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**INTERREG IV B PROJECT -**

**CODE 24**

**Corridor Development Rotterdam-Genoa**

WP 2: Noise and environment

Action 5: Management of ecological compensation measures

**FINAL REPORT**

Mannheim, 18/12/2014



## CODE24 – MANAGEMENT OF ECOLOGICAL COMPENSATION MEASURES Final Report

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## Contents

<b>Acknowledgements .....</b>	<b>10</b>
<b>1 Introduction.....</b>	<b>11</b>
1.1 Management of ecological compensation measures within the project CODE24	11
1.2 Objectives	12
1.3 Methods and terminology	13
1.4 General requirements for ecological impact compensation of infrastructure projects	14
<b>2 Legal obligations of environmental compensation .....</b>	<b>15</b>
<b>3 Management of ecological compensation measures in Germany .....</b>	<b>16</b>
3.1 Institutions and stakeholders	16
3.2 Legislation and regulations	16
3.3 Guidelines and handbooks	17
3.4 Methods and instruments	17
3.4.1 Eco-account	17
3.4.2 Compensation pools	18
3.4.3 Compensation agency	19
3.4.4 Compensation register	19
3.4.5 Integrated compensation measures	20
3.4.6 Monetary compensation	20
3.5 Case examples	21
3.5.1 Expansion of Frankfurt Airport	21
3.6 Deficits, factors of success and new approaches	23
3.6.1 Deficits	23
3.6.2 Factors of success	24
3.6.3 New approaches in Germany	24
<b>4 Management of ecological compensation measures in Italy .....</b>	<b>26</b>
4.1 Institutions and stakeholders	26
4.2 Legislation and regulations	27
4.3 Guidelines and handbooks	27
4.4 Methods and instruments	28
4.4.1 General principles of the Italian impact compensation	28
4.4.2 Monetary compensation	28
4.4.3 Obligations and recommendations	28
4.4.4 Spatial Planning Instruments	29
4.5 Case examples	30



4.5.1	Autostrada Pedemontana Lombarda	30
4.6	Deficits, factors of success and new approaches	31
4.6.1	Deficits	31
4.6.2	Factors of Success	32
4.6.3	New approaches	32
<b>5</b>	<b>Management of ecological compensation measures in the Netherlands .....</b>	<b>34</b>
5.1	Institutions and stakeholders	34
5.2	Legislation and regulations	34
5.3	Guidelines and handbooks	36
5.4	Methods and instruments	36
5.4.1	General background of the Dutch compensation principle	36
5.4.2	Monetary compensation	38
5.4.3	Compensatieloket Provincie Utrecht	40
5.5	Case examples	40
5.5.1	New Highway A4	40
5.5.2	Canal Zuid-Willemsvaart	40
5.5.3	A12 Maarsbergen - Veenendaal	41
5.6	Deficits, factors of success and new approaches	41
5.6.1	Deficits	41
5.6.2	Factors of success	42
5.6.3	New approaches	42
<b>6</b>	<b>Management of ecological compensation measures in Switzerland .....</b>	<b>43</b>
6.1	Institutions and stakeholders	43
6.2	Legislation and regulations	44
6.3	Guidelines and handbooks	45
6.4	Methods and instruments	45
6.4.1	General principles of the Swiss impact regulation	45
6.4.2	Linear compensation of the Swiss Federal Railways	46
6.4.3	Swiss Landscape Concept	47
6.4.4	New approaches in Switzerland	47
6.4.4.1	Site pools	47
6.4.4.2	Compensation measure pools	48
6.4.4.3	Compensatory Fund	48
6.4.5	Réseau Ecologique National	48
6.5	Case examples	49
6.5.1	Railway line Mattstetten - Rothrist	49
6.5.2	Alp Transit: Ceneri base tunnel	49
6.5.3	Lötschenbach in Ostermundigen	50
6.5.4	Bypass of Strada	50
6.6	Deficits, factors of success and new approaches	50



6.6.1	Deficits	50
6.6.2	Factors of success	50
6.6.3	New approaches	50
<b>7</b>	<b>Concepts for improved participation/ acceptance</b>	<b>51</b>
<b>8</b>	<b>Comparison and evaluation</b>	<b>52</b>
<b>9</b>	<b>Documentation Workshop I</b>	<b>54</b>
9.1	Presentations at the international CODE24-workshop at the Verband Region Rhein Neckar, Mannheim	56
9.1.1	“Case studies implementing ecological compensation in Italy: legal context, obstacles and potentials” - Dr. Carlo Rega (Politecnico di Torino)	56
9.1.2	“A park for the never-ending city”: Environmental impact compensation of Autostrada Pedemontana Lombarda – Arch. Barbara Vizzini (Autostrada Pedemontana Lombarda - APL)	59
9.1.3	“Ecological compensation and railway projects in Switzerland” - Laurence von Fellenberg (Federal Office for the Environment - FOEN, Bern)	62
9.1.4	Cooperative solutions with regional stakeholders: maintaining agricultural land use and revaluing agrarian biotopes through integrated compensation measures - Catharina Druckenbrod (Association of Rural Development Thuringia)	65
9.1.5	Compensation pools and compensation agencies - Martin Szaramowicz (Flächenagentur Brandenburg GmbH)	67
9.1.6	“Highway projects and nature compensation in the Netherlands” - Edward de Boer (Bureau Waardenburg, Culemborg)	69
9.1.7	Nature Compensation in the Netherlands – Examples and latest developments - Hans Leermarkers (Government Service for Land and Water management, Utrecht)	70
<b>10</b>	<b>Expert-Delphi</b>	<b>74</b>
<b>11</b>	<b>Toolbox of compensation management</b>	<b>75</b>
11.1	Objectives	75
11.2	Documentation Workshop No. 2	76
11.2.1	Workshop invitation	77
11.2.2	Handout	78
11.2.3	Presentations at the regional CODE24-workshop at the Verband Region Rhein Neckar, Mannheim	80
11.2.3.1	Demands on the new federal compensation decree <i>Anforderungen an die naturschutzrechtliche Kompensationsverordnung des Bundes</i> Prof. Dr. Klaus Werk (Hochschule Geisenheim University/ B.B.N)	80



11.2.3.2	Ecological Compensation management of the high-speed railway line Frankfurt – Mannheim (Kompensationsmaßnahmenplanung bei der Neubaustrecke Rhein/Main - Rhein/Neckar - von der Raumordnung bis heute. Erkenntnisse, Erfolge, Erwartungen) Matthias Mähliß (DB ProjektBau GmbH)	80
11.2.3.3	Green Konversion – an opportunity for project developers <i>Grüne Konversion – Eine Chance für Großeingreifer</i> Matthias Pollmeier (Institute for Federal Real Estate (BlmA), Bundesforstbetrieb Schwarzenborn)	81
11.2.3.4	Suitable compensation measures for the high-speed railway line Frankfurt – Mannheim from a nature conservation point of view <i>Sinnvolle Kompensationsmaßnahmen für die NBS Rhein/Main – Rhein/Neckar aus Sicht des Naturschutzes</i> Gerhard Eppler (NABU Hessen)	82
11.3	Federal compensation decree	85
11.3.1	Description	85
11.3.2	Evaluation	86
11.4	Compensation pool	87
11.4.1	Description	87
11.4.2	Legal background	88
11.4.3	Evaluation	88
11.4.4	Example 1	90
11.4.5	Example 2	92
11.5	Compensation agency	94
11.5.1	Description	94
11.5.2	Legal background	95
11.5.3	Evaluation	97
11.5.4	Example	98
11.6	Compensation register	99
11.6.1	Description	99
11.6.2	Legal background	100
11.6.3	Evaluation	101
11.6.4	Example	101
11.7	Integrated compensation measures	104
11.7.1	Terminology	104
11.7.2	Description	105
11.7.3	Legal background	105
11.7.4	Evaluation	106
11.7.5	Example	106
11.8	Monetary compensation	107
11.8.1	Description	107

11.8.2	Legal Background	109
11.8.3	Evaluation	109
11.8.4	Example	110
<b>12</b>	<b>Conclusion .....</b>	<b>113</b>
<b>13</b>	<b>References.....</b>	<b>115</b>
	<b>Annexes</b>	<b>120</b>

## List of Tables

Table 1:	International comparison of different aspects regarding environmental impact compensation*	52
Table 2:	Pros and cons of a federal compensation decree	86
Table 3:	Pros and cons of compensation pools	89
Table 4:	Pros and cons of the instrument “compensation agencies”	97
Table 5:	Pros and cons of the instrument “compensation register”	101
Table 6:	Pros and cons of the instrument „integrated compensation measures“	106
Table 7:	Pros and cons of monetary compensation	109

## List of illustrations

Illustration 1:	Flowchart of action 5 ‘Management of ecological compensation measures’	12
Illustration 2:	Expansion of Frankfurt Airport – Overview	22
Illustration 3:	General view on the project Autostrada Pedemontana Lombarda	30
Illustration 4:	Concept of environmental impact compensation - <i>Autostrada Pedemontana Lombarda</i>	31
Illustration 5:	Impacts affecting EMS – Dutch compensation procedure	39
Illustration 6:	Cross section of highway embankment	41
Illustration 7:	Classification of the track area	63
Illustration 8:	Impressions from the international workshop at the Verband Region Rhein-Neckar in March 2012	73
Illustration 9:	Regional workshop at the Verband Region Rhein-Neckar in Mannheim, September 2013	84
Illustration 10:	Special Area of Conservation DE-5819-309 , <i>US-Militärgelände bei Großauheim</i> ‘	91
Illustration 11:	Przewalski horses at Campo Pond	91
Illustration 12:	Draft of concept for the regional compensation pool <i>ReKoBO</i>	94
Illustration 13:	Schematic functioning of compensation agencies	95
Illustration 14:	Operational areas of the <i>Ökoagentur Hessen</i>	99



Illustration 15: Functioning of the compensation register	100
Illustration 16: Web view of a compensation measure in the ,Kompensationsverzeichnis' of Baden-Württemberg, City of Karlsruhe (1)	103
Illustration 17: Web view of a compensation measure in the ,Kompensationsverzeichnis' of Baden-Württemberg, City of Karlsruhe (2)	104
Illustration 18: Concept of financial compensation	108
Illustration 19: Nature conservation project Rednitztal next to Railway track Nürnberg-Roth	112

## Annexes

Annex 1:	Compensation management - Institutions, regulations and guidelines
Annex 2:	Exemplary questionnaire on environmental compensation management





## List of abbreviations

EMS	Ecological Main Structure
ICM	Integrated compensation measures
APL	Autostrada Pedemontana Lombarda
FOEN	Swiss Federal Office for the Environment
SFR	Swiss Federal Railways
EIA	Environmental Impact Assessment
EU	European Union
AEM	Agri-Environmental Measures
MATTM	Italian Ministry of the Environment and the Protection of the Territory
CIPE	Italian Interministerial Committee for the Economical Planning
ISPRA	Italian Institute for Environmental Protection and Research
DG	Directorate-General (Italy)
RER	Rete Ecologica Regionale (Italy)
DETEC	Swiss Federal Department of the Environment, Transport, Energy and Communications
FOT	Swiss Federal Office of Transport
öA	ökologischer Ausgleich (Switzerland)
SLC	Swiss Landscape Concept
REN	Réseau Ecologique National (Switzerland)
SEA	Strategic Environmental Assessment



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## 1 Introduction

### 1.1 Management of ecological compensation measures within the project CODE24

„CODE24” (CODE24 – Corridor Development Rotterdam-Genoa), a project approved under the Strategic Initiatives Framework of the INTERREG IVB program, aims in a future development of the major European north-south transport axis connecting the Dutch port of Rotterdam and the Italian port of Genoa. 50% of the north-south rail freight is operated along this corridor and 70 million inhabitants are living in its catchment area. The opening of the Lötschberg Tunnel in 2007 and the Gotthard Tunnel (expected in 2017) as well as the parallel expansion of the feeders will raise the transport capacities in parts of the axis. Thus, the famous bottlenecks will be relocated: the passage linking Frankfurt on the Main and the city of Mannheim will represent one of those future narrows.

As a consequence, the regionally concerned Metropolitan Area Rhein-Neckar has created an interdisciplinary European team consisting of Dutch, Swiss, Italian and German partners, aiming to create a kind of a platform to discuss the mentioned problems and to develop solutions on a strategic level. “The overall objective is to accelerate and jointly develop the transport capacity of the entire corridor by ensuring optimal economic benefits and spatial integration while reducing negative impacts on the environment at local and regional level” ([www.code24.eu](http://www.code24.eu)).

The project consists of several work packages (WP1: “Spatial and Infrastructural Development”, WP2: “Environmental Aspects and Noise Reduction”, WP3: “Increasing regional economic benefits”, WP4: “Communication, acceptance and enduring interregional cooperation”) and actions. “Management of ecological compensation measures”, representing action no. 5 in work package 2, is focusing on innovative methods and solutions reducing negative impacts of the corridor development on the environment.

Action 5 treats the following aspects (see Illustration 1):

- current methods and instruments of environmental impact compensation along corridor 24 and proposals for adjustments in legal regulations,
- “toolbox” with useful planning tools and best practice examples and
- possible compensation strategies in bottleneck region Rhein-Main/ Rhein-Neckar.

The present final report documents and summarizes the information obtained throughout all stages of the project “management of ecological compensation measures” of CODE24.

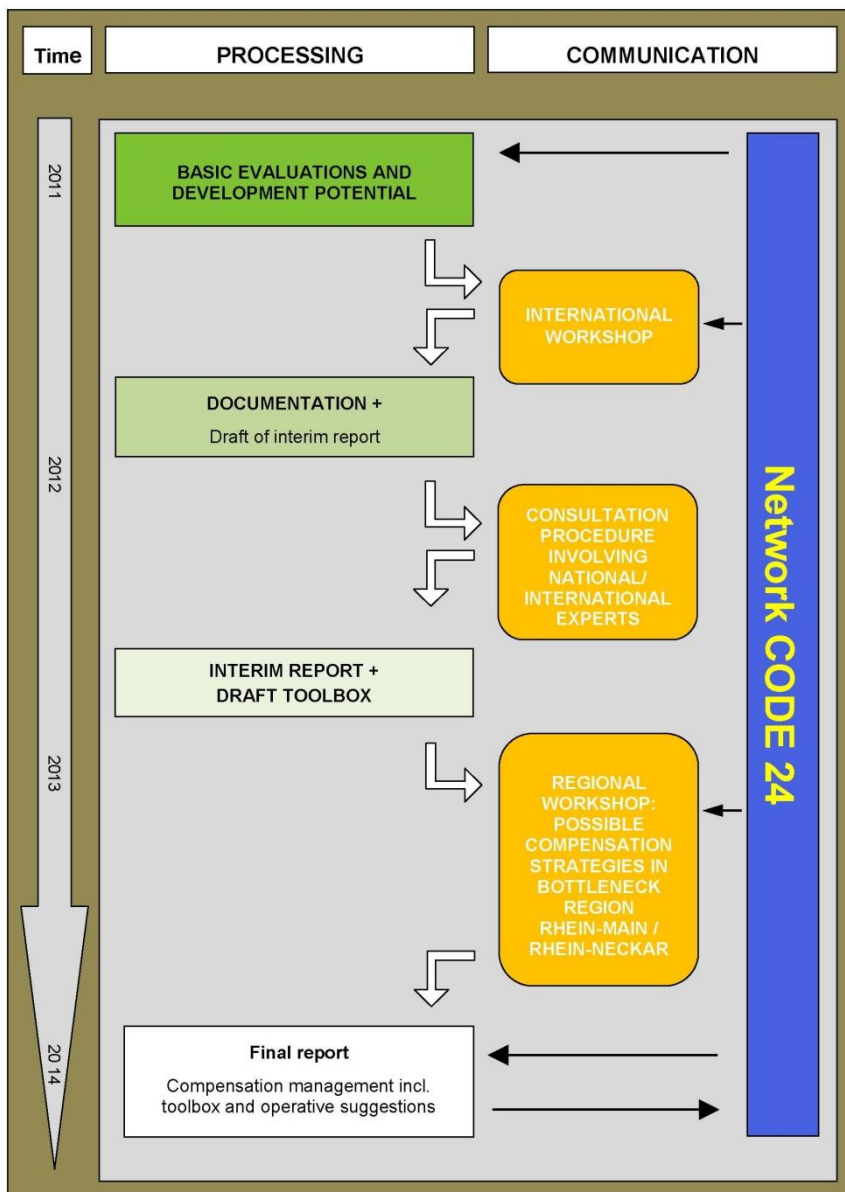


Illustration 1: Flowchart of action 5 'Management of ecological compensation measures'

## 1.2 Objectives

“Ecological compensation may be defined as creating, restoring or enhancing nature qualities in order to counterbalance ecological damage caused by infrastructure projects” (luell et al. 2003). This process is of crucial importance with respect to the ‘no net loss’ principle, an essential policy of the European Biodiversity Strategy 2020 (European Commission 2011). Nevertheless, ecological compensation remains a ‘last resort solution’ which applies when negative impacts are inevitable since avoidance as well as minimization measures are exhausted (luell et al. 2003). As described in the guidebook COST 341 (luell et al. 2003) “compensatory measures are mainly implemented on a voluntary basis, rooted in agreements between project developers, nature conservation trusts, landowners or other stakeholders”. Seeking for suitable land



for compensation measures is a mostly time-consuming and exhausting process that often leads to insufficient solutions.

In general, compensation measures should be implemented close to the impacted area. In reality this is sometimes impossible, since suitable sites are unavailable. But the scale for environmental compensation is usually the natural region (*Naturraum*) and on this quite large scale, it is mostly possible to find adequate sites for the realization of measures. As Rega (2011) mentions “whilst they could be good sites from an ecological point of view, a social question arises, as the benefits of the compensation could be enjoyed by other human communities than the one that is primarily affected”. And of course, a municipality is interested in saving sites in order to compensate the impacts deriving from their “own projects”. Moreover, only in exceptional cases an expropriation of private citizens or entities is feasible for public use – the vicious circle is closed.

For this reason, phase 1 of action no. 5 “Management of ecological compensation measures” seeks to gather appropriate methods and instruments to counterbalance the environmental impact of larger linear infrastructure projects in densely populated and used regions within corridor 24.

How do Dutch, German, Swiss and Italian stakeholders solve the problem of insufficient available space for environmental impact compensation? Responding this question allows to share efficient solutions and to detect future trends.

In our project “management of ecological compensation measures“ we do neither want to discuss the existing differences in environmental impact evaluation, respectively the different methods for calculating compensatory needs, nor the obligation to avoid impacts. Our focus is on the implementation of required and concrete compensation measures.

Gathering experiences, best-practise-examples and case studies, discussing common problems that occur during environmental impact compensation and selecting as well as describing several effective instruments (“effective” in a sense of a valuable contribution to the aims of nature protection and in a sense of a sustainable treatment of the resource “space”) of the involved countries will enable a transnational exchange and thus, a benefit for all participating partners.

### 1.3 Methods and terminology

Our main sources of information were the internet, scientific journals and expert interviews.

A vast preliminary internet research concerning methods for environmental impact compensation was carried out, always distinguishing between the concerned countries Netherlands, Germany, Switzerland and Italy. We concentrated on articles and websites written in German and English but also tried to understand Italian texts, since Italian websites were rarely available in English.

Legal regulations and guidelines, representing the framework during every environmental impact compensation process were of major interest. Besides specific national legislations, we focused as well on European directives and conventions that are common to several involved nations. Throughout our internet research, we listed important institutions, organizations, associations and other bodies that are involved in the process of compensation management. In addition to that, we searched for best-practice-examples in all involved countries, to follow the application of specific compensation management systems.



