucial in rationale understanding of EPI.

But environmental policy has not only to deal with such ‘win-win situations’ but involves substantial ‘trade-offs’ and ‘net-loses’ e.g. with (short-term) economic goals. This implies the question on the relative importance of environmental goals compared to other policy goals. To enhance environmental concerns it has been proposed to weight them at least equally with the sectoral policy goals (Liberatore 1997) or to give them ‘principled priority’ (Lafferty and Hovden 2003). Irrespective of weighting them equally or giving them absolute priority, both approaches claim that environmental objectives have to be introduced explicitly and weighted against other (sectoral) policy objectives in an overall policy framework like in the constitutions, or in national environmental or sustainability strategies. But any of these ‘documents’ need high political support and societal backing to be effective. Furthermore, although most Western countries introduced EPI in an official high level document, the degree of EPI on lower levels remained poor. Obviously the obstacles arise in concrete policy-making and implementation when ‘trade-offs’ and ‘net-loses’ become more concrete and raise opposition.

The organizational approach

The organizational matters concern the governmental and administrative organization, the interactions of governmental and non-governmental actors, the power structures, resource allocation and budgeting, and the capacities respectively (Persson 2004). Whereas the procedural approach mainly deals with the administrative techniques and instruments to overcome the institutional fragmentation, the organizational approach aims at reorganizing the administrative and governmental architecture to achieve EPI. With the creation of environmental department and agencies since the 1970s environmental policy-making is institutionally separated from other sectoral policy-making. On the one hand this historically grown functional specialization results in cost-effectiveness and reduces complexity by a division of labor. But on the other hand it negatively affects EPI through turf mentality with established departments, a competitive attitude with respect to goal-attainment between sector departments, a marginalization due to few resources and correspondingly weak ministers and a narrow focus (Carter 2007; Jordan 2002).

To solve these organizational problems of EPI a rearrangement of the organizational structure, improvements of the coordination, collaboration and communication processes, budget incentives, or additional interactions between the environmental administrative units and other key sectors have been proposed. Two main strategies have been followed. On the one hand the

above mentioned single department was maintained. Additionally, managerial techniques like committees, working groups, special advisory groups, and sectoral ‘green satellites’ were initiated. On the other side, a second strategy contained the creation of ‘super-ministries’ like the UK ‘Department for Environment, Transport and the Regions’ or the Belgian Ministry for Social Affairs, Public Health, and the Environment. However, whereas the first strategy led to the problem of environmental issues remaining at the ‘communication’ level, the second strategy simply shifted the problems of turf mentalities and marginalization from the inter-ministry to the intra-ministry level.

3 Integrating Adaptation – A Network Perspective

3.1 Adaptation as a Policy Problem

Recently, the political and scientific communities are becoming the more and more aware that adaptation to climate change is indispensable. Due to no substantial slowdown of GHG emissions, growing concentrations of CO₂ in the atmosphere, and a slow reaction time, a mean global temperature rise between 1.1 and 6.4°C is expected until the end of the 21st century (IPCC 2007). Therefore, an increase in impacts of climate change is projected for the second half of the 21st century regardless of what is done now (Lebel 2007). Among the expected consequences are changes in precipitation patterns, a reduction of snow and ice coverage on the surface, rising sea levels, changes in biodiversity, shifts of disease areas, and more intense and an increasing number of natural disasters and extreme weather events (IPCC 2001, 2007; UNDP 2004). The growing concerns on unavoidable and more pronounced impacts of climate change as well as the failure of mitigation policies established now *adaptation to climate change* – which was initially perceived as fatalistic – as a second key strategy in climate change policy (Biesbroek et al. 2010; Giddens 2009; Massey and Bergsma 2008; Urwin and Jordan 2008).

Basically, adaptation is understood as *the structural adjustment* to prevent and minimize negative impacts and future costs due to climate change (European Commission 2008). Often cited examples for adaptation are altering crops, new water management systems, ‘climate proofing’ of infrastructure, reconditioning of natural hazard maps, and adjusted flood control measures. A crucial economic argument for adapting to climate change is that costs for adjustments – although being high – will be lower compared to the possible damage caused by

climate change. But it is also important to note that crisis and disasters due to unpreparedness would not only be more expensive but could also hit the economy, social stability, and security severely (European Commission 2008). On the other side it is clear that such investments in adaptation would be lacking somewhere else leading to debates on the distribution of resources.