In order to ensure a good understanding of specific national methods, we tried to identify relevant experts from all affected countries who could assist us during our research work. In a next step, we elaborated a questionnaire (see annex 2) containing specific questions about compensation management on a national level (no questionnaire was elaborated for Germany). The questionnaires were sent to the identified experts and their responses were analyzed and included in our research results. The German practices were discussed during conferences and meetings with stakeholders of the compensation process.

During our work we always tried to find out the weaknesses of current practices in planning of environmental impact compensation. Pointing out the disadvantages of existing methods and instruments can evoke a discussion of the problems and hence, clear the way for strategic advancements.

In this report, the term “compensation” is used according to Rundcrantz et al. (2003) in “Environmental compensation in Planning”, including the meaning of “restoration compensation” [environmental compensation for lost environmental values in the right functional context = in-kind compensation] and “replacement compensation” [environmental compensation for lost environmental values implemented in another functional context = out-of-kind compensation]. The measures can be implemented ‘on-site’, meaning within the landscape-ecological context of the impacted area or ‘off-site’ meaning the opposite.

#### **1.4 General requirements for ecological impact compensation of infrastructure projects**

The main ecological impact of larger linear infrastructure projects consists of habitat isolation through landscape fragmentation. Landscape fragmentation is one major reason for the loss of biodiversity (Luell et al. 2003). If avoiding measures are exhausted, impact mitigation and compensation should focus on the reinforcement or (re-)creation of ecological corridor functions. Creating new patches between core habitats, enlarging existing areas of high quality to increase the habitat potential for more species or individuals and the closing of ‘low level’ road network may represent appropriate compensatory measures.

In order to support a sustainable way of impact compensation, the measures should be integrated in local conservation and land use plans. The integration in larger plans protects the compensation sites against future developments and ensures a durable functioning of the chosen measures. For the same reason, the subsequent management and monitoring which have to be included in the overall compensatory plan, should be transferred to compensation agencies or other conservation bodies. In general, compensation sites should preferably require low management input.



## 2 Legal obligations of environmental compensation

Compensatory measures may be required through international and national legislation. Developments underlying the EU Birds Directive (1979 respectively 2009) and/or the EU Habitats Directive (1992) must follow stringent principles. The following section is based on chapter 8.2 and 8.3 of the COST 341 guidebook (Luell et al. 2003):

- Species and habitats protected under (inter)national regulations require stringent constraints within the planning process and it is usually difficult to justify the social necessity for developments in protected areas, or areas with protected species.
- Financial compensation or compensation in terms of other values than the impacted ones (trading-off) should not be permitted.
- Ecological compensation must address physical and functional aspects of the impact.
- According to the Birds and Habitats Directives compensatory measures should be implemented before the start of the infrastructure development.

Where compensation is linked to formal national policy, usually less stringent measures are required:

- Economic or social necessity may, in exceptional cases, justify project development under the condition that ecological damage is compensated for.
- Compensation in terms of 'comparable' ecological values as well as financial compensation are both permitted, though less preferable.
- Compensatory measures do not necessarily have to be implemented before the project starts.

Compensation based on voluntary agreements, implying that it has neither a legislative nor a policy basis, requires less stringent conditions on the implementation of the compensation principle. In the assessment process, socio-economic and nature conservation interests are weighted against each other.

## 3 Management of ecological compensation measures in Germany

### 3.1 Institutions and stakeholders

The planning of compensation measures is usually realized by an assigned environmental consultancy agency which aligns potential compensation measures with the relevant lower nature conservation authority, hence the district or the urban municipality. Depending from the kind and size of development, the upper and supreme nature conservation authorities are involved as well. The compensation planning has to be authorized by the concerned approving authority. In case of railway projects, the Federal Railway Authority (*Eisenbahnbundesamt – EBA*) has to approve the compensation planning. A selection of involved institutions is listed in annex 1.

### 3.2 Legislation and regulations

Ecological compensation measures are legally rooted in

1. the German impact regulation principle (*‘Eingriffsregelung’*) and
2. European regulations concerning the protection of habitats and species and
3. Forestry Act.

The *‘Eingriffsregelung’* being the German instrument regulating ecological impact compensation in general, is often translated as ‘impact mitigation regulation’, ‘impact regulation principle’ or ‘compensation principle’. The legal tool exists since 1976 and is rooted in par. 13, 14 and 15 of the German Federal Nature and Landscape Conservation Act (*BNatSchG*). Since 2010, the German Nature Conservation Act is a no more just a legal framework but a fully binding regulation. The Nature Conservation Acts of the German federal states can deviate from the federal law and may contain supplementary provisions with more precise obligations. According to the ‘the polluter pays’ principle, the project developer causing an impact on nature and landscape needs to 1. minimize the unavoidable impacts as far as possible and 2. compensate the remaining impacts. Since 2010, restoration compensation is not prior to replacement compensation anymore, but on the same (legal) level. In exceptional cases and as a last resort, monetary compensation is possible. Unlike regulations of other countries (namely Italy, the Netherlands and Switzerland), the German impact regulation principle applies to the total area concerned of the development.

More detailed regulations about eco-accounts, pooling and trading of compensation measures are fixed by federal state law.

E.g., the Hessian *Kompensationsverordnung - KV* (= compensation decree) regulates more specifically how ecological impact compensation should be carried out in the federal state Hessen. For example, ecological compensation measures should be preferably realized within Natura 2000 sites whilst areas of high value for agricultural land use should be avoided for compensation planning. Furthermore, compensation measures should be bundled as far as possible and as reasonable.

According to article 6 of the European Fauna-Flora-Habitats Directive (Habitats Directive) from 1992 (92/43/EEC), a plan or a project affecting Natura 2000 sites needs to consider specific measures in order to offset the negative effects of the development and to maintain the overall ecological coherence of the Natura 2000 Network (coherence measures). The German Nature Conservation Act implements this aspect through par. 34 into national law.





Since November 2011 the *Umweltschadengesetz - USchG* implements the European Directive 2004/35/EG on environmental liability with regard to the prevention and remedying of environmental damage into German law. Damages deteriorating the conservation status of protected species and habitats of communal interest (see annex I, II and IV of the Habitats Directive and annex I of the Birds Directive) as well as waterbodies and soils must be prevented or compensated. The law applies all over the country. Nevertheless its implementation in the daily routine of approving institutions proceeds rather slowly.

Additional ecological measures may also be necessary through an expected damage of species being protected on a European level. Relevant regulations in this context are the Habitats Directive and the Birds-Directive from 1979 (79/409/EEC). Referring to developments being subject to the impact regulation principle, par. 44 of the German Nature Conservation Act demands measures to avoid damages on species listed in annex IV of the Habitats Directive and all European bird species. Those measures not being compensation measures in terms of the “*Eingriffsregelung*” may require sites and space for ‘continuous ecological functionality-measures’ (CEF-measures) and/or FCS-measures, meaning measures contributing to safe-guard a favorable conservation status of the relevant species. During the last years, the percentage of species conservation measures and the significance of species conservation law in general rose tremendously and may now pose serious problems for the realization of large developments (e.g. Stuttgart 21).

If a project or development affects forested areas, specific regulations for ecological impact compensation have to be considered: the Federal Forest Act represents the legal framework for the fully binding forest acts of the federal states which regulate e.g. afforestation measures and compensatory payments for safe-guarding forest functions.

In summary, the ecological impact compensation has a strong legal support in the German law. A selection of relevant regulations is listed in annex 1.

### 3.3 Guidelines and handbooks

According to the type of development, different guidelines and handbooks should be considered during the planning of compensation measures in Germany. In case of national railway projects, the guideline of the Federal Railway Authority (*EBA-Leitfaden*) is relevant. The German federal states also publish guidelines explaining the existing regulations and assuring and facilitating their compliance. An example is the Hessian “*Arbeitshilfe zur Kompensationsverordnung*” (HMULV 2007) which describes in detail the required spatial and temporal aspects of compensation measures, the planning of compensation measures within Natura 2000 sites and agricultural areas, the functioning of eco-accounting and compensation agencies and many more.

### 3.4 Methods and instruments

#### 3.4.1 Eco-account

The “Report on best practices for limiting soil sealing and mitigating its effects” from the European Commission (2011) describes the functioning of eco-accounts as following: “The eco-account system is based on trading eco-points. Developments requiring nature compensation measures according to the National Nature Conservation Act are charged with eco-points. Developers have to prove that compensation measures of equal value are being carried out somewhere else. Eco-points can be acquired at compensation agencies,

which are officially authorized and carry out compensation measures.” Compensation agencies are owners of eco accounts and can sell eco-points to a market-led price.

According to Küpfer (2008) “eco-accounts are used in Germany to simplify and particularly optimize the planning and realization of mitigation and compensatory measures within the environmental impact assessment (EIA) and other impact coverage systems.(...) In general, an eco-account should be developed out of a landscape plan which covers the whole surface of a municipal district. The potentials of these landscapes within the districts for ecological improvement measures are evaluated. The appropriate and available lots are transferred to a pool. As soon as a measure on one of these lots is realized, it can be transferred onto the eco-account and be used as a compensatory measure for any impact”.

The possibility to stock compensation measures that are implemented in advance of an impact (often called ‘eco-account-measures’ = *Ökokonto-Maßnahmen*) is regulated by law in par. 16 of the German Nature Conservation Act. More specific regulations for eco-accounting are fixed in the Nature Conservation Acts of the German federal states (e.g. the *Ökokonto-Verordnung* of Baden-Württemberg from December 2010). Compensation measures that are registered in an eco-account should not be based on other legal obligations and should not depend on public funding. Eco-account measures need to be authorized by the lower nature conservation authority and are recorded in a central register for compensation measures.

### 3.4.2 Compensation pools

Pools are the bundling of compensation measures on large and coherent sites. A project developer can achieve parts of the pool meaning that the developer himself doesn’t need to implement compensation measures. The compensation requirements of numerous developments can be assigned to one single pool. Possible measures are the creation of wetlands or the plantation of hedgerows. Several types of measures can also be combined in one pool. The advantages of compensation pools are mainly:

- Implementation of the impact regulation principle gets more efficient
- Spatial improvement of compensation effects through size and/or coherency of areas
- Measures are planned in a ecologically sensible way (not according to available sites and under time-pressure)
- Safeguarding of site at early stage and in a resilient way
- The implementation and monitoring of compensation measures can be assured
- Measures are more sustainable (long-term stewardship)
- Better integration of compensation measures in larger planning aims (e.g. habitat connectivity)
- Impression of worthwhile investment through visible sustainable effects deriving from compensation measures → higher public acceptance, and less conflicts (especially with farmers).

In general, no legal and procedural changes are necessary for the implementation of pools.

Compensation pools need a responsible body for planning, realizing, managing and monitoring the pool areas. Compensation agencies are a suitable service provider for ensuring high quality compensation pools.

Compensation pools may be integrated in **regional park** concepts, as practiced in the Regional Park Rhein-Main ([www.regionalpark-rheinmain.de](http://www.regionalpark-rheinmain.de)). Possible compensation measures in regional parks are e.g. restoration of rivers and river banks, plantation of alleys, hedgerows or creation of green corridors and other biotopes (small water bodies etc.). In this context, it is important to assure the basic intention of compensation

measures, which is to achieve an ecological improvement of sites. Other measures rather related to recreational or informal functions (e.g. cycle tracks, signposted paths) usually predominate regional park concepts but are not appropriate measures to offset damages on ecological functions.

A project of the Region Bremen/Lower Saxony tries to develop a compensation pool across federal state borders and municipalities. Within this project Wittrock et al. (2006) developed distinct rules adapted to the required intensive coordination process. This voluntary instrument containing nine distinct rules helps to avoid conflicts and eases the organization of the common pool development.

### 3.4.3 Compensation agency

Compensation agencies are innovative service providers for nature conservation offering the planning, the realization, the safeguarding and management, as well as the monitoring of compensation measures through creation of compensation pools. A foundation regulated by public law is a possible owner of the agency (example: Compensation Agency Brandenburg - [www.flaechenagentur.de](http://www.flaechenagentur.de)).

Compensation agencies often provide all-in-one-packages including the implementation of compensation measures and a long-term-stewardship (25 years). If compensation measures require maintenance, land users (agriculture, forestry) are often involved in the pool management.

The German Assembly of Compensation Agencies ([www.verband-flaechenagenturen.de](http://www.verband-flaechenagenturen.de)), responsible for lobbying, public relation and the organization of conferences published a list of quality standards for compensation agencies which should be retained during the work of such agencies:

- Ecological improvement („*Naturschutzfachliche Aufwertung*“)
- Long-term stewardship and site management („*Langfristige Sicherung von Maßnahmen*“)
- Documentation / monitoring
- Integration into regional plans and strategies („*Fachliche Abstimmung und Einbindung in übergeordnete Strategien*“)
- State of the art planning quality.

### 3.4.4 Compensation register

Par. 17 no. 6 of the German Federal Nature and Landscape Conservation Act demands of the competent nature conservation authorities to create a central register of compensation measures. The federal state Baden-Württemberg, for example, implemented this national regulation in federal law by releasing a separate compensation register decree (*Kompensationsverzeichnis-Verordnung*) which prescribes the responsibilities and the contents of this register. Restoration and replacement measures, but also eco-account measures (realized (stocked) compensation measures which haven't been assigned to a distinct impact) need to be recorded, always accompanied by information concerning location, type and temporal obligations of the measures and – if existent – the assigned impact.

Central tasks and objectives of the compensation register are:

- enabling to verify the implementation and functioning of planned compensation measures,
- to avoid the planning of compensation measures on sites which have already been assigned to other compensatory purposes,
- to allow the stocking of compensation measures and



- to avoid the assignment of stocked measures to more than one impact.

### 3.4.5 Integrated compensation measures

An integrated compensation measure (ICM) consists of long-term agricultural land use under specific (nature conserving) restrictions whereby nature and habitat qualities should be enhanced. Especially endangered open land species benefit from the adaption of farming measures. The farmer changing from intensive to extensive land use is paid for the difference in the yield by an investor. The measures are monitored and accompanied by biologists/ecologists and have to be accepted as compensation by the nature conservation authorities. ICM are a cooperative way of compensation management since the participation of regional stakeholders is required.

ICM can consist of, for example:

- developing a habitat for arable weeds
- developing a habitat for red kite or hamsters
- developing flower strips as habitat for farmland birds, rabbits, partridges, insects
- protection of farmland birds
- organic farming (can be a compensation measure, according to the regulations of the EU).

In contrast to the similar agri-environmental measures (AEM) of the European Union, ICM last longer (20-30 year). The specific restrictions for ICM are defined jointly by authorities and farmers and are thus more adapted to the needs of the farmers who, as a result, show increasing willingness to cooperate. Furthermore, unlike in AEM, exceptions are possible within ICM (e.g. application of herbicides), which means more flexibility for the land user.

Integrated compensation measure create win-win situations: ecological compensation measures are implemented without losing precious ground for agricultural exploitation and at the same time, the ecological value of the agricultural landscape rises.

### 3.4.6 Monetary compensation

In case of authorized projects having negative impacts on the environment which cannot be avoided, minimized and/or offset, a monetary compensation may be accepted as last resort solution (see German Nature Conservation Act par. 15 no.6). The amount, fixed by the responsible nature conservation authority, corresponds to the average costs of the potential but non realizable compensation measures including their planning, maintenance, monitoring and management. If those costs are not assessable, the monetary compensation is calculated in consideration of the duration and intensity of the impact and the deriving benefits for the developer.

The monetary compensation is usually paid in advance of the development and should be spend in distinct nature and landscape conservation projects within the same natural region. The nature conservation projects must not depend on other legal obligations.

A German publication of the Bavarian Agency for the Environment (Bayrisches Landesamt für Umwelt 2009) presents some best-practice-examples for projects financed by money deriving from monetary compensation. Nevertheless, according to Hessian experts, monetary compensation is rarely applied in practice.



## 3.5 Case examples

### 3.5.1 Expansion of Frankfurt Airport

Due to the growth of the international air transportation industry, Frankfurt Airport (*Fraport AG*) planned to expand his capacities by a new landing runway, a new passenger terminal and a maintenance complex for the A380 superjumbo (see Illustration 2). The expansion requests 300 ha soil sealing and a deforestation measure of 282 ha, affecting large areas of a designated site of the European ecological Network Natura 2000. In order to compensate those unavoidable negative impacts on nature and landscape, a huge concept of ecological measures was elaborated and fixed in the zoning procedure (*Planfeststellungsbeschluss*) of the project approval.

The compensation concept consists of different components:

#### **Afforestation measures**

Distributed on 13 different sites, 288 ha of new forest were created in order to compensate for 282 ha of lost forest. One site consists of 112 ha of new alluvial forest alongside the river Rhine. This afforestation measure will also contribute to flood prevention, another important aim of the federal state Hessen (→creating synergies). In general, afforestation measures were combined with the creation of other habitats as e.g. orchards, extensive grasslands, reeds and small water bodies.

The compensation sites were either purchased by the Fraport AG, or a treaty with the concerned landowner was signed in accompany of a single payment. The research for suitable compensation sites was carried out in collaboration with the Hessian compensation agency (*'Hessische Landgesellschaft'*).



Illustration 2: Expansion of Frankfurt Airport – Overview

### Coherency measures

Impacts affecting the network Natura 2000 require distinct measures: “the compensatory measures sensu stricto have to ensure the maintenance of the contribution of a site to the conservation at a favorable status of natural habitats types and habitats of species within the biogeographical region concerned” (European Commission 2000). In order to achieve this goal, besides creating new habitats, existing habitats were enhanced. In the vicinity of the airport, 2000 ha of existing forests were ameliorated through different ecological measures. For example, non-natural forests are converted to deciduous forests, the percentage of deadwood has been raised and silvicultural exploitation has been stopped. The implementation of those measures was ensured by a treaty signed of the Fraport AG and *Hessen-Forst* (= the Hessian State Forest Administration).

### Species protection

Numerous protected animal and plant individuals (frogs, toads, lizards, ant colonies, stag beetle larva, locusts, cloves etc.) were resettled to new habitats and hundreds of new nesting boxes for birds and bats were installed in order to prevent prohibitions related to species protection and to compensate the loss of natural habitats. In addition to that, high fences between roads and forest borders avoid the loss of bat and bird individuals.



### **Nature within the airport complex**

Whenever it is possible to create near-natural green space, the Frankfurt Airport develops extensive grasslands, heath or other suitable habitats. For example, extensive grasslands and heath were developed on unsealed areas of the new landing runway, by utilizing native regional seeds.

### **Creating synergies**

An important aspect of the compensation concept of Frankfurt Airport is that - whenever possible - compensation measures were aligned with existing concepts, in order to create synergies. For example, some measures were integrated in the concept of the Regional Park Rhein-Main (see also chapter 3.4.2). Or another example: the alluvial forests on the Rhine, which also contribute to flood prevention, as a superior objective of the federal state Hessen. Another significant aspect is the inclusion of the local population, resulting in a higher public acceptance. Numerous paths, accompanied by plaques, allow to experience the accomplished measures and to observe their development.

Furthermore, the compensation management of Frankfurt Airport was special since compensation measures basing on different regulations (impact regulation principle, species protection, Natura 2000) were bundled within suitable, adjacent Natura 2000 sites and military ground. The concentration of multifunctional measures within those sites avoided the use of agricultural land and reduced the competition on land (*Flächenkonkurrenz*). The bundling of compensation measures, as exercised by Frankfurt Airport, was afterwards adopted in federal regulation on ecological compensation.

The Fraport AG is responsible for the implementation and long-term stewardship of compensation measures. The related costs exceed 160 Million Euros while public funding and sponsoring are not engaged. The concept for ecological compensation concerns an area of 2600 ha. A long term monitoring of an area covering 10.000 ha will ensure the implementation and functioning of compensation measures.

More detailed information about ecological compensation measures of Frankfurt Airport are summarized in a publication (German language) of the Fraport AG (2011).

## **3.6 Deficits, factors of success and new approaches**

### **3.6.1 Deficits**

A fundamental problem of ecological compensation management in Germany is the existence of multiple existing methods that are used to evaluate the impacted area and thus, to quantify and qualify the requested compensation measures. Each federal state disposes of own guidelines and specific procedures need to be followed depending of the kind of project. As a result, the amount of land needed for compensation measures of a distinct project varies widely among different federal states or even within a single federal state. Consequently, the acceptance for ecological compensation measures from a developer's point of view is reduced. Common standards on a national level could solve this problem.

Numerous studies (e.g. Dierßen 1998) attest deficits in the implementation of compensation measures in Germany. Either the planned compensation measures were not realized at all or a lacking maintenance, evaluation and monitoring of measures result in abandoned sites. In those cases, the fundamental condition for environmental impact compensation, being the ecological improvement of compensation sites, is often failed. Those problems usually occur if the developer himself implements and manages compensation



measures, since his major job is focused on the planning and implementation and management of the original impact. Compensation agencies are specialized and focusing on planning, implementation and management of ecological compensation measures and are thus a suitable possibility to assure the functioning of compensation measures.

### 3.6.2 Factors of success

The concentration of multifunctional compensation measures (relying on impact regulation principle AND contributing to species protection and coherency of Natura 2000 network) within one (or few) large compensation site(s) results in multifunctional compensation measures of high ecological value and reduces meanwhile competition on land. This approach was applied during the expansion of Frankfurt Airport and was in parts adopted in federal legislation on ecological compensation.

Especially the pooling of compensation measures has been a successful approach of German compensation management. The number of regions and countries adapting this concept are an unmistakable proof. Compensation agencies, the service providers which develop, manage and trade this pools are now - after 10 years of experience - spread all over Germany and were even exported in different countries (e.g. Switzerland). A huge advantage of compensation agencies is the clear situation concerning responsibilities in compensation management. Offering all-in-one packages, the project developer can proceed in the approval procedure (saving time and money) and meanwhile, a competent institution cares for the implementation and especially maintenance and durable functioning of compensation measures. Compensation pools enable larger nature conservation projects which are visible for the public and of high ecological value.

In conclusion, bundling, stocking and searching for cooperative solutions in compensation management (see chapter 3.4.5 - integrated compensation measures) are important factors for a successful compensation management.

### 3.6.3 New approaches in Germany

Compensation decree of Hessen (*Kompensationsverordnung Hessen*)

In 2005, the federal state Hessen released a decree regulating the handling of ecological impact compensation. The decree contains clear, binding rules concerning spatial and functional aspects of measures. For example, compensation measures should preferably be bundled and located within Natura 2000 sites. If the relevant development requires the sealing of surfaces, the compensation measure should, as far as possible, consist of unsealing sealed areas. Areas of high agricultural value should not be used for compensation measures. The compensation decree supports the stocking of compensation measures and regulates the introduction of innovative service providers as e.g. compensation agencies.

By releasing the decree in 2005, Hessen has been a pioneer for developing suitable regulations for compensation management in Germany.

While other counties are about to implement more stringent regulations on ecological impact compensation, the comparably stringent German impact regulation principle has become more flexible within the new German Federal Nature and Landscape Conservation Act from 2010. The spatial relation between impact and compensation is now fixed on the natural region (*Naturräumliche Einheit*) and replacement and restoration measures are now on the same legal level. The German impact regulation principle should not only be ap-



CODE24 - MANAGEMENT OF ECOLOGICAL COMPENSATION MEASURES  
Final Report



plied in a passive way (reactive instrument) but also actively, as a planning instrument for designing landscape (e.g. ecological corridor systems, regional park concepts).



## 4 Management of ecological compensation measures in Italy

Please note: the Italian expression “compensazioni ambientali” means environmental compensation for impacts affecting both, ecological and social factors, meaning that a cycling path can represent an environmental compensation measure. According to this, the regulations cited considers always both, ecological and social aspects for compensation measures.

### 4.1 Institutions and stakeholders

The Italian state is organized in 20 regions, which consist of multiple provinces and the provinces being divided into different municipalities. The body being in charge of giving the permission for the realization of a project varies depending on type and size of the project and can reach from national to municipal level. According to this, the authority being able to make prescriptions for compensation measures also varies.

The competent authority for EIA of large, national projects is the Ministry of the Environment and the Protection of the Territory (*Ministero dell'Ambiente e della Tutela del Territorio e del Mare - MATTM*), which exists since 1986. Being part of the *MATTM*, the national Environmental Impact Assessment (EIA) Commission is the competent authority carrying out the technical inquiry of the environmental report provided by the developer and subsequently gives the permission (or not) for national infrastructure projects. In this context, the EIA Commission can prescribe distinct methods or measures for environmental compensation of the project. ‘Strategic’ projects (projects being part of a national strategic program) follow a specific EIA procedure (according to decree no. 443/2001), since they are divided into a preliminary and a final project. The preliminary project (which corresponds to a draft) is presented to the Interministerial Committee for Economical Planning (*Comitato Interministeriale per la Programmazione Economica - CIPE*). The *CIPE* can approve the preliminary project by giving an ‘EIA statement’ issuing the environmental compatibility of the project. The statement may contain prescriptions on impact compensation. Following the approval of the preliminary project via *CIPE*, the final project needs to be assessed by the EIA Commission, which has only to verify that the final project is equal to the preliminary project. If this is the case, the statement of *CIPE* is confirmed. If not, the technical inquiry of the EIA study is carried out by the EIA Commission.

The EIA Commission is in charge of monitoring and enforcing the prescriptions (e.g. compensatory measures) made in the final approval of the project.

The planning and implementation of environmental compensation is carried out by the developer, always retaining the prescriptions of the EIA statement. Usually, social & environment compensations are assessed and agreed with local authorities (Region, Provinces and municipalities) in order to meet local needs, such as creation of green areas, parks, re-naturalization of watercourses, reconstruction of alternative roads, etc.

On regional level, the Directorate-General for the Environment (*Direzione Generale - DG*) is in charge of regulating the protection of the environment and supervising the adherence of their regulations. The regional Directorate-General for Infrastructure and Mobility is also involved in environmental issues of infrastructure planning.

The Italian Institute for Environmental Protection and Research (*Istituto Superiore per la Protezione e la Ricerca Ambientale - ISPRA*) founded in 2008, provides the *MATTM* with scientific and technical support. The



ISPRA supervises the Regional Environmental Protection Agencies (*Agenzie Regionali per la Prevenzione e Protezione Ambientale – ARPA*) which were established to perform inspection and enforcement on request from regions and have a role as the main monitoring and inspection bodies.

A selection of involved institutions is listed in annex 1.

## 4.2 Legislation and regulations

Most important national law referring to environmental policy is the '*Norme in materia ambientale*' (*Decreto Legislativo 3 aprile 2006, n. 152*). This law describes how environmental aspects need to be taken into account when projects, plans and developments affect nature and landscape (principle: 1. avoidance, 2. minimization and 3. compensation). The law specifies the required structure of the Environmental Impact Assessment (EIA) study which must contain a description of the proposed minimization and compensation measures.

Decree 12 aprile 2006, n. 163 (*'Codice dei contratti pubblici di lavori, servizi, forniture in attuazione delle direttive 2004/17/CE e 2004/18/CE'*) prescribes the limit for costs being spend in environmental and social compensation measures. The costs should not exceed 2% of the total costs for the development.

Developments affecting Natura 2000 sites need to consider article 5 no. 8 of the 'Regulation implementing Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora' (*'Regolamento recante attuazione della direttiva 92/43/CEE relativa alla conservazione degli habitat naturali e seminaturali, nonché della flora e della fauna selvatiche'* - *D.P.R. 8 settembre 1997, n. 357*) saying that "if, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected".

Except for the regional forest laws, being quite specific about how negative impacts into forested areas need to be compensated for, the Italian law lacks of binding rules and standardizations for environmental impact compensation. The national law regulates the realization of compensation but doesn't specify any implementation methods or schemes. According to Rega (2011) the Italian planning system has traditionally focused on social and economic compensation types and "no specific provisions for strictly ecological compensations are in place in the national planning law, nor in more recent regional planning laws".

In summary, the ecological impact compensation has a weak legal support in the Italian law. A selection of relevant regulations is listed in annex 1.

## 4.3 Guidelines and handbooks

Compared to other Italian regions, the Lombardy Region seems to be quite progressive in environmental policy. The region released an executive act describing 'Criteria and guidelines for technical planning to improve the relation between road infrastructure and natural environment' (*'Criteri ed indirizzi, tecnico-progettuali per il miglioramento del rapporto fra infrastrutture stradali ed ambiente naturale'* D.d.g. 7 maggio 2007 - n.4517).



In addition to that, the Lombardy Region published ‘Guidelines for the impact assessment of large infrastructure projects in rural areas and for implementing proposed compensatory interventions’ (*Linee guida per la valutazione degli impatti delle grandi infrastrutture sul sistema rurale e per la realizzazione di proposte di interventi di compensazione*, Regione Lombardia (2006)), including relevant definitions, methods and possible compensation measures in rural areas.

The national EIA-handbook (*Linee Guida VIA*) contains some details about possible compensatory measures. A selection of handbooks dealing with compensation measures in some way is listed in annex 1.

## 4.4 Methods and instruments

### 4.4.1 General principles of the Italian impact compensation

Mitigation hierarchy:

1. avoidance
2. minimization (*mitigazioni*)
3. compensation (*compensazioni*).

The environmental compensation measures in Italy, also being a “last resort solution” after having exhausted all kind of avoidance and minimization measures, include ecological, territorial and social concerns. Nevertheless, the Italian planning system has traditionally focused on social and economic compensation types and “no specific provisions for strictly ecological compensations are in place in the national planning law, nor in more recent regional planning laws” (Rega 2011). The area on which ecological compensation has to be applied to (e.g. total area impacted or just protected sites) is not clearly outlined.

In order to evaluate residual impacts of developments after having applied all possible measures for impact avoidance and minimization, planners usually make use of some kind of matrix. Areas in which the development affects e.g. a regional ecological network (*Rete Ecologica Regionale - RER*) achieve a high score in the matrix and result in a high need for ecological compensation measures. However, there are no clear and binding rules about how to evaluate impacts.

### 4.4.2 Monetary compensation

If it is impossible to mitigate or compensate (from the environmental point of view) impacts in the same area or if there are institutions more skilled in the implementation of environmental restoration activities (e.g. parks), monetary compensation is a possible way in Italy to offset negative impacts on the environment due to developments. The amount is usually given to local authorities and has to be spend on specific projects after an agreement about them.

### 4.4.3 Obligations and recommendations

The national decree 163/2006, fixes at 2% of the infrastructure total cost, the maximum allowed for compensations of both environmental and social impacts, for national strategic infrastructures.

Forest transformations leading to the elimination of existing vegetation intended for soil uses other than forestry practices, should be compensated through reforestation with species having a local origin, through



forest improvements, or through cash payments (Piemont). In case of woods cutting, tree planting is required by law up to 1:5 (Lombardy).

Compensation measures are recommended to be carried out in the same time and area of the infrastructure construction and should be homologous and at least equivalent to the negative impacts caused by the project, but always avoiding the loss of natural habitats. The compensation should be oriented towards high priority measures, which should be identified in advance at the regional scale. The aspect of environmental compensation has to be included in the calculation of the final project version and should be performed during the execution of the final project.

Some specific measures are set out in other national and regional regulations, for example in Lombardy Region via the 'Criteria and guidelines for technical planning to improve the relation between road infrastructure and natural environment' (D.d.g. 7 Maggio 2007, n. 4517)

#### 4.4.4 Spatial Planning Instruments

By developing environmental compensation measures, spatial planning instruments on different levels are usually considered in order to align the measures to superior aims of landscape planning. Especially the Regional Spatial Plan (*'Piano Territoriale Regionale' - P.T.R.*) and the Provincial Spatial Plan (*'Piano territoriale di coordinamento Provinciale' - P.T.C.P.*), displaying priority areas for nature and landscape conservation, need to be considered.

The Regional Ecological Network (*Rete Ecologica Regionale - RER*) is recognized as an infrastructure priority of the Regional Spatial Plan and is a guideline for local and regional planning. The *RER* and the criteria for its implementation provide the framework of the P.T.R., by outlining the existing sensitive nature areas and the major elements of the referring ecosystems. The ecological strengths and weaknesses, opportunities and threats of the region are assessed and visualized.

The *RER* supports the P.T.R. in playing a coordinating role with respect to plans and programs of the regional industry. It identifies ecologically sensitive areas and sets priorities. This information is indispensable in order to take into account the needs of ecological balance in the process of regional planning.

The document '*RER - Rete Ecologica Regionale*' (Region Lombardia 2008) illustrates the structure of the network and the constituting elements on a scale of 1: 25 000. The document '*Regional Ecological Ecological Network and local spatial planning*' (*'Rete ecologica regionale e programmazione territoriale degli enti locali'*) provides essential information for the composition and the protection of the network as part of planning and programming ([www.lombardia.it](http://www.lombardia.it)).

Referring to the environmental impact assessment, the *RER* must be taken into account during the evaluation of the ecosystems in order to identify the vulnerable elements that must be protected and to plan compensation actions.

## 4.5 Case examples

### 4.5.1 Autostrada Pedemontana Lombarda

The current major infrastructure project of the Region Lombardy '*Autostrada Pedemontana Lombarda*' (APL) ([www.pedemontana.com](http://www.pedemontana.com)) will connect the provinces of Varese and Bergamo in the North of Milano in order to improve the intercity connection and to discharge the existing highways in the metropolitan region *Grande Milano*.



Illustration 3: General view on the project Autostrada Pedemontana Lombarda

The Pedemontana road system is composed of 157 Km, of which 67 km highway, 20 km urban motorway (bypassing Como and Varese) and 70 km local roads. The 67 km highway will consist of 31 km road embankment, 17 km ground level, 11 km artificial gallery, 5 km bridge / viaduct and 3 km natural gallery.

The routing of the future highway is located along the 60 km long green corridor 'Dorsale Verde' connecting the rivers Adda and Ticino through 5 regional parcs, 12 local parcs and narrow linking structures. The concept of environmental compensation of *APL* concentrates on enforcing the ecological network of the Dorsale Verde by creating new 'stepping stones' (Lopez Nunes 2010) through numerous local projects (see Illustration 4). Those stepping stones will be integrated and linked by one major project called 'greenway' - a 90 km long cycling path close to the future highway. The greenway will give access for the public to regional and local parcs and will strengthen the green infrastructure by ameliorating the north-south and east-west connection between existing nature areas. The project *APL* and its required impact mitigation and compensation is recognized as an opportunity to re-build landscape and environment and to create new space for public recreation.

The *APL* project represents a best-practice-example since the company proposed an own large compensation project which was developed in cooperation with all affected communities and stakeholders (participatory planning) and considered superior aims of landscape planning. Usually, the project developers in Italy effect a compensatory payment towards local municipalities which can spend the money in their own projects. Often, those projects consist of building new infrastructure needed and thus, a real ecological compensation is lacking.

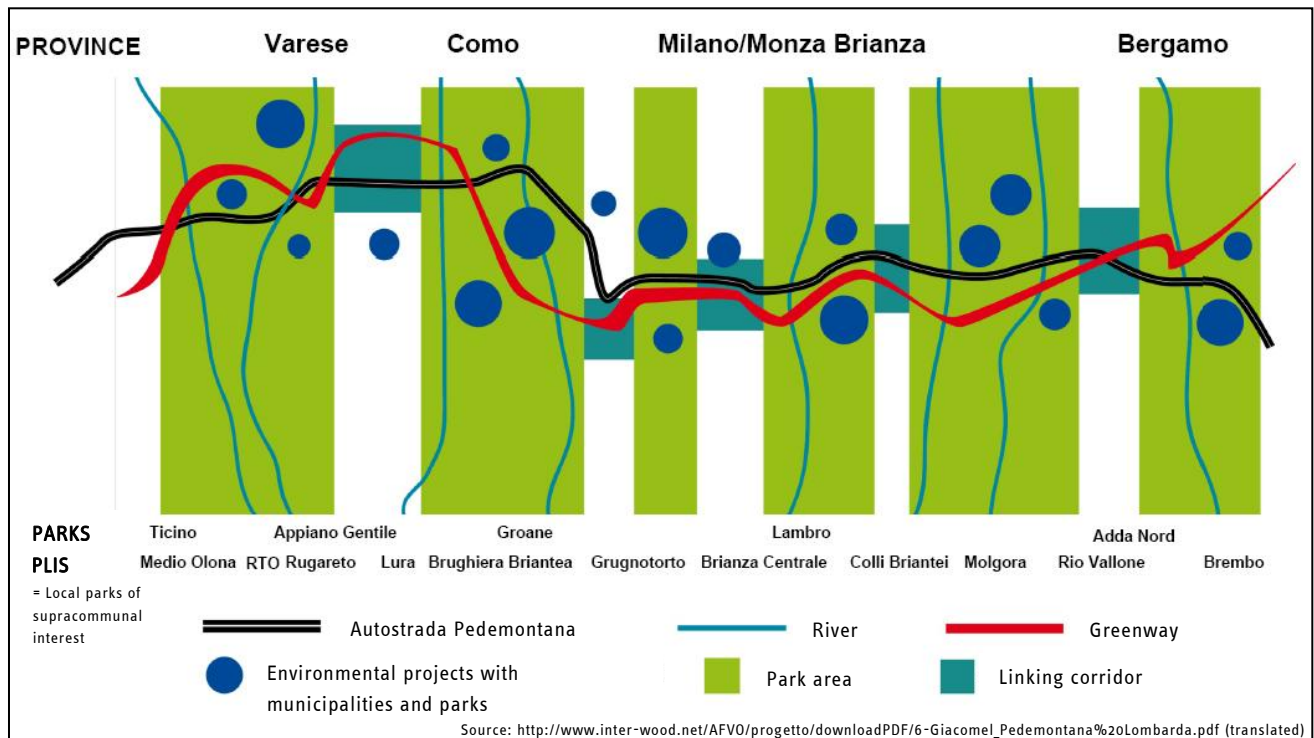


Illustration 4: Concept of environmental impact compensation - *Autostrada Pedemontana Lombarda*

## 4.6 Deficits, factors of success and new approaches

### 4.6.1 Deficits

As Rega (2011) points out, important aspects hindering ecological compensation in Italy are:

1. “Lack of legal requirements: current national and regional laws on planning do not provide for binding rules linking the possibility of developments with the obligation to realize compensation measure. The establishment of a clear legal framework thus appears to be the most critical point in the Italian context. Developers are not used to consider compensations as an integral element in their projects and they will continue to do so unless legally obliged.
2. Lack of established methodologies: there is clearly a need for sound, but “ready-to-use” methods and tools to establish the amount and kind of compensation needed or required for different types of actions, based on the characteristics of the areas affected, their localization, their use for the local population and so on. The theoretical and methodological issues examined in the second section are not easy to tackle, so every established methodology could probably be criticized and could be im-



proved with practice, but the lack of any established methods, which is the current situation, is the worst scenario.