It is evident that climate change will have an impact on most if not all socio-economic sectors over the long term. But like in the case of EPI, identifying key sectors for integrating adaptation issues is crucial as some are more vulnerable and vary with respect to adaptive capacity. Moreover, political systems lack the capacity of revising or refocusing them all at once. The European Commission identified three key sectors: agriculture, health, water coasts and marine issues (European Commission 2009). Munasinghe and Swart (2005p. 207-226) name hydrology and water, ecosystems, coastal zones and marine issues, energy, industry, settlements, financial resources and services, and human health. The IPCC (2007) sees key impacts for water resources, coastal and marine systems, mountains and sub-Arctic regions, forests, shrublands, and grasslands, wetlands and aquatic ecosystems, biodiversity, agriculture and fisheries, energy and transport, tourism and recreation, property insurance, and human health.

Several countries recently prepared, commissioned and published National Adaptation Strategies. These strategies mostly agree that adaptation is a multi-sectoral and multi-level task affecting a broad variety of public and private actors.³ This lead to the conclusion that adaptation strategies and measures must be integrated at multiple governmental levels and in multiple existing sector policies (Biesbroek et al. 2010). Such an integration and coherence in and between scales is connected to an active role of national governments as it is probably the only level which has the human and financial resources for undertaking a task like initializing climate change adaptation. This is crucial as the literature on ‘adaptive policy’ and ‘adaptive governance’ stresses the importance of local knowledge and stakeholders which lack the institutional capacities to effectively address adaptation (Brunner and Lynch 2010; Ingold, Balsiger, and Hirschi 2010).

³ Although the issue of adaptation is perceived as affecting all sectors it is strongly biased towards extreme weather events (e.g. Brunner and Lynch 2010; Henstra and McBean 2009) and natural disasters (e.g. Giddens 2009; Yohe and Strzepek 2006).

3.2 Integrating Adaptation

The integration of adaptation faces many common challenges with EPI. Very basically, the integration of adaptation has to address the institutional fragmentation of policy-making. Firstly, it affects various sectors and has to be addressed by each sector. Furthermore, the current and expected interdependencies of the affected sectors have to be taken into account. Climate change is expected to change the interdependencies of the sectors. E.g. water shortages are expected to lead to intensified conflicts between different uses of water, for example irrigation in agriculture, hydropower, or potable water among other. Therefore, integrating adaptation has to identify interdependencies and to address the concerned sectors in a coordinated manner. Potential conflicts have to be addressed early. The early formation and incorporation of these interdependent units is crucial to allow consolidation in the case of intensifying interdependencies or conflicts.

From a procedural perspective, administrative tools like climate change impact assessments, strategic and risk assessments, as well as cost-benefit assessments can provide helpful guidelines for decision-making especially as not all measures for adaptation can be addressed simultaneously and some may be very costly.

The rationale/normative approach can be transferred to the integration of adaptation too. It is expected that some 'win-win situations' (e.g. the construction of a hydropower plant that also prevents from flooding) will be easily achieved. Highly conflicting situations (e.g. the above mentioned use of scarce water resources) which involve 'trade-offs' and 'net-losses' on the other hand the assignment of priorities is crucial. The 'lesson to be learned' from EPI is that in such cases powerful groups are expected to achieve favorable outcomes irrespective of commitments in high level documents.

The organizational approach stressed the difficulties of weak environmental ministries or agencies to enforce environmental goals in policy-making. One 'lesson to be learned' is that the integration of adaptation must be carried out by a powerful ministry. The current trend to mandate the weak environmental ministries and departments with the issue of integrating adaptation across seems therefore less plausible. However, deeper insight and the need of integrating adaptation could also help to strengthen the position of environmental ministries and agencies in the future.