3. Municipal authorities are still more in pursue of social-economic compensations rather than ecological ones. As stated before, traditionally the Italian planning system has worked with social and/or economic compensation. Often, developers are required to pay a certain amount of money to the municipality as compensation, ever more in recent years given the financial crisis of local authorities in Italy and all over Europe. A change of attitude from policy-makers is needed (again, a clear and binding legal framework would be a good driver)”.

Even the project developers on their part (*APL*) complain about missing strict regulations about compensation management and the fact that only vague standardizations exist, since those deficits are problematic for the planning process.

#### 4.6.2 Factors of Success

Participatory planning seems to be flexible enough to accommodate the many different factors which have to be considered by the developer: a large infrastructure needs to be planned and constructed in a complex geographical and multi-environmental area, always sticking to fixed timetables and costs. In addition to that, only vague standardization about compensation management exists in Italy. In the *APL* project, it is due to long-standing relationships with various parties that a mutually agreeable decision was achieved on the motorway project as well as on the compensation measures.

To align the planning of compensation measures with superior aims of spatial planning (e.g. green infrastructure) renders ecological measures more efficient and eases the planning process. Public acceptance rises since the measures are linked to large scale aims of nature and landscape conservation (instead of ‘something somewhere for nature’).

To establish cooperative win-win schemes (see point 4.6.3) in order to raise public acceptance.

#### 4.6.3 New approaches

##### Alliance with agricultural sector

The main problem in Italy is the identification of available areas for compensation and the ownership of suitable compensation sites. Rega (2011) suggests developing compensation strategies that are not imperatively linked to land acquisition, since public areas and acquired ones do often not suffice to implement effective compensation measures. One possible solution would be to pursue an alliance with the agricultural sector and to involve hereby private land owners. Since private owned agricultural areas are the real “pool areas” for compensation in Italy (especially in the Po Valley), the implementation of compensation measures within agricultural land would be reasonable. Areas for compensation do not necessarily have to be transferred to the public but may be maintained by farmers. Through the use of contracts between a public body (e.g. the municipality), the developer and the farmers, compensation schemes may be implemented. The idea has basically the same rationale as the Agri-Environment Schemes (AESs): developers would pay farmers, owning suitable areas for compensation, for carrying out certain measures such as

- tree plantation and hedgerow plantation/restoration
- creation/maintenance of wet areas



## CODE24 - MANAGEMENT OF ECOLOGICAL COMPENSATION MEASURES Final Report



- arable reversion to permanent grasslands
- set-aside (temporary fallowing scheme of agricultural production)
- application of integrated/biological pest control
- opening up areas to the public (for leisure).

## 5 Management of ecological compensation measures in the Netherlands

### 5.1 Institutions and stakeholders

The *Rijkswaterstaat*, is part of the Dutch Ministry of Infrastructure and the Environment (*Ministerie van Infrastructuur en Milieu*). Its responsibility is the practical execution of the public works and water management, including the construction and maintenance of waterways and roads, as well as flood protection and prevention. Even though the realization of compensation measures is not in the responsibility of the *Rijkswaterstaat*, it has to assure their suitable implementation according to the *Nota Ruimte* (VROM et al. 2004).

However, according to an agreement between state and provinces from 2011, the state is currently shifting the responsibilities concerning nature and landscape towards the provinces.

The Government Service for Land and Water Management (*Dienst Landelijke Gebied – DLG*) is an agency of the Ministry of Economic Affairs, Agriculture and Innovation (*Ministerie van Economische Zaken, Landbouw en Innovatie*), responsible for the local implementation of policies referring to recreation, nature, water management and agriculture ([www.dienstlandelijkgebied.nl](http://www.dienstlandelijkgebied.nl)). The DLG works on behalf of several government authorities and in cooperation with local institutions and citizens. In the context of compensation management, the DLG is responsible for the planning, implementation and management of compensation measures which are requested for public developments, e.g. of the *Rijkswaterstaat*. Purchasing land for compensation measures, managing and evaluating measures as well as preparing the necessary documents for the approval of project from a nature conservation point of view are common tasks. In order to develop compensation measures, the DLG acts in close cooperation with the relevant provinces and municipalities which are usually competent to assure sites for compensatory purposes.

Afterwards, the responsibility for compensation sites and their maintenance is transferred to nature conservation organizations (e.g. *Natuurmonumenten* ([www.natuurmonumenten.nl](http://www.natuurmonumenten.nl)), *De12Landschappen* ([www.de12landschappen.nl](http://www.de12landschappen.nl)) or *Staatsbosbeheer* ([www.staatsbosbeheer.nl](http://www.staatsbosbeheer.nl))).

The Dutch National Fund for Rural Areas (*Nationaal Groenfonds*) manages the investments of government funds in nature and landscape, and is responsible for the activation of private funding for rural areas ([www.nationaalgroenfonds.nl](http://www.nationaalgroenfonds.nl)). Compensatory payments, being accepted as an ultimate last resort solution of ecological compensation, are effected in the *Nationaal Groenfonds*, in order to be spend in regional projects for nature conservation, usually related to the Ecological Main Structure - EMS (*'Ecologische Hoofdstructuur' – EHS*).

The *Dienst Regelingen* (National Service), belonging to the Ministry of Economic Affairs, Agriculture and Innovation, is a professional public service supervising the compliance of governmental policy ([www.hetInVloket.nl](http://www.hetInVloket.nl)). Referring to ecological compensation, the service approves deforestation works and authorizes compensatory afforestation measures.

### 5.2 Legislation and regulations

Please note that the Netherlands are currently planning to merge their laws referring to nature conservation (*Natuurbeschermingswet, Flora- en faunawet* and *Boswet*).



As Cuperus (2004) describes, the ecological compensation principle was formally introduced as an element of national policy in the context of transportation infrastructure projects through the publication of the National Structure Plan for the Rural Areas (MANF and MHPE 1993). Before, it “had already been applied informally and *ad hoc* for a number of years in other policy areas in the Netherlands, notably forestry and land use” (Cuperus 2004). Projects which are initiated and implemented by the government have to apply the ecological compensation principle (*‘Compensatiebeginsel’*) by voluntary commitment. Since 2004, a new spatial strategy – the *Nota Ruimte* – needs to be taken into account for spatial relevant planning. The *Nota Ruimte* contains new provisions for project developers, including new guidelines for the Dutch compensation principle.

The Structure Plan for the Rural Areas or now the *Nota Ruimte* demands of the 12 Dutch provinces to implement the compensation principle in their regional plans (*Streekplannen*) and their provincial policy. Cuperus (2001) mentions that the “actual implementation of the compensation measures is, however, not rooted in national legislation.” At least until 2001, such compensation measures “have been implemented by means of nonregulatory approach”, e.g. through agreements in between the affected parties.

The Dutch ecological compensation principle (*‘Compensatiebeginsel’*) doesn’t apply on the total area affected by an impact, but on distinct designated areas, mainly consisting of the Ecological Main Structure - EMS (*‘Ecologische Hoofdstructuur’ - EHS*), an ecological corridor system which is still under construction. The EMS is designated by the Nature Policy Plan (*Nationaal Natuurbeleidsplan*) from 1990 and implemented on provincial level.

Four main regulations need to be considered for ecological impact compensation:

The Flora and Fauna Act (*Flora- en Faunawet*) from 2002 regulates the protection of distinct animal and plant species (list contains all wild mammals, birds, reptiles and amphibians and some fish, dragonflies, butterflies and plants). The listed species need to be considered in case of environmental impacts and suitable species related compensation measures need to be developed.

Nature Conservation Act (*Natuurbeschermingswet*) from 1998 regulates the protection of nature conservation areas including Natura 2000 sites, wetland areas, nature reserves and protected landscape elements (*Beschermde Natuurmonument*). Impacts affecting those designated nature areas request ecological compensation.

Regulations on the EMS: Spatial Planning Act (*Wet ruimtelijke ordening*): The EMS is a national, coherent network of existing and potential nature areas. The network consists of core areas, development areas and connection zones. A large part of the EMS is at the same time Natura 2000 site national park or nature reserve. Unavoidable impacts affecting the EMS need to be compensated by ecological compensation measures (*‘no-net-loss-principle’*). The EMS is implemented through different plans on regional level and its protection is regulated by the Spatial Planning Act.

The Forest Act (*Boswet*) from 1961 regulates that deforestation must be compensated by afforestation (at least ratio 1:1). Specific provincial regulations can demand higher ratios. Afforestation measures must be agreed with the relevant province and have to be approved by the *Dienst Regelingen*.

Respecting the legal framework of national and supranational (Natura 2000) regulations, the provinces can provide more detailed legislation on ecological compensation (e.g. the *‘Beleidsregel Natuurcompensatie’* of the province Noord-Brabant). However, the differences in between the provincial regulations are quite small and they will not be treated in detail within this project.



For linear infrastructure projects, the *Tracéwet* regulates the procedure which has to be followed by planning a new or adjusting an existing linear infrastructure (*Tracéwet-procedure*). Of course, the way how negative impacts on nature and landscape are avoided, minimized and - if necessary - compensated is relevant for project approval. However, in the context of ecological compensation, the *Tracéwet* does not deviate from the laws mentioned before.

In summary, the ecological impact compensation has a medium legal support in the Dutch law. A selection of relevant regulations is listed in annex 1.

### 5.3 Guidelines and handbooks

Most important is the publication *Spelregels EHS* (LNV et al. 2007), a joint work of the state and the provinces. This publication contains a policy framework for the Dutch compensation principle, according to the *Nota Ruimte* (VROM et al. 2007). A chapter of 5 pages is focusing on provisions for ecological compensation related to impact affecting the EMS (see also Illustration 5).

The handbook *De Vormgeving van Faunapassages* (Rijkswaterstaat and ProRail 2011) was published for all collaborators of provinces, *Rijkswaterstaat*, municipalities, planning agencies and other stakeholders being concerned with fragmentation due to infrastructure planning. In three volumes, the handbook issues the entire process beginning at the identification of conflict points and ending at the realization of crossings including construction, maintaining and monitoring. Even though the construction of a wildlife bridge is initially a minimization measure (something in between minimization and compensation), the guidebook is mentioned here, since, especially in the Netherlands, defragmentation measures are an important part of ecological compensation.

### 5.4 Methods and instruments

#### 5.4.1 General background of the Dutch compensation principle

Cuperus (2004) describes the procedure of the project approval as following:

“The Structure Plan sets out a phased planning and decision-making procedure involving both the initiator of the project in question and the competent authority. The first phase involves weighing up the perceived need for the project and its anticipated benefits against the projected loss of ecological values. This phase is steered by the principle of ‘no unless’ and culminates in a basic decision on whether or not the project may go ahead. In principle, no developments may be implemented in protected areas. If on the basis of the information emerging in this phase approval is withheld, the formal procedure is concluded. If the project is approved, given its perceived overall benefits to society, and it is anticipated that the ecology of the area concerned will suffer in any way as a result, the procedure moves into its second phase. In all cases measures must then be taken to mitigate the ensuing damage and, to the extent that such steps are inadequate, measures taken to compensate any remaining damage. The stated aim here is ‘no-net-loss of ecological values’.”

Since the Structure Plan for Rural Areas from 1993 was replaced by the *Nota Ruimte* in 2004, new guidelines for the compensation principle need to be considered during the planning of spatial relevant projects. Basic



principles for ecological compensation remain similar but some new prescriptions and possibilities were added, e.g. expropriation is a legal way to ensure requested ecological compensation measures.

### Subjects of regulation

The Compensation principle has to be applied on the following areas:

- “Core areas of the Dutch EMS
- Nature-development areas created as part of the EMS
- Nature areas outside the EMS that are designated as such in regional plans or zoning plans, or covered by the terms of the Nature Conservation Act
- Habitat sites covered by regional or zoning plans as designated in national species-protection plans, and
- Ecological values in woods and plantations covered by the Forestry Act” (Cuperus 2001).

### Provisions of the Dutch compensation principle

In order to achieve ecological compensation, existing biotopes can be improved, or new biotopes can be created. Management, maintenance and monitoring of realized measures also need to be ensured.

According to the *Spelregels EHS* (LNV et al. 2007) compensation must adhere to the following principles:

- the project initiator is responsible for implementing due compensation measures;
- the necessity and benefits of the project must first have been established before attention is turned to compensation;
- no net loss of values, in terms of area, quality and consistency;
- wherever possible, negative impacts must first be avoided or otherwise mitigated and only compensated as a last resort;
- compensating adjacent or near the area. For physical compensation, expropriation can be a possible way to purchase land;
- if physical compensation adjacent or near the impacted area is impossible, compensation measures may be implemented further away from the affected area by creating structures of equivalent ecological value (at least 1:1, overcompensation for biotopes needing a long time until being a fully functioning system).
- if in-kind and out-off-kind, respectively in-site and off-site compensation are both impossible, financial compensation may be accepted. The money has to be paid in the *Nationaal Groenfonds* and has to remain assigned to the related impact;
- at the moment of the project approval, the type and timing of minimization and compensation measures need to be fixed as well;
- for those areas being designated Natura 2000 sites (within or outside the EMS), some more stringent rules need to be considered according to the relevant directives. In designated 2000 sites, monetary compensation is not accepted. If such sites will be significantly affected by unavoidable developments of higher public interest, minimization and compensation measures need to be realized in advance and through in-kind compensation measures within the affected Natura 2000 site, in order to maintain the coherency of the network Natura 2000.

There is no standard method for evaluating the need for ecological compensation. As a result, the provinces dispose of their own methods (as it is the case in all studied countries).

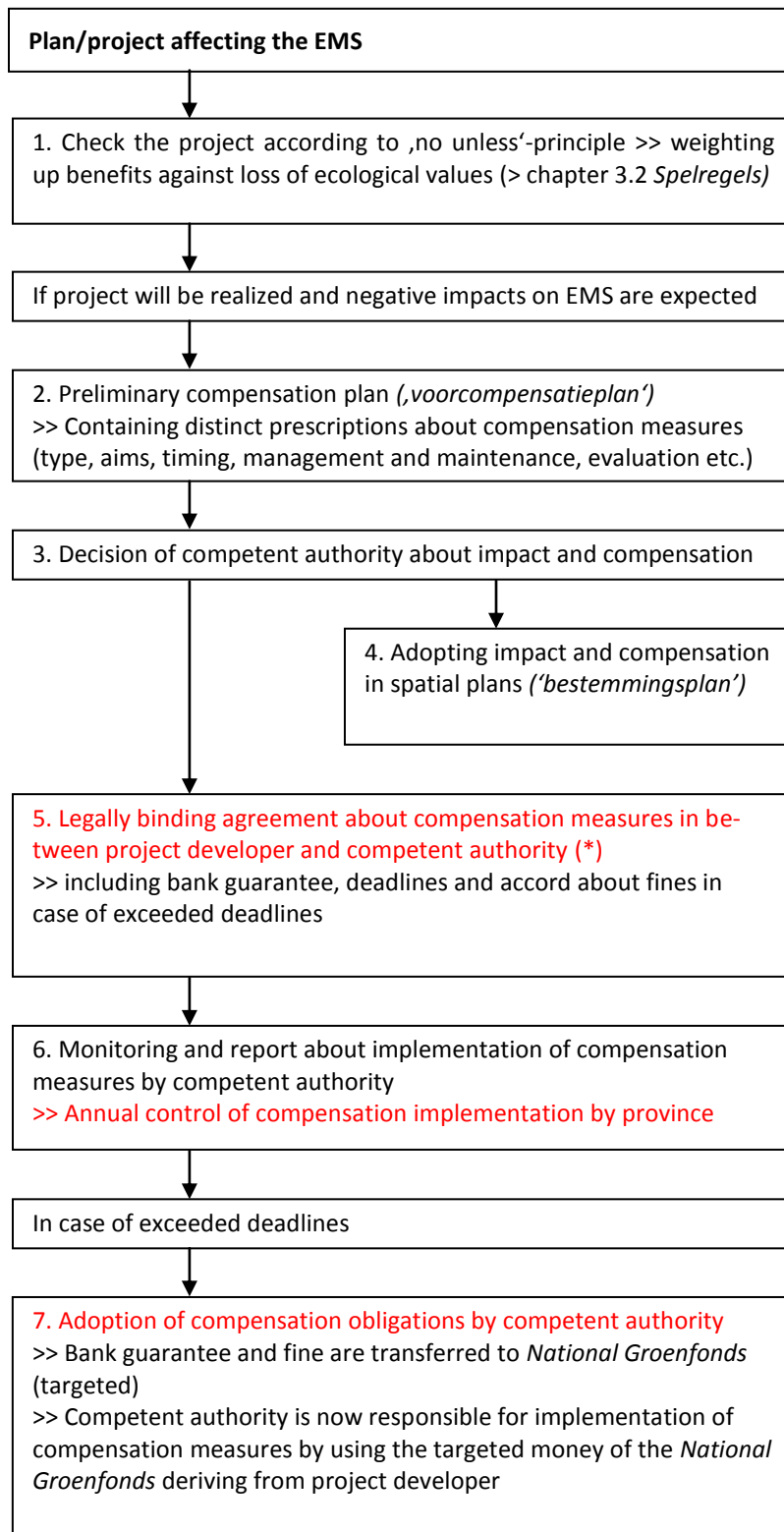


#### 5.4.2 Monetary compensation

Monetary compensation is possible as a 'last resort solution', if physical compensation is verifiably impossible. The targeted money is usually paid in the *Nationale Groenfonds* (see chapter 5.1) and spend in regional projects for nature conservation, usually related to the EMS.

The amount corresponds - according to German regulations about monetary compensation - to the average costs of the potential but non realizable compensation measures including their planning, implementation and maintenance (including prospected inflation rates).

Illustration 5: Impacts affecting EMS - Dutch compensation procedure (*Spelregels EHS* (LNV et al. 2007))



\*New regulation in *Nota Ruimte* (compared to Structuurschema Groene Ruimte (MANF 1993))



### 5.4.3 Compensatieloket Provincie Utrecht

The *Compensatieloket* of the province Utrecht helps to bundle the supply and demand of suitable sites for ecological compensation ([www.provincie-utrecht.nl/RAP](http://www.provincie-utrecht.nl/RAP)). The project developer remains responsible for the implementation and functioning of compensation measures (unlike in German compensation agencies which may also adopt all responsibilities of ecological compensation). The *Compensatieloket* supports the developer on his search for available and appropriate sites by considering the following criteria: sufficiency concerning quantity and quality, in line with existing spatial plans, distance to the impacted area and temporal availability. The province creates a central database where all possible sites for compensation and all requests from developers are integrated via registration system. Anyone, e.g. private landowners, disposing of potential sites for ecological compensation can entry his site in the central database. Afterwards, the *Compensatieloket* checks the suitability of the site for afforestation or other ecological measures and evaluates the actual condition of the ground from an ecological point of view. The compensation measures may also be implemented in advance of an impact, meaning that a stock of measures may be created. Another benefit is that the provinces can easily make annual evaluations concerning realized compensation measures and disposes of an instrument to control the compliance of compensatory obligations. The *Groene Contourkaart* (provincial plan illustrating the EMS on a provincial level) is adapted periodically according to the database of the *Compensatieloket*. This procedure demands a specific adaption of the relevant provincial law on spatial planning.

## 5.5 Case examples

### 5.5.1 New Highway A4

[Information provided by the Government Service for Land and Water Management]

“The new highway A4 is an important link between the ports of Rotterdam and Belgium and the south of Europe. Most part of the project is in agricultural use. The compensation task is 44 ha (18 ha forest and 26 ha flowery meadow). Five different search areas are determined in the compensation plan and information sessions for landowners had been held in these areas. Additionally, all the landowners were visited individually to identify whether they want to sell or exchange land. Because the purchased sites were not on the most suitable places, a number of owners exchanged parcels – so the farmers and the compensation areas could get a better parcelation. The process of land purchase is on a voluntary basis and was thus intensive and time consuming – after 3 years 35 ha were purchased. After this process a development plan for each location is drawn up and various investigations are required to optimize the plans (e.g. on soil quality, archaeology, explosives and phosphates). Subsequently the plan is technically worked out and the necessary permits are applied for. Finally, the zoning plan of the municipality specifies the nature use for the future protection.”