The literature on ‘adaptation policy’ and ‘adaptive governance’ have stressed the importance of local knowledge and stakeholders which lack the institutional capacities to effectively address adaptation (Brunner and Lynch 2010; Ingold, Balsiger, and Hirschi 2010). This gives more weight to the vertical dimension of policy integration which has also been addressed in the EPI literature. However, the main concern and focus of EPI was on the horizontal dimension for so far. Important insights can be drawn from the ‘multi-level’ governance literature (e.g. Hooghe and Marks 2003). Crucial points will be the formation of problem-driven jurisdictions, forms of participation, or resource allocation.

Having identified the main elements for integrating adaptation, the question of “How these elements are put into practice?” is discussed. For this purpose I will refer to the arguments developed in section 2.3.

3.3 A Network Approach to Policy Integration

Analyzing policy networks has been a growing field of research in all branches of political science. Social network analysis in political science assesses the actors and their relationships in the policy process in a policy domain-specific subsystem. Generally, it has been discovered that policies in general and environmentally relevant policies in particular have a closed and stable membership (Carter 2007). This stability of these structures in sectoral policy-making has been attributed to the persistence of these sectors to integrate environmental objectives (ibid.). But in some policy areas (e.g. agriculture) the instability of actor constellations led to an increasing influence of environmental groups although traditional producer interests prevail.

However, the method of social network analysis provides on the one hand a tool to examine the relationships of actors in the policy process. On the other hand theoretical approaches in social network analysis allow a characterization of different network structures (Van Warden 1992). Furthermore, more theoretical network approaches offer hypotheses on the policy outcome of different structural configurations. Based on distribution of power and the type of interaction in a of policy network Kriesi and Adam (2007) offered a typology determining the potential and type of policy change.

Distribution of power	Type of interaction		
	Conflict	Bargaining	Cooperation
Concentration	Moderate potential for rapid (serial) shift	Low to moderate potential for incremental change	Low potential for change – maintenance of the status quo
Fragmentation	High potential for rapid (serial) shift	Moderate to high potential for incremental change	Low to moderate potential for change – maintenance of the status quo

Tab. 3: Potential and type of policy change (Adam and Kriesi 2007)

This indicates the potential for policy integration as a policy change. Following the threefold typology developed in section 2.3, *incorporation/dissolution* seems only possible in one cell, whereas *unification/disentanglement* seems to be possible in two of cells. The other three cells allow only for *consolidation/deconsolidation*.

Distribution of power	Type of interaction		
	Conflict	Bargaining	Cooperation
Concentration	Incorporation/ Dissolution	Consolidation/ Deconsolidation	Consolidation/ Deconsolidation
Fragmentation	Unification/ Disentanglement	Incorporation/ Dissolution	Consolidation/ Deconsolidation

Tab. 4: Potential and type for policy integration

For hypotheses on the direction of integration the structural characteristics and attributes of the involved actors are crucial. Environmental policy integration only happens in the case of a powerful position of environmental actors – governmental or from the private sector – during the policy process. The centrality concept in social network analysis captures the power, prestige, and reputation of an actor (Jansen 2003; Maggetti 2009). The implicit hypothesis is that the more central an actor in a network, the greater the chance of enforcing its interests (in the case of EPI the consideration of environmental issues in a policy). However, social network analysis offers three basic concepts and measures of centrality.

Degree Centrality

Degree centrality refers to the degree-based centrality of actors that is the direct links (distance 1) of an actor. Based on the assumption that the most central actor is also the most active, degree centrality measures the direct links of one actor to the other actors in the network. Thus, to be central in policy-making, environmental units must establish the most direct links to other actors. It is hypothesized that integration takes place when 'environmental units' have a large number of direct connections with other units as well as when they are in positions of significance in the overall network. Or in other words: To what degree is the 'environmental unit' a 'star' in the network.

Betweenness Centrality

Some actors are supposed to have an 'intermediary', 'gatekeeper' or 'broker' role. 'Betweenness' is a centrality concept that allows to uncover such units. Such units bridge 'structural holes' and make the other units dependent on them.

Closeness Centrality

Closeness centrality captures the direct and indirect relationships of an actor. It is about the possibility to reach other actors with the shortest possible channels, say minimize the detours.

3.4 The APES Framework

Although analyzing a static policy network reveals information but a dynamic perspective over the whole policy process is more fruitful. The actor-process-event scheme (APES) allows a *systematic comparison of the centrality of political actors* over the course of a whole policy process (Maggetti 2009; Widmer et al. 2008). This actor-process-event approach (APES) is based on the assumption that a policy process can be understood as a sequence of political events. The empirical investigation therefore mainly includes a reconstruction of actions of political actors and their interrelations with each other during a particular policy process.

4 Adaptation Challenges in Switzerland

4.1 Mountain Regions

Climate change and its consequences are considered to be of considerable *topographic* and *geographic* variation demanding for specific adaptation measures. Especially highly vulnerable regions are under a particular pressure to adapt to climate change as they are going to be affected

first and most severely. Among other areas mountain regions are under strong pressure to adapt as they face particular risks due to high *exposure* and *sensitivity* to climate change. Since the mid 1980s – although being in step with global rises – an about three times higher warming, that is 0.5 to 1.0°C higher, than the global mean has been observed in the Alps and the Himalayas and is expected to be above-average in the 21st century too (Agrawala 2007; Beniston 2005; Giddens 2009; OcCC 2007; Rebetz 2006; Wanner et al. 2000). The high sensitivity of mountains to climate change is already visible in various forms. The average temperature rise of 1.0°C in mountain areas led to a substantial and accelerating reduction of glacier mass, snow pack, and permafrost as well as a substantial upward shift of biota habitats towards higher elevations (Agrawala 2007; Beniston 2004; European Commission 2008; Greenwood 2008; Rebetz 2006; UNEP 2010).

Mountain regions are particularly important in Switzerland. They cover more than half of the Swiss territory and one fourth of the Swiss population (Bätzing 2003). Furthermore, the Swiss mountain regions provide a large amount of goods and services like fresh water supply, repositories of biodiversity, recreation areas and cultural symbols which are of crucial importance not only for local residents but also for the mid- and lowlands (Balsiger 2009). Furthermore, they are cultural landscapes that evolved in close interaction with human use (Bätzing 2003). In terms of climate change related risks, forecasts for Swiss mountain regions indicate two main challenges for the 21st century (Agrawala 2007; OcCC 2002, 2003, 2007, 2008). Firstly, *droughts* and *water shortages* in summer due to a decrease in precipitation of 5-40% are expected to lead to crop failures, hydropower shortages, and changes in biodiversity. Secondly, *more* (5-25%) and *heavier rainfalls* (instead of snow) in winter are expected to lead to more erosion, natural hazards like spatial shifts of landslides, collapses of ice, more frequent and more severe flooding events, reduced stability of formerly firm rock, and higher water cycles at formerly frozen spots.⁴

4.2 Land Use Policy in Switzerland

Especially land use activities in higher altitudes are highly sensitive to the expected climate change and its impacts putting them under strong pressure to adapt (Ingold, Balsiger, and Hirschi 2010; Massey and Bergsma 2008). Basically, climate change can have three effects on land use

⁴ Since the 1970s a slight overall decline in mean precipitation has been observed in the Alps (Agrawala 2007).

(Flückiger and Rieder 1997). Firstly climate change has a *physiological effect* (e.g. growing CO₂-concentrations or higher temperatures). Secondly it has a *weather effect* (e.g. frequency and intensity of heavy storms). Thirdly climate change will have an *area effect* which means it changes the area available for different uses (e.g. desertification, land reclamation, flooding). All three effects will have a strong impact on future land even though the absolute and relative impact will vary geographically and with respect to different forms of land use. Hence, the main challenge in land use is to adapt to these three effects.