### 5.5.2 Canal Zuid-Willemsvaart

[Information provided by the Government Service for Land and Water Management]

“The new canal Zuid-Willemsvaart will have a length of 9 km around the city of 's-Hertogenbosch. This project affects the habitat of badgers, bats and birds. In this example mitigation measures were the construction of badger tunnels and the expansion of approximately 30 habitats at another location (by linking existing habitats).



The land needed for the compensation is provided through agreements with landowners to converse from agricultural use to nature. Most of the sites were narrow strips of 15 m on the border of the parcels. The landowners receive 85% of the agricultural value and a management fee of 1.370 € per hectare and year.”

### 5.5.3 A12 Maarsbergen - Veenendaal

[Information provided by Bureau Waardenburg, Culemborg]

The Dutch highway A12 connecting Utrecht and the German highway A3 will be expanded between Maarsbergen and Veenendaal. A landscape- and compensation plan (*'Landschaps- en compensatieplan'*), elaborated by the consultancy Bureau Waardenburg (2008), describes how the highway could be better integrated in the surrounding landscape and how compensatory obligations could be accomplished.

Since some Ecological Main Structure (EMS) sites and several protected species will be affected by the project, compensation measures will consists of, for example:

- the addition of land to the Ecological Main Structure (EMS),
- the maintenance or recreation of habitats and reproduction places within the EMS,
- prevention of barriers: an ecoduct for the highway and the railway is going to be built as well as several smaller wildlife passages,
- the creation of special landscape structures resulting in increased biodiversity and
- compensation measures within an area of old defense lines.

In order to better integrate the highway in its surrounding landscape and to create ecological benefits at the same time, the highway profiles were adapted in a way of creating a higher diversity of habitats for animals and plants. This will be achieved by establishing an asymmetric profile incorporating more diverse habitat characteristics (see Illustration 6).

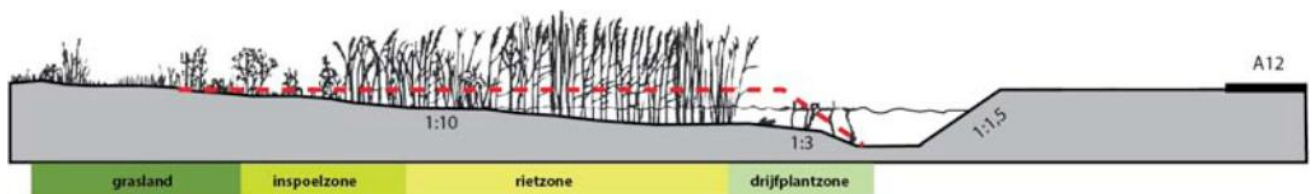


Illustration 6: Cross section of highway embankment (red line: standard profile) (Bureau Waardenburg 2008)

## 5.6 Deficits, factors of success and new approaches

### 5.6.1 Deficits

It is expensive and time-consuming to identify and acquire sites for the compensation measures. Moreover, individual compensation projects are not developed in a spatially coherent way and thus 'nature islands' are created ([www.lei.wur.nl](http://www.lei.wur.nl)).

Various studies stated that compensation measures in the Netherlands proved to be inefficient (Broekmeyer 2011). "Only half of the land which was classified as to be compensated was actually compensated. Major reasons were the lack of severe sanctions if compensation was not carried out and the lack of simple proce-



dures for investors. (...) In order to improve the system, professional compensation banks or local compensation pools are necessary.” This would ensure that compensation measures are more efficient since they are carried out by experts (Prokop et al. 2011).

### 5.6.2 Factors of success

At the CODE24 workshop I Compensation Management in March 2012 in Mannheim, a collaborator of the *Bureau Waardenburg* in Culemborg advises: “always try to combine offset measures with other initiatives, with compensation statements from other interventions and within the various components of the project itself.

Furthermore, Cuperus et al. (2001) underlines the importance of a mutual agreement about compensation at an early stage among project developer and provincial authority.

### 5.6.3 New approaches

According to the LEI (*Landbouw-Economisch Instituut* = Agricultural Economics Institute) and the Government Service for Land and Water Management (*Dienst Landelijke Gebied - DLG*), nature compensation can be implemented more efficiently both in the ecological and the economic sense. One way of doing this is through nature compensation banks. These are reservoirs of compensation sites which are being purchased in anticipation of future building activities. Compensation measures can then be realized in advance and in a consistent way. This results in higher nature quality, lower costs for the initiator and a faster process. The Netherlands are currently discussing and planning the creation of such compensation banks ([www.lei.wur.nl](http://www.lei.wur.nl)).

At the CODE24 workshop I Compensation Management in Mannheim, the participants of *Dienst Landelijke Gebied* mentioned the following: “There are substantial cuts of the nature budget in the Netherlands and thus Ecological Main Structure (EMS) realization and other nature targets are under pressure. These cuts demand creativity to achieve the best effects as possible with the residual scarce resources - ecological compensation could contribute to this aim.

In current regulations for environmental compensation appears a debate about the principles of “compensation in the vicinity of the operation” and “compensation of similar nature”

- both principles can lead to delay and/or not performing of the environmental compensation
- they do not always lead to optimal ecological and social benefits of environmental compensation.

Therefore it must be investigated (the DLG is currently working on this issue) whether regulations can be changed in such way that:

- nature compensation can be realized where it is ecologically most desirable,
- fragmentation of habitats can be prevented,
- higher ecological returns can be achieved and
- realization- and management costs can be decreased.”



## 6 Management of ecological compensation measures in Switzerland

Please note: the Swiss expression “*ökologischer Ausgleich*” (*öA*) describes the obligation (art. 18b of the Federal Law on the Protection of Nature and Cultural Heritage) of the cantons to enhance ecological structures (thickets, hedgerows, riparian tree plantations, or other near-natural vegetation) in intensively used areas within and outside residential areas. This legal obligation may be called ‘ecological compensation’ as well, but has to be differed from the project related obligation of developers to compensate for distinct impacts affecting nature and landscape, on which we are focusing here.

### 6.1 Institutions and stakeholders

The Swiss Confederation is a federal republic consisting of 26 cantons which have a large autonomy (own constitution, government, parliament, court and legislation). According to the Swiss Federal Constitution, the cantons are in first place responsible for the conservation and management of the natural and cultural heritage (art.78). As a result, every canton disposes of an own office for nature and environment and relevant special legislation, also referring to environmental impact compensation. The cantonal legislations cannot be treated in detail.

The Federal Department of the Environment, Transport, Energy and Communications - DETEC (*Eidgenössisches Departement für Umwelt, Verkehr, Energie und Kommunikation - UVEK*) is responsible for ensuring a “sustainable development and the provision of basic public services in the interests of society, the environment and the economy” ([www.uvek.admin.ch](http://www.uvek.admin.ch)). The DETEC takes decisions about infrastructure developments relying on foundations prepared in the various offices, for example the Federal Office of Transport - FOT (*Bundesamt für Verkehr - BAV*), the Federal Office for Spatial Development (*Bundesamt für Raumentwicklung - ARE*) and the Federal Office for the Environment - FOEN (*Bundesamt für Umwelt - BAFU*). The Federal Commission for the Protection of Nature and Cultural Heritage - FCNC (*Eidgenössische Kommission für Natur- und Heimatschutz - ENHK*) is administratively attached to the Nature & Landscape Division of FOEN and

- “advises the Federal Council and the relevant Department on fundamental matters of nature and cultural heritage protection;
- contributes in an advisory capacity to the enforcement of the Federal Law on the Protection of Nature and Cultural Heritage (NHG);
- contributes to the preparation and updating of the inventories of sites of national importance;
- submits opinions on proposed projects to the federal and cantonal authorities in cases where implementation could have a substantial adverse impact on sites listed in the Federal Inventory of Landscapes and Natural Monuments of National Importance or the Federal Inventory of Valuable Sites of Local Character;
- advises cantonal agencies on matters of nature and cultural heritage protection;
- prepares submissions to the Federal Supreme Court or cantonal administrative courts”  
[www.enhk.admin.ch](http://www.enhk.admin.ch).

The Federal Office of Transport (FOT) is the responsible authority for approving national railway projects and hence, for ensuring their environmental compatibility. In this context, the FOT works closely together with the Federal Office for the Environment (FOEN).



The FOEN published a guideline for environmental impact compensation in Switzerland, representing an important source of information for the CODE24-project.

A selection of involved institutions is listed in annex 1.

## 6.2 Legislation and regulations

Nature and landscape conservation in Switzerland are anchored in the legislation of various official levels of the Federation, the cantons and the communities. The significant federal laws are article 78 (protection of nature and heritage) of the Federal Constitution and the Federal Law of 1st July 1966 on the protection of Nature and Heritage (*Bundesgesetz über den Natur- und Heimatschutz - NHG*; SR 451), serving as legal framework. According to article 74 of the constitution, the ‘polluter pays principle’ is relevant for impacts in nature and landscape. Referring to environmental impact compensation, article 3, 6 and 18 of the Federal Law on the protection of Nature and Heritage are most important:

Article 3 - Obligations of the Confederation and cantons

Article 6 - Importance of inclusion in an inventory: inventoried sites need “to be preserved undiminished, or in any case to be managed with the greatest possible care, including the application of restoration or appropriate replacement measures”

Article 18 - Protection of animal and plant species and biotopes: “If (...) damage by technical interventions to habitats deserving of protection is unavoidable, the party responsible must take measures to ensure the best possible protection, restoration, or, failing that, the provision of appropriate compensation”.

The Ordinance of 16 January 1991 on the Protection of Nature and Cultural Heritage - NCHO (*Verordnung über den Natur- und Heimatschutz - NHV*, SR 451.1) demands that anyone who carries out a “technical intervention that could damage biotopes deserving protection” is “obliged to take the best possible protection or restoration measures, or failing that, appropriate compensation measures”.

Impacts in forested areas need to be compensated in the same kind and in the same region of the affected forest according to article 7 of the Federal Act on Forest (*Bundesgesetz über den Wald*, SR 921.0). In exceptional cases, compensation may be implemented in another region or through another benefit of nature and landscape conservation (out-of-kind). Article 8 permits the use of exemption taxes in exceptional cases (if physical compensation is not possible). The money obtained through exemption taxes should be spend in forest conservation measures.

It should be underlined that the Swiss law concerning ecological compensation of project related impacts doesn't apply on the total area affected, but only on

- federal, cantonal and communal inventoried sites and
- protected biotopes and biotopes deserving of protection
- forested areas.

In summary, the ecological impact compensation has a strong legal support in the Swiss law. A selection of the mentioned and other relevant regulations is listed in annex 1.



### 6.3 Guidelines and handbooks

As already mentioned in chapter 6.1, the FOEN published a well structured guideline for environmental impact compensation in Switzerland (Kägi et al. 2002), containing all relevant regulations and definitions, instructions for implementation and management as well as case examples and new approaches. According to the FOEN, the guideline in German language is still valid and was not updated until now.

The interesting publication “Nature, landscape and infrastructures - Succeeded project optimization” (*“Natur, Landschaft und Infrastrukturen - Erfolgreiche Projektoptimierung”*) of the FOEN dates from 2005. By giving 12 case examples, the authors illustrate how infrastructure projects can be optimized in consideration of nature and landscape conservation and underline the high significance of an intensive reconciliation process. The publication is edited in German and French language.

### 6.4 Methods and instruments

Our main source of information in terms of Swiss compensation practice is the publication *“Wiederherstellung und Ersatz im Natur- und Landschaftsschutz”* (= ‘Restoration and replacement in nature and landscape conservation’) from Kägi et al. 2002, edited by the Swiss FOEN.

#### 6.4.1 General principles of the Swiss impact regulation

The Swiss impact regulation hierarchy consists of four levels, namely:

1. avoidance
2. minimization
3. restoration compensation (in-kind) (*Wiederherstellungsmaßnahme*) and
4. replacement compensation (out-off-kind) (*Ersatzmaßnahme*).

In the Swiss impact regulation, restoration compensation is prior to replacement compensation, unlike in the German Nature Conservation Act from 2010. In general the appropriate measure (best effect with given financial and temporal investment possibilities) with preferably low necessity of maintenance should be chosen. The project impacts should be compensated in accordance with the law of proportionality. While planning whichever compensation measure, superior planning levels - for example landscape concepts (= *Landschaftskonzepte*) - should be integrated in the planning process in order to benefit from synergistic effects.

#### Subjects of regulation

In contrast to the German impact regulation principle which applies on the total area, the Swiss regulation refers environmental impact compensation to protected landscape elements. Riparian zones, fenlands and mires, rare forest communities, hedgerows, thickets, dry grasslands and other sites that play a role in preserving the ecological balance or which provide especially favorable conditions for biocoenoses are subject to protection.



## Spatial context

The spatial context for compensation measures comprises a physiographic region called natural region (*Naturraum*), usually including the territory of four to five administrative districts. The area of impact compensation should remain in a functional and spatial context to the interfering development.

## Timing

Compensation- and project planning should be simultaneous processes. The compensation measures should be realized in advance of the starting constructions and temporary compensation measures shall bridge the gap between construction start and the proper functioning of compensatory measures.

## Habitat fragmentation

In order to reduce habitat fragmentation caused by infrastructure developments,

- green corridors should be re-established as good as possible,
- the interconnection of replaced biotopes should be as high as the interconnection of the destroyed biotopes,
- in case of highway projects, an off-site compensation beyond the impacted area could be reasonable,
- replaced biotopes: the more they are isolated the bigger they should be and the more they should be of high quality,
- in any case, a sufficient interconnection allowing repopulation has to be guaranteed.

## Agricultural land, 'ökologischer Ausgleich' and environmental impact compensation

In Switzerland, Art. 18b para. 2 of the Federal Law on the protection of Nature and Heritage and art. 76 par. 3 of the Federal Law on Agriculture regulate the obligation for 'ökologischen Ausgleich' - *öA* (see explanation at the beginning of chapter 6) within agricultural holdings. According to the FOEN "the purpose of ecological compensation is primarily to connect isolated biotopes, if necessary by the creation of new biotopes, in order to promote species diversity, to achieve forms of land use that are as near-natural and benign as possible, to integrate nature into residential areas and to enliven the landscape" ([www.admin.ch](http://www.admin.ch)). Ecological compensation is obtained by means of thickets, hedgerows, riparian tree plantations, or other near-natural vegetation adapted to the site. The *öA*-area has to cover at least 7 % of the agricultural usable land (concerning special crops 3,5 %). By realizing and managing this ecological compensation as required by law, the farms have right to direct payments (*Direktzahlungen*). It is important to note that the project related compensation of infrastructure developments (and others) can overlap with the area of *öA* within agricultural holdings. Consequently, farmers are more interested in realizing impact compensation within their holdings since they can draw on the direct payments.

### 6.4.2 Linear compensation of the Swiss Federal Railways

The Swiss Federal Railways – SFR (*Schweizerische Bundesbahnen - SBB*) usually purchase the land flanking the intensive maintenance zone left and right of the track and implement an extensive management concept (see illustration in chapter 9.1.3). This area is often used for compensation measures, since it represents an

important ecological corridor within an intensively used landscape. Furthermore, railway embankments are suitable habitats for numerous highly endangered species. Common types of compensation measures are the creation of ruderal sites and poor grasslands, integration of small structures for reptiles and other animals, plantation of hedgerows or revitalization of streams.

It is currently discussed to realize an inventory of Swiss railway embankments in order to ascertain the ecological value of the embankments and to identify ecological hotspots. Afterwards, potential valorization measures in or near the hotspots may be defined and implemented. Those accomplished measures could form an SFR-own compensation measure pool.

### 6.4.3 Swiss Landscape Concept

The Swiss Landscape Concept - SLC (*Landschaftsentwicklungskonzept - LEK*) (BUWAL 1998) was established by the Federal Administration and approved by the Federal Council in December 1997. It seeks to achieve sustainable landscape development by stipulating binding objectives that are to be pursued by government departments in any of their activities which have implications for land use. The concept shall promote a dialogue between land users and conservationists and thus create and support favorable alliances. It serves as an official guideline and is elaborated on a local or regional level ([www.bafu.admin.ch](http://www.bafu.admin.ch)).

Referring to the federal transport sector, the SLC demands to include the costs for measures and management contributing to nature landscape conservation in the planning of the project. A quality management system should assure the incorporation of nature and landscape concerns. Furthermore, the SLC and the overall transport strategy should be aligned to each other and norms and guidelines ought to be integrated in the concerns of nature and landscape.

Specific actions suggested and described in detail by the SLC target the following aims:

- elaborating guidelines concerning crossing aids at linear transport axes,
- generating operating procedures allowing to optimize infrastructure traces from an ecological point of view and
- superior wildlife corridors have to be identified cartographically serving as groundwork for transport planning.

### 6.4.4 New approaches in Switzerland

The guidebook „*Wiederherstellung und Ersatz in Natur und Landschaft*“ (= Restoration and Replacement in Nature and Landscape Conservation) from Kägi et al. (2002) presents some ‘new approaches’ for the implementation of ecological compensation measures which were adapted in particular cases in the past, but could represent innovative solutions for the future.

#### 6.4.4.1 Site pools

On occasion, public authorities may establish a stock of areas (site pool; *Flächenpool*) disposable for future compensatory measures through the purchase of ecologically suitable land (e.g. abandoned agricultural holdings, public developments etc.). The stock is build without being linked to specific projects but it should first of all be located in a spatially and ecologically reasonable overall context and secondly be embedded in a large-scale planning, as e.g. landscape concepts (SLC). The project developer can buy the land if required



and can concentrate on the detailed planning of measures, their maintenance and monitoring. This concept avoids the long and often exhausting search for suitable land.

#### 6.4.4.2 Compensation measure pools

In contrast to the site-pool, the compensation measure pool (*Maßnahmenpool*) already includes the overall-planning and preparations for a specific large-scale nature conservation project and its management, it just needs money for definitive realization. The developer who needs to compensate an impact may enable, or at least contribute, to the implementation of the project by financial participation. Unlike in site-pools, the developer doesn't necessarily need to realize the measure by himself. The existence of such nature protection projects is, of course, an indispensable precondition for this tool.

According to the FOEN, the described pool-solutions are not commonly used at present. Nevertheless, single cantons apply those instruments within cantonal-specific concepts.

#### 6.4.4.3 Compensatory Fund

The approach of eco-funding consists of investments in a cantonal fund for nature protection projects (compensatory Fund; *Ersatzmaßnahmenfonds*) instead of implementing specific compensatory measures. The purpose of the investment remains open while depositing the money. A suitable institution or foundation will manage the fund and spend the money in reasonable ecological measures (e.g. revitalization of streams, afforestation, and creation of specific habitats). This approach remains a 'last resort solution' since the compensation measures are largely undocked from the environmental impact of the development. In contrast to Germany's monetary compensation (*Ersatzzahlung*), the use of financial compensation is not regulated by the Swiss national law. Nevertheless, the cantonal legislations for nature conservation regulate the creation of cantonal funds for money deriving from financial compensation (e.g. canton Luzern).