Given the strong impact of climate change on land use in Swiss mountain regions, the question arises how land use is shaped by policy and politics. Following Hirschi (2010: 3) land-use relevant policies are defined “*as public policies that regulate the use of, the protection of, or the protection from the hazards of primary natural resources (excluding air), namely forests, cultivated land, and water*”. Hence, it follows that land use is not a policy area in the classical sense including only one institutional responsibility (Lowi 1964) but is formed by a multi-institutional setting of agricultural, energy, environmental, regional, forest, tourism, water, spatial planning, infrastructure policies among others (Bättig, Rageth, and Kaufmann 2010; Biesbroek et al. 2010). Furthermore, the task of adapting land use to climate change is challenged not only by such different and sometimes conflicting sectoral and transversal policies (Mickwitz et al. 2009b; Zingerli, Bisang, and Zimmermann 2004) but also by the strong federalist structure of the Swiss political system (Kriesi and Trechsel 2008).

As analyzing past and current land use policies in Switzerland can provide scientifically valuable and practically relevant information on the conditions, processes and modes of adaptation strategies to cope with changing climate conditions in highly climate sensitive and exposed regions with complex political settings the article presents fourthly first results from recent policy-making in land use relevant sectors in Switzerland. For this paper forestry will be in the main focus and preliminary results are presented.

4.3 The Integration of Adaptation in Switzerland

The Swiss government has now published several reports on particular issues related to climate change adaptation. The Federal Office for Civil protection published a report on climate change and civil protection (Bundesamt für Bevölkerungsschutz 2009), the Mountain Water Network – a collaboration of the Federal Office for Energy and various research organizations – published a

pilot study on climate change and water use (Netzwerk Wasser im Berggebiet 2009), and the Federal Office for Agriculture analyzed the irrigation needs of agriculture (Fuhrer 2010). Furthermore, several cantons and cities started to assess the actual and potential impacts of climate change. Massey and Bergsma (2008) identified 49 measures related to climate change adaptation in Switzerland. However, the vast majority of these measures refers to ‘concerns’ which are characterized by general statements but do not offer concrete plans, measures, or actions.

However, Switzerland has no national adaptation strategy so far. Only in 2009 the Federal Council mandated the Department of the Environment, Transportation, Energy, and Communications to develop a national adaptation strategy in collaboration with the Department of Home Affairs, the Department for Defense, Civil Protection and Sport, the Department of Economic Affairs, and the Department of Finance to develop a national adaptation strategy which should allow a coordinated course of action by summer 2010. Furthermore, specific sectoral reports are planned. For so far, neither sectoral strategies nor a national adaptation strategy are available...

Since several land use relevant policy sectors have recently been subjected to reform processes, political decision-making processes took place on a larger political scale. It can be assumed that these decision-making processes have revealed the structure of the respective policy networks since the relevant policy actors were forced to take their positions, tried to bring in their policy ideas and interests into the decision-making process, and organized themselves with other political actors to maximize their political influence.

4.4 Policy Networks in Recent Policy-Making in Forestry

The policy network in forestry has been a closed policy community. This ‘wooden triangle’ consists of actors of the administration, the scientific communities, and professional associations (Zingerli and Zimmermann 2006). Hence, the power distribution can be described as concentrated with a cooperative type of interaction. The location of forestry in the upper right field of the typology indicates a low potential of policy change. So mainly a consolidation respectively deconsolidation is expected. Forestry, however, has a strong tradition in maintaining protection forests and the protection of the forests more general is deeply rooted. Hence, it is expected that a consolidation towards more integration of environmental and adaptation is more

probable. This is tested in two recent processes the formulation of the ‘Forest Program Switzerland’ and the revision of the Federal Forest Law.

Growing interdependencies with environmental issues and the growing demand of forests as recreational areas had a direct impact on the formulation of the ‘Forest Program Switzerland’ (Waldprogramm Schweiz, WAP-CH) between 2002 and 2004 and its subsequent implementation. Arguing that international agreements oblige more participation, inter-sectoral coordination, and an eco-system approach, the Federal Office for the Environment launched a strongly participative formulation process. Although more than 130 actors participated in this process, the lead of the project remained within the traditional stakeholders of science and forest agency. Furthermore, the participation was limited to the early stages of the process (Zingerli and Zimmermann 2006).⁵ During the final stages, the process was again dominated by the ‘wooden triangle’.