Even though not fixed in national legislation, financial compensation seems to be accepted and of common use if appropriate land for compensatory measures is unavailable close to the impacted area. The Swiss Federal Railways (SFR), the Federal Office of Transport (FOT) and the FOEN planned to create a compensatory fund for very small and small infrastructure developments which would have only small compensation requirements. The fund would have been designated for larger measures enhancing biodiversity and habitat quality on ecologically reasonable sections of banquettes. Unfortunately, this joint project remains unrealized until now.

#### 6.4.5 Réseau Ecologique National

Protection, restoration and interconnection of habitats are of crucial importance in order to maintain and enhance biodiversity. The *Réseau Ecologique National (REN)* being the „Swiss Green Network“ is an important instrument to protect the diversity of species and landscape. The vision of REN is that

- habitats and their network form a functional unit within a large-scale landscape planning,
- isolated habitats are linked-up, existing corridors are maintained and enhanced and
- the conservation of flora and fauna is achieved through extension of habitats and thus, populations.





The REN serves as a planning tool on a regional and national level. It contributes to the planning of

- the regional network of *öA*-sites in terms of the ÖQV (Act for Eco-Quality, *Öko-Qualitätsverordnung*)
- Landscape concepts (SLC)
- cantonal directive plans (*kantonaler Richtplan*).

In addition to that, the REN should be integrated in the spatially relevant actions of the cantons, for example in the process of infrastructure planning, since (re-)construction and development of infrastructure are possibilities to enhance nature and landscape in a well-directed manner (www.bafu.admin.ch; Berthoud et al. 2004).

## 6.5 Case examples

### 6.5.1 Railway line Mattstetten - Rothrist

In 2004, the construction of the new railway line in between Mattstetten and Rothrist was finished. The project requested 50 ha for ecological compensation measures. The concept for ecological compensation is quite specific in this project, since one large compensation site was not purchased by the Swiss Federal Railways (SFR), as usually practiced, but still belongs to the farmers. This large site, called 'Brunnmatte' is a system of wet meadows on a site of marginal agricultural use. In former times, the extensive land use, being indispensable for maintaining this cultural landscape of high ecological value, was not suitably managed. The compensation measure consists of a service level agreement (*Dienstbarkeit*) of the SFR with the cooperative society of the consolidation of land Mumenthal to assure the maintenance, husbandry and compensation for charges of use (*Nutzungsauflagen*) for 25 years. The money for these charges has been paid in a fund. After 25 years, the site will pass into cantonal possession. In order to maintain a high water level on the site, a revitalized stream, also being part the compensation concept, is periodically ponded in this area.

Another part of the compensation concept is the deconstruction of the old railway line. After deconstruction, the old track line was filled up with gravel, in order to accelerate the recolonization of plant species. In addition to that, the SFR implemented common compensation measures along the railway embankments.

### 6.5.2 Alp Transit: Ceneri base tunnel

The Ceneri base tunnel in the canton Ticino is part of the Swiss federal project 'Alp Transit', aiming to create faster north-south rail links across the Swiss Alps. The construction of the tunnel bears a lot of excavated rock which is used to build a landfill in Sigirino. One part of this new landfill is situated in a national wildlife corridor and worsens the connectivity of the corridor. To improve the connectivity, a number of measures including a wildlife bridge are planned. In this example the ground does not belong to the Swiss Railway Company.

The compensation management in this project is a good example for the synergy between the canton and SFR since tasks which by law have to be realized by the canton are financed by the railway company.



### 6.5.3 Löttschenbach in Ostermundigen

The Löttschenbach in Ostermundigen (canton Bern) was deculverted (*entdolt*) and revitalized. The project being originally planned by the municipality was partly funded by the canton and the confederation. Another part was paid by a compensatory fund which was created within a regional landfill project. The negative ecological impacts of the landfill on watercourse biotopes could not be compensated in the area of the project. The revitalization of the Löttschbach was implemented in the same natural region and has a suitable functional context to the impacted site. In this example, the tool compensatory funding was applied in combination with a compensation measure pool and different project developers and legal regulations were involved (Kägi 2002).

### 6.5.4 Bypass of Strada

The canton Graubünden planned to build a bypass in Strada, affecting 3,1 ha of the floodplain San Niclè-Strada, an inventoried site of national importance for natural and cultural heritage. Another cantonal project which has been discussed for several years was the revitalization of the Inn floodplain, a nature conservation project lacking financial resources. The requested compensation measures for the bypass construction and other smaller projects (e.g. gravel mining) enabled the realization of the revitalization project (including the deconstruction of a gravel quarry) which served as a joint large compensation measure and thus, as a compensation measure pool (Kägi 2002).

## 6.6 Deficits, factors of success and new approaches

### 6.6.1 Deficits

The lack of a mutual regulation and methodology for impact compensation evaluation implies that, referring to the same impact, different cantons have different compensation requirements. This heterogeneity lowers the acceptance and the understanding of environmental impact regulation on multiple levels (land users and holders, developers, citizens). A joint regulation (exceeding the recommendatory character of the handbook (see chapter 6.3)) would result in more objectivity, transparency and traceability of compensation measures and thus, in a higher acceptance of compensatory obligations. The joint regulation would need to be simple in its application and flexible enough to meet all cantonal prescriptions.

### 6.6.2 Factors of success

An important factor of success is to create synergies between compensation measure implementation and other objectives of regional planning (see chapter 6.5.4 for an example).

### 6.6.3 New approaches

New approaches of compensation management in Switzerland, in particular pooling concepts as described in chapter 6.4.4, should be legally fixed in national and cantonal legislation in order to ease their application and to become a standard instrument of Swiss compensation management. Until now, compensation pools are rather applied on an experimental level in single projects.



## 7 Concepts for improved participation/ acceptance

In the Netherlands, highway initiators try to involve interest groups in talks on the issue of compensation (Cuperus et al. 2001).

“The Dutch *Dienst Landelijk Gebied* also uses ‘Interactive Planning’ in many of its land consolidation projects. In interactive planning various groups work together: professionals, politicians, representatives of interests groups, residents and users. They are actively involved early in the planning process. The advantages of interactive planning are legion: an intrinsically richer plan and a better planning process; with more public understanding and support, and consequently a faster process.” ([www.dienstlandelijkgebied.nl](http://www.dienstlandelijkgebied.nl))

Swiss publications underline that the consultation of superior spatial planning (Cantonal Structure Plans, SLC) is of crucial importance during compensation management of larger projects. The embedding of compensation measures in superior planning levels often reveals usable synergetic effects and evokes a higher public acceptance which for their part, allow efficient environmental impact compensation. Furthermore, evaluation methods and balancing procedures should be transparent and as consistent as possible in order to enhance public acceptance.

A laborious but successful participatory planning process was applied in the Italian highway project *Autostrada Pedemontana Lombarda* (see chapter 4.5.1 and 4.6.2).

## 8 Comparison and evaluation

The main principles of ecological compensation are valid for all studied countries: the ‘polluter pays’ for the damage done to the natural environment and needs to follow the hierarchy of 1. avoidance, 2. minimization and 3. compensation (see Table 1). But when it comes to comparing the significance of the term ‘environmental compensation’, some fundamental differences are already noticeable: in Italy the term does not only include compensation of ecological values, but also socio-economic values. This makes it quite difficult to study and compare the existing Italian regulations, provisions and habits referring to strictly ecological compensation, being in focus of action 5 of the CODE24-project.

Even though all studied countries dispose of regulations on environmental compensation, the intensity of legal support is varying significantly. While Switzerland and Germany have stringent laws and provisions on this topic, the Dutch legislation has a medium and the Italian legislation a rather weak support through binding regulations. However, some fundamental changes occurred during the last years and especially the Netherlands dispose of more stringent provision than 10 years ago. In contrast to that, the reformation of the German Federal Nature and Landscape Conservation Act renders the quite stringent German impact regulation principle more flexible, for example by permitting ecological compensation measures within the same natural region of the impact or by overriding the former hierarchy of replacement measures prior to restoration measures (unlike in Switzerland, where replacement measures have still legal priority, see chapter 6.4.1).

Even though the Swiss and the German legislations about environmental compensation are quite similar, there is a fundamental difference regarding the area on which the regulation applies to: while the German impact regulation principle is valid for the total surface affected by an impact, the Swiss and also the Dutch regulations apply to selected areas. As multiple studies point out (e.g. Rundcrantz et al. 2003; Jessel 2003; Peters et al. 2002), not only concerning the application area, but also in general, the Federal Republic of Germany seems to dispose of one of the most stringent and developed legislation about environmental impact compensation.

Nevertheless, it is noticeable that, apart from the diversity of existing legislations, similar problems occur during environmental impact compensation: all involved countries are currently discussing about creating a joint methodology for the evaluation of compensatory needs. Increasing problems of public acceptance, concerning the impact itself but also concerning compensatory obligations require common rules on a federal level. It is obvious that the acceptance of compensatory obligations is reduced, if the same impact in the canton Graubünden and the canton Basel, or from a German point of view, in Hessen and in Baden-Württemberg, result in totally different compensatory requirements regarding quantity and quality. A standard methodology should, of course, be simple in its application and flexible enough to meet all requirements of the federal states, regions, cantons or provinces. But since the main problem is in fact that the implementation of such framework requires a strong political will and remains a great challenge for the future.

In conclusion, especially in Italy seems to be a demand for further developing a fully binding legal framework on impact compensation in a strict ecological sense. The lack of clear rules does not necessarily facilitate the procedure of environmental compensation, as an Italian expert, being involved in the case example Autostrada Pedemontana Lombarda, underlined.

Table 1: International comparison of different aspects regarding environmental impact compensation\*

Aspect	Germany	Italy	Netherlands	Switzerland
<b>Framework</b>	Impact regulation principle	<i>Norme in materia ambientale</i>	Compensation principle	Art. 3.6 and 18 NHG
	<i>Eingriffsregelung</i>	<i>Decreto legislativo 3 aprile 2006, n. 152</i>	<i>Compensatiebeginsel</i>	Law on the Protection of Nature and Cultural Heritage
	§ 14, 15 BNatSchG			
<b>General principles</b>	'Polluter pays' Avoidance → minimization → compensation			
<b>Legal support</b>	Strong	Weak	Medium	Strong
<b>Application area</b>	Total area	No regulation	Selected area	Selected area
<b>Monetary compensation possible</b>	Yes, but 'last resort solution' (legally rooted)	Yes, commonly used (compensatory payment towards affected municipalities)	Yes, but 'last resort solution' (legally rooted)	Practiced but not rooted in national law, only in cantonal regulations
<b>Value basis</b>	Focus on ecological values	Focus on ecological and social values	Focus on ecological values	Focus on ecological values
<b>Compensation plan</b>	Landscape Conservation Support Plan	Not compulsory	Preliminary Compensation Plan	Not compulsory
	<i>(Landschaftspflegerischer Begleitplan - LBP)</i>		<i>(Voorcompensatieplan)</i>	

\*(Rundcratz et al. 2003, modified illustration)



## 9 Documentation Workshop I

During an international workshop on March 22<sup>nd</sup>, 2012 at the Verband Region Rhein-Neckar in Mannheim, various experts from Germany, Italy, the Netherlands and Switzerland discussed current methods and perspectives of managing ecological compensation measures. After getting a short introduction in the strategic project CODE24 funded by the European Union, common constraints of managing ecological impact compensation were described referring to the densely populated area inbetween Frankfurt a.M. and Mannheim. Furthermore, central tasks and objectives of action 5 “Management of ecological compensation measures” were pointed out. Afterwards, seven experts having a diverse professional background, ranging from consultants in planning agencies up to developer of large infrastructure projects, gave an insight in ecological compensation management of their countries and presented distinct best-practice-examples and innovative solutions to improve the compensation process.

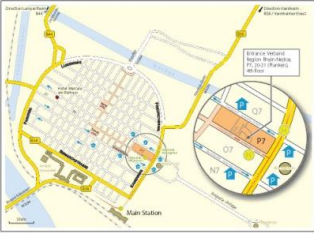


The workshop contributed to creating a network of experts which can assist in developing new strategies or improve existing models for ecological impact compensation, with respect to larger linear infrastructure projects.

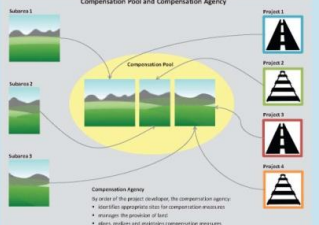
# CODE24 - MANAGEMENT OF ECOLOGICAL COMPENSATION MEASURES

## Final Report



### Workshop invitation

<b>Registration</b>	<b>General Information</b>	<b>CODE 24: Management of Ecological Compensation Measures – Current Methods and Perspectives</b>		
<p>International Workshop Verband Region Rhein-Neckar Mannheim, March 22, 2012</p> <p>Surname, name _____</p> <p>Institution _____</p> <p>Street _____</p> <p>Postal code, town _____</p> <p>Telephone _____</p> <p>Telefax _____</p> <p>Email _____</p> <p>Date, signature _____</p> <p>For further participants please copy the registration sheet. Please send the registration sheet by mail, fax or email until <b>March 16, 2012</b> to the following address:</p> <p>Verband Region Rhein-Neckar P 7, 20-21 68161 Mannheim Tel.: +49-(0)621-10 708-0 Fax.: +49-(0)621-10 708-34 E-Mail: claus.peinemann@vrrn.de</p>	<p>Date: Thursday, March 22, 2012 09:30 - 15:45 h</p> <p>Address: Verband Region Rhein-Neckar (conference room) P7, 20-21 68161 Mannheim</p> <p>Venue: Please note that the city centre of Mannheim is designed in squares and is characterized by letters and numbers instead of street names. The workshop will take place in square P7, number 20-21, right in the middle of the main shopping street and close to the water tower. The entrance of the office of the Verband Region Rhein-Neckar is located at the beginning of a roofed shopping passage, in between "Studio-Haus" porcelain shop and "Von Drathen" fashion shop.</p> <p>Arriving at Mannheim main station: Either take a 10 minute walk or take tram No. 3 or 4 to station "Wasserturm" (water tower).</p>  <p>For any further question please do not hesitate to contact:</p> <table border="0"> <tr> <td>Rebecca Nagel Baader Konzept GmbH Tel.: +49-(0)621-71 84 86-38 E-Mail: r.nagel@baaderkonzept.de</td> <td>Dr. Claus Peinemann Verband Region Rhein-Neckar Tel.: +49-(0)621-10 708-38 E-Mail: claus.peinemann@vrrn.de</td> </tr> </table>	Rebecca Nagel Baader Konzept GmbH Tel.: +49-(0)621-71 84 86-38 E-Mail: r.nagel@baaderkonzept.de	Dr. Claus Peinemann Verband Region Rhein-Neckar Tel.: +49-(0)621-10 708-38 E-Mail: claus.peinemann@vrrn.de	 <p>International Workshop Verband Region Rhein-Neckar Mannheim, March 22, 2012</p> 
Rebecca Nagel Baader Konzept GmbH Tel.: +49-(0)621-71 84 86-38 E-Mail: r.nagel@baaderkonzept.de	Dr. Claus Peinemann Verband Region Rhein-Neckar Tel.: +49-(0)621-10 708-38 E-Mail: claus.peinemann@vrrn.de			

<b>Preface</b>	<b>Agenda</b>	<b>Agenda</b>
<p>"Ecological compensation may be defined as creating, restoring or enhancing nature qualities in order to counterbalance ecological damage caused by infrastructure projects" (luell et al. 2003 COST 341). This process is of crucial importance with respect to the 'no net loss' principle, an essential policy of the European Biodiversity Strategy 2020.</p> <p>As described in the guidebook COST 341 "compensatory measures are mainly implemented on a voluntary basis, rooted in agreements between project developers, nature conservation trusts, landowners or other stakeholders". Seeking for suitable land for compensation measures is a mostly time-consuming and exhausting process that often leads to insufficient solutions.</p> <p>For this reason, action no. 5 – "management of ecological compensation measures" – of the EU funded strategic project CODE 24 seeks to gather appropriate methods and instruments to counterbalance the environmental impact of larger linear infrastructure projects in densely populated regions within Corridor 24.</p> <p>How do Dutch, German, Swiss and Italian stakeholders solve the problem of insufficient available space for environmental impact compensation? Our workshop on March 22, 2012 in Mannheim will treat this question in order to share efficient solutions and to detect future trends.</p> <p>For further information see: www.code-24.eu</p>  <p>Source: Kaji, B., Stalder, A., Thommen, M. (2002) (modified illustration)</p>	<p>09:30 h <b>Welcome</b> Ralph Schlusche, Dr. Claus Peinemann, Verband Region Rhein-Neckar</p> <p>09:40 h <b>Introduction to the workshop</b> Dr. Markus Gonsler, Baader Konzept GmbH, Mannheim</p> <p>10:00 h <b>Compensation management within Corridor 24: Seeking for innovative and feasible compensatory strategies</b> Rebecca Nagel, Baader Konzept GmbH</p> <p>10:15 h <b>Case studies implementing ecological compensation in Italy: legal context, obstacles and potentials</b> Dr. Carlo Rega, University of Turin</p> <p>10:35 h <b>Environmental impact compensation of the Autostrada Pedemontana Lombarda</b> Barbara Vizzini, head of deivation environment – Autostrada Pedemontana Lombarda</p> <p>10:55 h <b>Discussion / questions</b></p> <p>11:10 h <b>Coffee break</b></p> <p>11:25 h <b>Ecological compensation and railway projects in Switzerland</b> Laurence von Fellenberg, BAFU, Bern</p> <p>11:45 h <b>Methods and strategies of compensation management in the canton Graubünden</b> To be confirmed: Consultant of Swiss planning agency</p>	<p>12:05 h <b>Cooperative solutions with regional stakeholders: maintaining agricultural land use and revaluing agrarian biotopes through integrated compensation measures</b> Catharina Druckenbrod, Thüringer Landgesellschaft</p> <p>12:25 h <b>Discussion / questions</b></p> <p>12:40 h <b>Lunch break</b></p> <p>13:40 h <b>Infrastructure projects and implementation of compensation measures in the Netherlands</b> To be confirmed: Dienst Landelijk Gebied (= Government Service for Land and Water Management)</p> <p>14:00 h <b>Highway projects and compensation in the Netherlands</b> To be confirmed: E.J.F. de Boer, Planning office Waardenburg</p> <p>14:20 h <b>Discussion / questions</b></p> <p>14:35 h <b>Compensation pools and compensation agencies – ways to ensure long-term sustainability of compensation</b> Mr. Martin Szaramowicz, Flächenagentur (= compensation agency) Brandenburg</p> <p>14:55 h <b>Discussion / questions</b></p> <p>15:10 h <b>Coffee break</b></p> <p>15:25 h <b>Summary and outlook</b> Dr. Markus Gonsler, Baader Konzept GmbH</p> <p>15:35 h <b>Final remarks</b> Dr. Claus Peinemann</p> <p><b>Moderation:</b> Kerstin Langer, KOMMA.PLAN, München</p>



## 9.1 Presentations at the international CODE24-workshop at the Verband Region Rhein Neckar, Mannheim

### 9.1.1 “Case studies implementing ecological compensation in Italy: legal context, obstacles and potentials” - Dr. Carlo Rega (Politecnico di Torino)

Carlo Rega holds a M.Sc. in Environmental Engineering (Polytechnic University of Milan, 2002) and a PhD in spatial planning and local development (Polytechnic University of Turin). He is currently working as post-doctoral research fellow at the Interuniversity Department of Regional and Urban Studies and Planning (DIST) at the Polytechnic University of Turin. His research interests concern the relation between spatial planning and the environment, with particular reference to environmental assessment theory and practice, spatial analysis, ecological modeling and governance issues. He also works as external consultant for regional and local authorities on spatial planning and environmental assessment.