However, in 2004 the program was approved and introduced. The ‘Forest Program Switzerland’ established the main goals of “sustainable forestry” and “a good context for efficient forestry and timber industry”. Additionally, five prioritized goals were established: i) *maintain protection function of forests*, ii) *maintain biodiversity*, iii) *secure forest soils, trees, and potable water*, iv) *a strong value creation chain for timber products*, and v) *improve the economic performance of forestry*. Moreover, seven additional goals with lower priority are outlined: *maintain wooden surface area, maintain scenic diversity, networked forests, protection forests from neobotia, to assure that forests offer a habitat for game, forests as recreation area, and research and education on forests*. Although giving new directions, the content of the program has been described as a “request program” of various actors and no shifts in mandates and responsibilities can be observed (Zingerli and Zimmermann 2006). As the program is localized on a low political level, that is the administrative level, ‘experimenting’ with processes and instruments was possible. Overall, the changes are minor and go in the expected direction: already established interactions between actors should be intensified on a case by case base (Zingerli and Zimmermann 2006). With regard to adaptation, a minor clause was introduced. Measure 4a4 in the program states that impacts of climate change should be identified. Based on

⁵ The APES-tool will provide further information on the participation of actors at different stages.

this measure a research program on forest and climate change was launched by the Federal Office for the Environment. A sectoral strategy is actually in preparation.

In 2008 the WAP had to be approved by legislation with a partial revision of the Swiss Federal Law on Forestry. Already during the preparation the popular initiative “Save the Swiss Forests” was launched as the draft version (prepared by the Federal Office for the Environment) of the law was too economy friendly. On the other hand, the timber industry and forestry rejected the popular initiative as it was too much environmentally biased. However, the main goal of the initiative was to stop the ongoing revision. Therefore, the initiative committee announced that they would withdraw the initiative in case the parliament decides refrains from passing the revision of the law. Facing the popular vote both commissions of the parliament rejected the draft and the legislation process was finally stopped by both chambers of the parliament. The maintenance of the status quo in the forestry sector corresponds to the outcome predicted by the hypothesis. The two proposed major changes were abandoned. The proposition towards a more restrictive environmental regime (popular initiative) as well as the more economy friendly proposition (law revision) had no chance of being institutionalized. As predicted the status quo is maintained. Initiatives for minor changes have recently been launched within the parliament.