#### Introduction in the theory of ecological compensation

Theoretically, the issue of ecological compensation is strictly related to the concept of ecosystem services, a rapidly increasing field of research within the Environmental Assessment (EA) domain. Ecological compensation should be a key factor of EA practices and it is increasingly becoming a common practice for large development projects. But smaller projects (the “everyday-impact” like urbanization processes) don’t undergo any environmental impact assessment. A strategic environmental assessment could be a tool with which environmental compensation and offsets could be implemented.

In general, the implementation of ecological compensation bears the following problems:

- treating the environment as a “stock of natural capital” does not sufficiently describe the dynamics and relations within the environment as well as the cultural, spiritual and recreational values (dynamic character and replication time of the environment is not considered)
- a spatial polarization between high value areas and highly degraded areas can provoke economic and social problems
- problem of defining values for the environment since the environment serves different interests and thus the same area has many different values
- problem of trade-off also within the environment

#### Legal background

Unlike other EU countries, in Italy there are no established schemes for ecological compensation. Transposing the European Environmental Impact Assessment (EIA), the Strategic Environmental Assessment (SEA) and Habitat Regulation Assessment Directives, the national law regulates the realization of compensation but doesn’t specify any implementation methods or schemes (except Forestry, where compensation measures are well established).

A positive development was the last amendment of the national decree that has increased the binding power of the “reasoned opinion” issued by the competent authority on SEA. The “reasoned opinion” concludes the SEA process and often prescribes compensation and mitigation measures. As prescribed in the SEA, environmental procedures are shifting to external authorities.



However, except for large infrastructures or national programs, competences on plan-making is generally given to single regions, so the picture is highly fragmented and diversified among the 20 Italian regions. Administrations and especially municipalities are not used to ask for ecological compensation and are more focused on economic and social compensation.

### **Worst case example**

The Case of the Turin-Lyon high-speed line crossing the Valley Valsusa, a highly urbanized and very narrow valley (railway, motorway) is a bad example for compensation planning. There were severe protests during the construction of the high-speed line. Even 10 years after the initial project planning, compensation measures were still not in place. Efficient compensation should be preventive and integrated in the project and not an ex-post practice.

### **Good examples**

#### Park of Balossa

Developments in the surrounding municipalities of Novate, Milan and Cormano finance compensations in the Park of Balossa (147 ha), based on a methodology called ‘ecoconto’ resembling the German ‘Ökokonto’. Before, the park had an average ecological value. Through vegetation equipment counting as compensation measure it has been significantly improved. The pool areas (the Park) are public and the project is principally voluntary.

#### Dorsale Verde Nord (Milan Province)

The Northern Greenway is a system of green areas covering more than 29.000 hectares between the Adda and Ticino Rivers (65 Km) in the northern part of the province of Milan. The project aims at creating a network of green urban areas, peri-urban areas and agricultural areas. It is a strategic project which includes all areas in one system and thereby contributes to the implementation of the Regional Ecological Network. The project provides and defines suitable areas for compensation (both public and private) and it proposes very detailed compensation measures.

#### Territorial Plan of the Province of Turin

In Italy the provincial level has competences on provincial roads, which contribute significantly to the amount of the total linear infrastructure in Italy. The new provincial plan of the Province of Turin establishes that any soil loss derived from linear infrastructure shall be compensated. Suitable areas for compensation in the Provincial Ecological Network are indicated in the plan. So, compensation is part of the binding rules of the territorial plan of the Province of Turin.

### **Future trends**

The empirical investigation and the examples mentioned above demonstrate that the significance of ecological compensation rises in Italy, despite the lack of a well established normative context.

The main problem in Italy is the identification of available areas for compensation and the ownership of suitable compensation sites. There are 4 possible situations (see also Pileri, 2007):

- areas are owned by public bodies (municipalities etc.)



- areas are transferred to the public by means of expropriation or negotiation
- areas are acquired by the developer
- what if public areas and acquired ones do not suffice to implement effective compensation?

What can be done in the current legal framework in Italy to solve this problem of insufficient available sites for compensation? One possible solution is to pursue an alliance with the agricultural sector and to involve hereby private land owners.

Since private owned agricultural areas are the real “pool areas” for compensation in Italy (especially in the Po Valley), the implementation of compensation measures within agricultural land would be reasonable. Areas for compensation do not necessarily have to be transferred to the public but may be maintained by farmers. Through the use of contracts between a public body (e.g. the municipality), the developer and the farmers, compensation schemes may be implemented. The idea has basically the same rationale as the Agri-Environment Schemes (AESs) and Integrated Compensation Measures (ICM): developers would pay farmers, owning suitable areas for compensation, for carrying out certain measures such as

- tree plantation and hedgerow plantation/restoration
- creation/maintenance of wet areas
- conversion of arable land to permanent grasslands
- set-aside of current agricultural production
- application of integrated/biological pest control
- opening up areas to the public (for leisure).

### Summary

In the Italian context, a number of factors are currently limiting the implementation of ecological compensation measures to offset negative impacts deriving from urban development or the building of infrastructures. The main shortcoming concerns the lack of a clear and binding normative frame. However, recent experience demonstrates that sound ecological compensation measures can indeed be implemented if negotiated and cooperative win-win schemes are put into place. The idea is that the agricultural sector should be more deeply involved in compensation planning. The management of compensation sites could follow the rationale of Agri-Environment Schemes (AESs) as implemented in the frame of the EU structural Funds. This may ease the identification of compensation areas and it is strongly in line with the new direction for agriculture in the EU envisaged by the new Common Agricultural Policy towards 2020.

### Discussion

The discussion reveals that the combination of agricultural land use and ecological compensation still remains a proposal in Italy. There is no experience in the application of this idea in relation to larger infrastructure projects but only to smaller urban development projects. The plan is to implement the combination of agricultural land use and ecological compensation into the land use plans and to involve the farmer associations to reach the local level. Especially the farmers are already experienced with the approach because it's similar to AES (Agri-Environmental Schemes) of the EU, meaning that an existing scheme would just be extended.



### 9.1.2 “A park for the never-ending city”: Environmental impact compensation of Autostrada Pedemontana Lombarda – Arch. Barbara Vizzini (Autostrada Pedemontana Lombarda - APL)

Mrs. Barbara Vizzini is a designated architect specialized in urban planning and landscape studies and has more than 15 years of experience concerning impact evaluation of big infrastructures on environment and landscape, such as high speed railways and motorways. In this sector, she has been involved in planning and design of the mitigation and compensation measures.

Since 2007 Mrs. Vizzini has been the head of the environmental department in Autostrada Pedemontana Lombarda Company.

#### Planning of Autostrada Pedemontana Lombarda

The project of the Autostrada Pedemontana Lombarda (APL) is planned to be finished in 2015. The estimated traffic on Pedemontana motorway will be about 65.000 vehicles per day with Milan as its main origin/destination area. The proposed 87 km route lies within a densely urbanized area and connects the two main regional airports: Malpensa and Orio al Serio.

The Pedemontana project applies a participatory planning methodology which is flexible enough to involve the numerous different factors that have to be considered. The compensation planning of a large infrastructure demands complex frameworks since a diverse geographical and environmental territory is affected. The lack of strict laws about compensation management and the fact that only vague standardizations exist is problematic for the planning process. In addition to that, the project has to adhere to fixed time tables and costs. Nevertheless, due to long-standing relationships with various parties in the region and an intensive communication process with numerous municipalities, a mutually agreeable decision on the motorway project as well as on the compensation measures was possible.

The new national law “*Legge Obiettivo*” (L.443/2001) sped up national infrastructure projects which have been included in a national strategic program list and gave a “turning point” for the project. All the decision makers (ministers, regions and provinces) are brought together to form CIPE (*Comitato Interministeriale per la Programmazione Economica* - Interministerial Committee for Economical Planning). This committee allowed the simplification and the speedup of the approval procedure since only one approval from a single committee was needed.

The Environmental Impact Assessment procedure started in 2004 with the preliminary project. The CIPE approved the project with a list of 400 specific requirements. One requirement was the implementation of a compensation analysis method, which should align the different motorway typologies (such as tunnels, trenches, embankments, bridges) with environmental features. Thus, a specific matrix was elaborated to combine the impact effects of the typologies with effects on the territory (land use, green corridor interruption, landscape interference, view interference, air quality and noise). The main goal hereby is the quantification of the residual environmental impact (beyond the mitigation) in order to fairly distribute the environmental budget for the compensation measures. The entire budget for the compensation is 100 million €, which is 3% of the total cost of the project.

Usually, in Italy the money for compensation measures is given to the municipalities and often it is unclear how to invest the money. The idea for the Autostrada Pedemontana Lombarda (APL) is to compensate the environmental impact with environmental projects, which is a new approach in the Italian context.



### **The ecological project of Autostrada Pedemontana Lombarda**

The Lombardy ecological system is structured with parks and fluvial ecological systems in a north-south orientation. The east-west ecological connection is greatly reduced and very weak, because of the urban areas. The motorway will occupy this east-west corridor. The basic idea of the APL ecological project was to strengthen the ecological connection in order to enhance the local environmental potential. A so called “greenway” is created: a locally designed metropolitan park built up of several green parks of 320 hectares with 45 local projects and crossed by a 90km cycle path. Specific measures are for example:

- the creation of new woodlands to enhance the existing forests or to create stepping stones in the east-west ecological corridors
- preserving land from urbanization
- improvement of the rural landscape and connection of the greenway with local cycle paths

### **Sharing the ecological project – Public acceptance**

The compensation idea of APL was shared with all the main stakeholders involved. In 2007 a “Masterplan” was prepared and discussed in many public meetings with municipalities, parks, local communities, local agricultural and environmental committees and local environmental committees. Occurring proposals of different involved stakeholders were considered and, if possible, integrated in the development of the compensation project.

For example, some municipalities of very densely urbanized areas had themselves plans to protect the borderline rural areas (in one case they wanted to create a local agricultural park). In those cases, the environmental budget coming from APL could start up a self generating cycle for the local communities to preserve their own territory.

Another approach is to buy the land and give the property to the municipalities whilst keeping the agricultural uses. Therefore agreements and cooperations with the local farmers are needed. This ensures long term agricultural land use and its ecological function as well as the preservation of the land from further urbanization.

Since the definitive approval of the project by the CIPE in 2009, the APL Company has to deal with the delicate compulsory purchase process facing the concerns of the farmers. In 2009 the APL Company received about 20.000 objections from land owners, 45% concerning the compulsory purchase for the compensation works. The compulsory purchase for the motorway is much more accepted than for compensation land, especially if the land has an agricultural value.

### **A participatory planning example: a cooperative process to create a valuable public park**

This cooperative example represents one preliminary compensation project which has been developed by considering the suggestions and requests coming from the concerned municipality and Province.

The specific area has been an abandoned borderline area for a long time and the land use has been beyond the municipality's control. The three municipalities involved decided to allocate more financial resources than they will receive from APL to create a better public park. With this project the parties are willing to improve



the area, combining the public use of the commercial area connected to the motorway with a public park and the greenway.

## Discussion

The discussion reveals that the relation in between impact and compensation is in Italy compared to Germany less stringent and there are no clear schemes and methods for compensation. The planning of compensation is more flexible and free which also means that larger and coherent compensation measures can be realized. For example the unique requirement for the APL ecological project was the evaluation of the residual impact beyond the mitigation and the compensation of it. Because the APL ecological project is the first real ecological compensation project within a larger infrastructure project in Italy, there are no clear methods and rules in place.

In the APL project, the planning of the motorway is prior to the compensation planning. As a result, the compensation project always follows the highway project, which is quite problematic.

The project affects NATURA 2000 sites and species of the EU Directives. The habitats and species along the corridor were inventoried and a monitoring until 2020 will be supervised by the ARPA Lombardy (environmental agency of the region). Nevertheless, no distinct measures for compensation this impact were mentioned.

On the consideration of agricultural areas for impact compensation can be mentioned that there is a potential for the protection of environment within the agricultural land use. But because of many complaints of farmers it will be hard to find a solution. A constructive dialogue with farmers and farmer associations is necessary.



### 9.1.3 “Ecological compensation and railway projects in Switzerland” - Laurence von Fellenberg (Federal Office for the Environment – FOEN, Bern)

Mrs. Laurence von Fellenberg is working as a scientific collaborator at the Federal Office for the Environment – FOEN (*Bundesamt für Umwelt – BAFU*) in the Species, Ecosystem, Landscapes division and is a designated forestry engineer. Being a former employee of the Swiss Federal Railways, she is now in charge of the environmental concerns of railway infrastructure in Switzerland.

#### Legal background

It is a federal task to ensure the management and preservation of protected sites or sites deserving protection. The Ordinance on the Protection of Nature and Cultural Heritage (NCHO) lists and defines protected biotopes and species.

Federal Act on the Protection of Nature and Cultural Heritage (NCHA):

- Art. 3: Obligations of the Confederation and cantons
- Art. 6: Importance of inclusion in an inventory
- Art. 18: Protection of animal and plant species

Ordinance on the Protection of Nature and Cultural Heritage (NCHO):

- Art. 14. par. 3: Biotope protection
- Art. 20 par. 1 and 2: Species protection
- Annex 1, 2, 3

The hierarchy of impact compensation that has to be maintained is

1. protection and avoidance
2. restoration and compensation
3. replacement

In Switzerland only protected areas which are in communal, cantonal or national inventory or protected biotopes and biotopes deserving of protection have to be compensated.

The replacement of biotopes has to be suitable concerning area and value of the impacted site and a long term conservation of the compensation area is necessary.

How to know in practice, which area has to be replaced?

- Check the federal, cantonal and communal inventoried sites (GIS)
- Ascertainment of biotopes and species
- Appreciation (protected biotopes, biotopes deserving of protection)
- How much of the area is protected or deserving of protection?
- Estimation of the natural value?
- Balance of measures (qualitative and quantitative) (*Maßnahmenbilanz*)

In railway construction projects the extensive maintenance zone which flanks the track area on both sides is often used for compensation measures. Therefore the railway company buys the needed grounds.

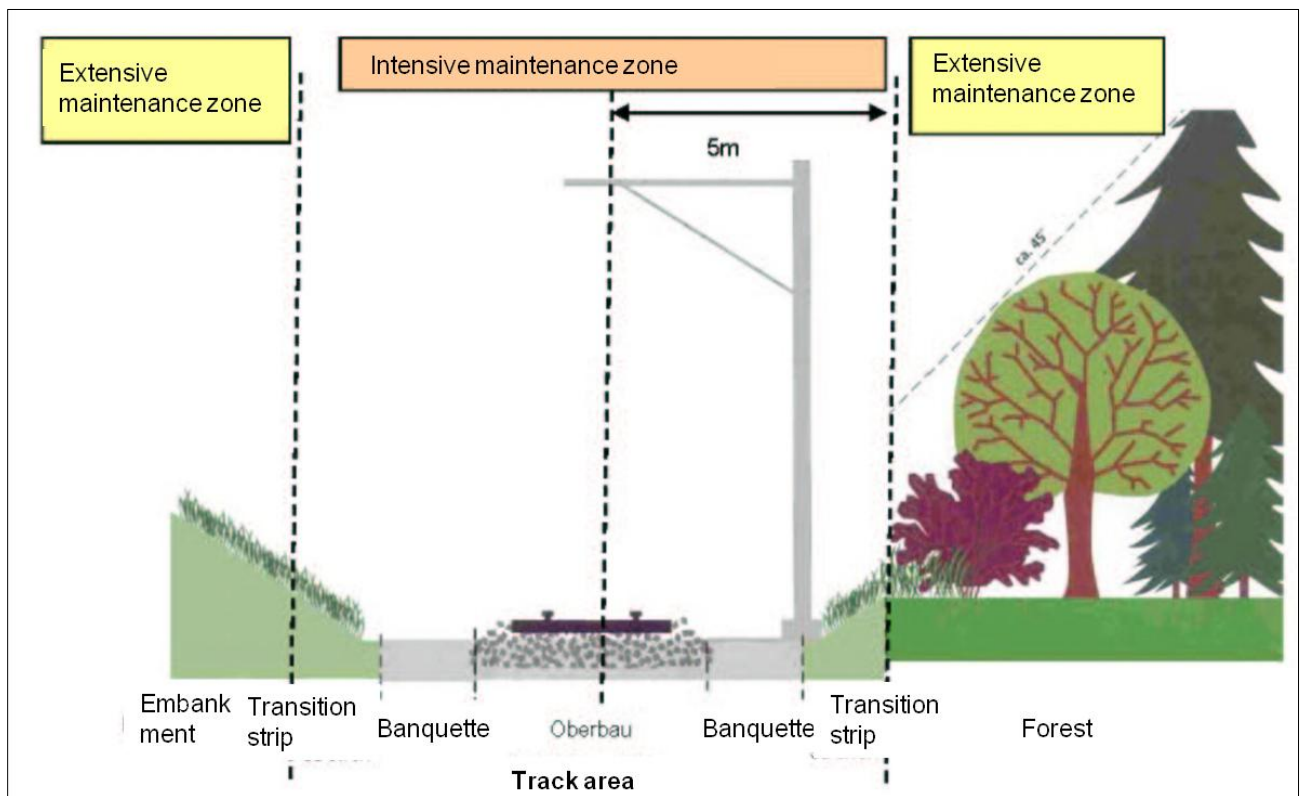


Illustration 7: Classification of the track area

The following types of compensation measures are possible:

- Construction of new railway embankment with ruderal area or poor grassland
- Construction of biotopes for reptiles to improve the connectivity of the embankment
- Revitalizing of streams
- Integration of small structures for small animals in the embankment
- Plantations of hedges

For each project a landscape management plan is realized which lasts for at least two years (5-10 years for larger projects) after the termination of the project. This guarantees the maintenance of the measures.

### Examples

Construction of a new railway line between Mattstetten and Rothrist

The railway company bought 50m left and right of the railway line for the new trackage, the compensation measures and the afforestation. The old railway line is filled with gravel to accelerate the colonization of plants (counts as a compensation measure in Switzerland) and small structures for reptiles were installed. By a service level agreement with the cooperative society of the consolidation of land Mumenthal, the Swiss Railways are obligated to assure the maintenance, husbandry and compensation for charges of use (*Nutzungsauflagen*) for 25 years. In one area (Brunmatte) the Swiss Federal Railway is responsible for the



maintenance of the sites but the ground still belongs to the farmers and they are paid for the maintenance (*Dienstbarkeit*).

Connectivity across the wildlife corridor “Dosso di Taverne”

The construction of the new “Ceneri base tunnel” bears a lot of excavated rock which is used to build a landfill in Sigirino. One part of this new landfill is situated in a national wildlife corridor and worsens the connectivity of the corridor. To improve the connectivity, a number of measures including a wildlife bridge are planned. In this example the ground does not belong to the Swiss Railway Company.

The compensation management in this project is a good example for the synergy between the canton and the railway company since tasks which by law have to be realized by the canton are financed by the railway company.

### Conclusion

Railway embankments are precious straight line elements and extensively maintained areas within an intensively used landscape. They can contain important elements and structures for the ecological connectivity. One main goal is to integrate the railway line into the landscape.

A new idea in Switzerland is to make an inventory of the railway embankments regarding their ecological value and to identify ecological hotspots. Afterwards potential valorization measures in or near the hotspots can be defined and achieved, which could be taken into account as a compensation for future projects. Thus, a pool of accomplished compensation measures could be created.

### Discussion

The discussion reveals that the FOEN tolerates the fact that investors as e.g. the railway company pays for measures which by law have to be realized by the canton. This is practicable since it is more favorable to realize measures with money of investors instead of not realizing the measures at all.