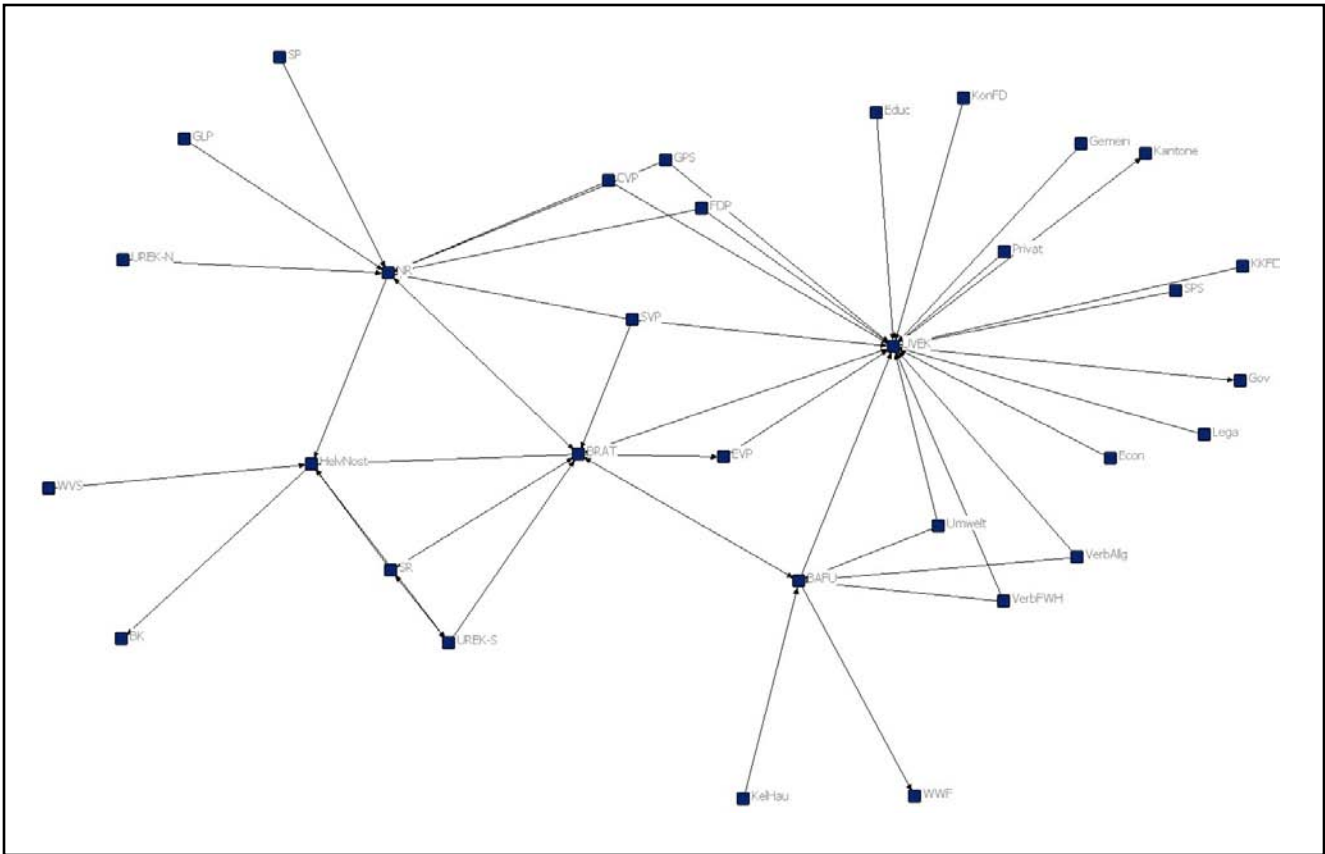


Fig. 1: Policy Network of the forestry sector from 2004-2008.

Policy	Forestry
Strategy	- sector strategy in preparation
Program	- research program on forest and climate change (FOEN & WSL)
Measure	- identify impacts of climate change for forest conservation (WAP, measure 4a4)

Tab. 5: Adaptation measures in Swiss forestry

5 Preliminary Conclusions and Outlook

A first rough ‘empirical test’ on two cases in the Swiss forestry sector supports the theoretical argument. Four main arguments have been outlined. Firstly, policy integration and disintegration – whether in the case of the environment or adaptation - must be understood as policy change. Secondly, the potential for change is determined by the power distribution as well as the type of interaction. Or to put it differently: “we assume that the practice of a country’s policy system is the outcome of the interaction between the strategic activities of the various actors and the

institutional structure within which they act ” (Hanf and Jansen 1998, p. 9). Thirdly, the type of integration/disintegration depends on the potential for policy change. And fourthly, the direction of integration/disintegration of change can be predicted by the actor’s central positions. Compared to former research in PI and EPI, the main advantage of the developed model is that it offers a causal model to systematically predict PI in general and EPI in particular.

The empirical analysis for the forest sector is still going on and has to become more precise (e.g. calculation of network measures) and refined. Furthermore, data on Swiss water policy, agriculture, and spatial planning have been collected and are currently formatted for analysis. Due to problems with the APES-software, analysis could not be carried out yet. However, as they seem to be solved by now, the analysis will be carried out in due course and provide information on the actor’s position in different stages of policy-making.

Links from national to regional and local measures on adaptation and its integration are currently under investigation. First results seem to support the argument that a strong integration of local and regional actors is essential to enhance adaptive capacity. A strong central position of local actors with the support (that is peripheral position) of national actors seems to enhance the local adaptive capacity (Ingold, Balsiger, and Hirschi 2010).

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⁶ Additional information on the project is provided at: <http://www.cces.ethz.ch/projects/sulu/MOUNTLAND>.

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