Furthermore, compensation measures occur in railway projects on linear structures close to the railway site. Because of the high pressure of land use in Switzerland compensation planning on railway embankments is realized in terms of extensive use of the embankments. Investigations prove the high ecological value of these measures for several endangered species. In Germany, however, compensation sites can be several kilometers away from the impact site. They have to be put into a place within the same natural region.



#### 9.1.4 Cooperative solutions with regional stakeholders: maintaining agricultural land use and revaluing agrarian biotopes through integrated compensation measures - Catharina Druckenbrod (Association of Rural Development Thuringia)

Catharina Druckenbrod studied Landscape Ecology & Nature Conservation at the University of Greifswald. She is now the project leader of the project “Implementing integrated compensation measures in the state of Thuringia” funded by the German Environmental Foundation (*Deutsche Bundesstiftung Umwelt*) at the association of rural development Thuringia (*Thüringer Landgesellschaft mbH*).

##### Introduction

Major problems of compensation management are insufficient compensation measures, the lack of suitable sites and the loss of agricultural land. One possible solution to encounter these problems is to integrate compensatory measures in a running farming system by applying extensive land use. An integrated compensation measure (ICM) consists of long-term agricultural land use under specific (nature conserving) restrictions whereby nature and habitat qualities should be enhanced. Especially endangered open land species benefit from the adaption of farming measures. The farmer changing from intensive to extensive land use is paid for the difference in the yield by an investor. The measures are monitored and accompanied by biologists/ecologists and have to be accepted as compensation by the nature conservation authorities. ICM are a cooperative way of compensation management since the participation of regional stakeholders is required.

ICM are similar to the agri-environmental measures (AEM) of the European Union but there are three major differences:

- the specific restrictions for ICM are defined jointly by authorities and farmers and are thus more adapted to the needs of the farmer; this results in increasing willingness to cooperate
- exceptions are possible within ICM (e.g. application of herbicides), thus more flexibility for the farmers
- ICM last for 20-30 years

ICM can consist of, for example:

- developing a habitat for arable weeds
- developing a habitat for red kite or hamsters
- developing flower strips as habitat for farmland birds, rabbits, partridges, insects
- protection of farmland birds
- organic farming (can be a compensation measure, according to the regulations of the EU)

##### Legal background

The German impact mitigation regulation requires a functional relation of impact and compensation measures. Since it is proven that most of the impacts affect open landscapes, the functional relation of impact and ICM is usually given. Furthermore, the German Federal Nature Conservation Act (§ 15 III) underlines that for impact compensation, an adaptation of maintenance- and management measures is favorable instead of minimizing agricultural land. For this reason, ICM are in line with the current German nature conservation legislation.



## ICM project in Thuringia

A current project in Thuringia is testing ICM by applying them and evaluating the legal and economic aspects as well as the acceptance of stakeholders and farmers. Having started in March 2011, the project will be funded during 18 months from the German Federal Foundation for the Environment (*Deutsche Bundesstiftung Umwelt* - DBU). The ministries for agriculture and nature conservation as well as farmer associations are involved in the project.

A major challenge during ICM-application seems to be the integration of ICM on a regional level, or more specifically:

- to fit the ICM to the regional method for biotope mapping and evaluation (*Biotopwertverfahren*)
- to clarify the relation of agri-environmental measures and ICM – in Thuringia AEM can be restored by ICM since the avoiding of intensive use can be evaluated as an enhancement (only in Thuringia)
- the skepticism of farmers: many farmers did not believe that they would still receive the single farm payment (*Direktzahlungen*) - it is possible to receive single farm payments and the money for ICM for the same site (which also means that ICM are less expensive!)

Nevertheless, until now the testing of ICM mostly got positive feedback. There is a great interest for ICM coming from farmers, investors, as well as nature conservation and agricultural administration. In more dense areas, as e.g. the Rhine valley, farmers would show a similar interest for ICM due to the limited availability of arable land.

## Practical Examples

### Example 1:

A farmer built a new stable and compensates his own impact by suggesting a site for ICM. Since the site was suitable for the protection of endangered weeds, measures were developed in cooperation with the farmer (reduction of the sowing rate, no usage of herbicides and mineral nitrogen fertilizer and fallow land as part of the crop rotation) and monitored. The realization of ICM was in this case financed by the farmer himself. The nature conservation authority accepted the compensation measures.

### Example 2:

New wind energy plants affecting the red kite were compensated by developing a feeding habitat for the red kite through different harvesting dates in Lucerne fields and abandoning the usage of rodenticides. A lease agreement ensures the area for the period of the measure and a contract between investor and farmer (farmer receives payment every year) finances the measure. The measure was developed in a cooperative way involving the investor, the local nature conservation authority and the farmer.

## Conclusion

ICM mainly focus on sites with marginal agricultural yield. Developing ICM on those sites means an increasing income for the farmers whose interest consequently rises. Hence, the interest and motivation of the farmer for developing ICM can ease the process of finding adequate sites for ecological impact compensation.

One main advantage of ICM is the fact that the land can remain in farmer's hands and the agricultural land remains in agricultural use. Especially the endangered farmland flora and fauna can benefit from ICM.

In conclusion, ICM is a legal way of ecological impact compensation and an opportunity for nature conservation and farmers. Furthermore, public acceptance rises since the important cooperation between farmers and nature conservation is strengthened.

## Discussion

The discussion reveals that the ICM seems to be not only a possible solution for small but also for major infrastructure projects, but it lacks in experience. Further all farmers can benefit from ICM. Especially on large farms there are certain areas of marginal significance for land use, suitable for ICM. Hence, not only farmers who are interested in nature conservation anyway realize ICM.

Another point of the discussion was the continuation after the fixed contract duration of 25 – 30 years. It was pointed out that it isn't possible to plan ICM for infinite times. The goal is to focus on feasible compensation strategies and to preserve the options for future farmer generations.

The amount which is paid to the farmers for ICM is calculated from the difference in yields, the costs for administration and for the planning of measures, its realization and monitoring. A certain percentage of the amount is fixed for the loss of yield over 30 years.

Finally it was mentioned that the application of ICM saves the costs for buying sites and the maintenance of measures is ensured through integration of measures in land use plans. ICM are a feasible compromise.

### 9.1.5 Compensation pools and compensation agencies - Martin Szaramowicz (Flächenagentur Brandenburg GmbH)

Mr. Martin Szaramowicz is holding a degree in Landscape Planning of the Technische Universität Berlin. After having worked as a research assistant at the Potsdam University and the Helmholtz Center for Environmental Research in Leipzig, he is being project leader at the Compensation Agency Brandenburg (*Flächenagentur Brandenburg GmbH*) since 2006/2007 and has a vast practical and theoretical experience in all fields relevant for the impact regulation principle. He has been (co-)author of several books and articles on impact regulation, compensation pools and agencies on the international and national level. Furthermore, Mr. Szaramowicz is a board member of the Federal Assembly of Compensation Agencies in Germany (*Bundesverband der Flächenagenturen e.V.*).

## Introduction

Major aims of all experts involved in compensation planning are to find coherent sites, effective measures, visible (real) effects and real habitat improvement. Another factor of crucial importance is the sustainability of compensation measures.

Compensation pools are an instrument to guarantee sustainable compensation measures and compensation agencies are the competent managers of those pools.

### Compensation pools and Compensation Agency Brandenburg

There is no standard definition for "pool". The expression 'pool' describes

1. a collection of sites or catalogs of possibilities or



## 2. a coherent large area (Compensation agency Brandenburg is focusing on this type of pool)

The “Flächenagentur Brandenburg” is a certified compensation agency with certified compensation pools and measures (certification is realized by the Ministry for Environment according to the decree of compensation pools (*Flächenpool-Verordnung*). The agency exists since 2002 and is a privately owned company with one single owner – the Nature Conservation Trust of Brandenburg (*NaturSchutzFonds Brandenburg*). In case of occurring profits, the agency could either reinvest the money or give the money to the owner who would also invest the money in nature conservation projects.

The main task of the agency is to find, acquire and manage sites for compensation. Therefore, the agency offers “one-stop solutions” for investors or planning offices and cares for the maintenance of the sites fixed through a treaty between agency and land user. The investor can pursue the authorization procedure of his project and saves precious time and energy.

The best way to guarantee the sustainability of compensation measures is to purchase the land for the nature conservation trust. If this is not possible, management schemes are fixed in the cadastre (*Grundbuchsicherung*) or lease contracts (*Pachtverträge*) are signed. Nevertheless, land ownership is the best way to develop continuous compensation measures since it allows managing the site in an adapted way (water level, hunting etc.). Most of the purchased sites were under agricultural use and they mostly stay in agricultural use. The agency signs management treaties with the farmers fixing the kind and frequency of land use and the amount of money that is being paid to the farmers on an annual basis. Sometimes it is simple to get coherent sites but it can also be difficult to bargain the land if there are many different small ownerships. Latest developments of biomass cultivation tighten this problem.

The agency provides compensation pools (e.g. renaturation of streams or wetland) of about 250 hectare distributed onto different natural areas (in one example, a 70 ha pool combines 20 different investor parties). For the measures only seeds and plants of regional origin are used.

The German Assembly of Compensation Agencies is responsible for lobbying, public relation and the organization of at least one conference per year in order to exchange experiences among compensation agencies. The Assembly published a list of quality standards for compensation agencies which should be retained during the work of such agencies:

- Ecological improvement
- Long-term stewardship and site management
- Documentation / monitoring
- Integration into regional plans and strategies
- State of the art planning quality.

## Discussion

The discussion reveals that the monitoring of the compliance of the farmers is part of the long-time stewardship that includes managing and maintenance including hunting and water management. The costs for the long-time stewardship are 1/4 to 1/3 of the total cost. Concerning the integration of general landscape planning in compensation planning, Mr. Szaramowicz mentions that prior to starting a project, the landscape

plans are studied by the compensation agency. In most cases the plans are not detailed enough. Landscape plans would need to be more precise about aims and recommendations for distinct areas.

By law, impact and compensation pool need to be in the same natural area. But anyway, a county usually doesn't like the fact that an impact of another county is being compensated on his land. So in practice, the political borders need to be considered as well.

In Brandenburg, the functional relation between impact and compensation measure is assured by focusing on general functions e.g. of soil or water. Brandenburg has no distinct model of biotope points.

Concerning the application of compensation pools in the Rhine-Main area the transformation of land uses and integrating different environmental aims in existing land use schemes are most interesting according to Mr. Battefeld. Furthermore, an infrastructure along the Rhine valley will have impacts on large forested areas and NATURA 2000 sites. Consequently, in order to keep the requested functional relation between impact and compensation, coherent compensation measures for forest and forest habitats need to be developed. Public authorities owning forests in the concerned regions will be willing to apply measures in their forests since they know that this would be a valuable amelioration. Another possible solution could be financial compensation which is also feasible in forest law. The deriving money could be used for amelioration of existing forests areas.

#### **9.1.6 “Highway projects and nature compensation in the Netherlands” - Edward de Boer (Bureau Waardenburg, Culemborg)**

Edward de Boer works as senior advisor in ecology in the consultancy Bureau Waardenburg in Culemborg. Bureau Waardenburg is an research and advice consultancy specialized in ecology, nature, environment and landscape design. Mr. de Boer is specialized in impact assessments and ecological management and protection plans. He also participates in the development of plans for development of rural areas, emphasizing on nature and landscape.

Edward de Boer presented a practical approach for ecological compensation on the example of the expansion of the highway A12 in the Netherlands. This large project was split up into several smaller projects. The Consultancy for ecology in Waardenburg treats one of those subprojects in terms of landscape and ecological compensation management.

#### **Legal background**

The most important regulations for ecological compensation in the Netherlands are:

- The *Natuurbeschermingswet* (Nb-wet) regulates the habitat protection and implements the Birds and Habitat Directives and other conventions of the EU
- The *Flora- en faunawet* (Ffw) regulates the protection of species
- Planning sector: the ecological main structure (*Ecologische hoofdstructuur* EHS) is carried out on regional level through nature conservation plans and regional plans

Ffw and EHS are applicable all over the Netherlands, whilst the Nb-wet is only relevant for Natura 2000 sites and other special designated sites.

The main authorities being in charge of ecological impact compensation are:



- Ffw: Ministry of economic affairs, agriculture and innovation (Ministeries van EL&I), (the State)
- Nb-wet: Largely provinces, exceptions by Ministry of economic affairs, agriculture and innovation (Ministerie van EL&I) and Ministry of infrastructure and the environment (Ministerie van I&M)
- EHS: Provinces

In order to determine the need for compensation measures, the ecological effects of the project on protected species (Ffw) and habitats (Nb-wet) as well as the affected EHS-areas are evaluated and analyzed. In first place, negative impacts need to be avoided as far as possible through adaption of technical planning etc. Secondly, the unavoidable negative impacts need to be minimized as much as possible. The residual negative impacts have to be determined concerning quality and quantity and have to be compensated appropriately through e.g. creation of new suitable habitats etc. If an EHS-area is concerned, the habitat quality needs to be improved elsewhere in the Ecological Network in order to maintain quality. Barriers need to be prevented (defragmentation measures through ecoducts, wildlife tunnels, etc.) and negative effects on the landscape will be eliminated.

One special issue in the Netherlands is the very high background nitrogen deposition, which can have extra-negative effects on habitats. Thus, the minimization of nitrogen deposition deserves a special interest through the so called N-plan within the Nb-wet.

#### **Highway A 12 Maarsbergen – Veenendaal: Ecological impact compensation**

Within the treated investigation area of the highway A12 several protected species were found and some EHS areas exist. Therefore compensation measures are or could be:

- the addition of land to the EHS
- the maintenance or recreation of habitats and reproduction places within the EHS
- prevention of barriers: an ecoduct for the highway and the railway is going to be built as well as several smaller wildlife passages
- there are some estates, which are suitable for the creation of special landscape structures increasing biodiversity
- another idea is to use old defense lines as compensation areas

In general, a possible way to encounter the problem of finding adequate sites for ecological impact compensation is to try to combine offset measures

- with other initiatives
- with compensation statements from other interventions
- within the various components of the project itself.

The following discussion reveals that the combination of compensation measures is practiced but not common. A more integrated plan where compensation measures are within the infrastructure, like the regional park idea, would be useful.

#### **9.1.7 Nature Compensation in the Netherlands – Examples and latest developments - Hans Leermarkers (Government Service for Land and Water management, Utrecht)**

Hans Leermarkers is project leader of nature compensation projects at the Government Service for Land and Water management (*Dienst Landelijk Gebied* – DLG) in Utrecht. Mr. Leermarkers manages several projects on

nature compensation for the construction and widening of Dutch highways. For the workshop he is accompanied by Edo Dijkman, account manager for DLG and also familiar with nature compensation. The presentation treats ecological compensation in the Netherlands in general with a focus on the latest developments in the Dutch compensation policy and gives two practical examples.

### Legal background

In the Netherlands there are four different regulations for nature compensation:

- the Forest Act prevents the reduction of forest acreage (every felled tree has to be replaced)
- the Flora and Fauna Act cares for the protection of species (thus the presence of species has to be investigated)
- Natura 2000 areas, where the compensation must take place before the project is realized
- Designated areas for the Ecological Network (EHS), where compensation may be realized after the project.

First of all, the initiator of a project should always investigate whether the project will have a negative impact on nature. If this is the case, alternatives have to be researched (avoidance). If there is no alternative, mitigation measures (e.g. construction of fauna tunnels or wild life crossings/bridges) have to be developed. Only if there is no possibility for avoidance and mitigation, nature compensation will be necessary.

If compensation is required, the initiator must have a compensation plan (including measures and management) which must be approved of the competent authority (Province). The nature value that is harmed must be restored with the same amount of hectare (sometimes there is even a surcharge). In order to do so, so called 'search areas' have to be collected which have to be suitable for the target species of the damaged land and should be close to the project. In most cases it is necessary to possess the land before the project is drawn up. The costs for land purchases and construction are borne by the initiator and he is responsible for the management. Since the purchasing takes place on a voluntary basis and there are no measures to expropriate owners in the Netherlands, the search areas have to be about three times larger than the areas required for compensation.

The maintenance of the compensation is usually required for 10 years on average. In most cases the initiator transfers the management to land management organizations or private owners. In this case the private landowner is paid 80% of his land value and a fee for managing the site (treaty between landowner and initiator). One hectare of compensation site costs approx. 60.000-80.000 €, the management of one hectare ranges from about 100-4.000 €. After the first 10 years of managing and maintenance, the owner or organization that is responsible for nature conservation is paid by regular funding sources.

### Example 1: New Highway A4

The new highway A4 is an important link between the ports of Rotterdam and Belgium and the south of Europe. Most part of the project is in agricultural use. The compensation task is 44 ha (18 ha forest and 26 ha flowery meadow). Five different search areas were determined in the compensation plan and information sessions for landowners had been held in these areas. Additionally, all the landowners were visited individually to identify whether they wanted to sell or exchange land. Because the purchased sites were not on the most suitable places, a number of owners exchanged parcels – so the farmers and the compensation areas



could get a better parcelation. The process of land purchase is on a voluntary basis and was thus intensive and time consuming – after 3 years 35 ha were purchased. After this process a development plan for each location has been drawn up and various investigations were required to optimize the plans such as soil quality, archaeology, explosives and phosphates. Subsequently the plan has been technically worked out and the necessary permits have been applied for. Finally, the zoning plan of the municipality specifies the nature use for the future protection.

### Example 2: Canal Zuid-Willemsvaart

The new canal Zuid-Willemsvaart will have a length of 9 km around the city of 's-Hertogenbosch. This project affects the habitat of badgers, bats and birds. In this example mitigation measures were the construction of badger tunnels and the expansion of approximately 30 habitats at another location (by linking existing habitats).

The land needed for the compensation was provided through agreements with landowners to converse from agricultural use to nature. Most of the sites were narrow strips of 15 m on the border of the parcels. The landowners receive 85% of the agricultural value and a management fee of 1.370 € per hectare and year.

### New developments in the Netherlands

There are substantial cuts of the nature budget in the Netherlands and thus EHS realization and other nature targets are under pressure. These cuts demand creativity to achieve the best effects as possible with the residual scarce resources - ecological compensation could contribute to this aim.

In current regulations for environmental compensation a debate appears about the principles of “compensation in the vicinity of the operation” and “compensation of similar nature”. Both principles can lead to delay and/or non-implementation of the environmental compensation. Furthermore, they do not always lead to optimal ecological and social benefits of environmental compensation

Therefore it must be investigated (the DLG is currently working on this issue) whether regulations can be changed so that

- nature compensation can be realized where it is ecologically most desirable
- fragmentation of habitats can be prevented
- higher ecological returns can be achieved and
- realization- and management costs can be decreased.

### Discussion

During the discussion it was mentioned that the Netherlands are willing to introduce a compensation plan combining different aspects (e.g. water management and flood preservation) and to look at the project and its ecological compensation on a larger level. In fact, the difficulty of combining compensation plans and other initiatives is the existence of numerous legislations relating to different environmental aspects. At present, there is a new project with the target to consider the infrastructure plan and the compensation plan simultaneously in an integrated plan (*'Gebietimpuls'*). Thereby the land acquisition is realized for the entire project e.g. infrastructure/project, agriculture and nature compensation. The integrated plan should be real-



ized on a regional level meaning that the compensation measures of different sites are put in a regional network. This requires a responsible regional authority.

The existing multiple rules and regulations concerning ecological impact compensation result in declining public acceptance e.g. of farmers.

Concerning densely populated areas with little space for nature, a new green infrastructure with integrated compensation measures could give an important impulse for future nature conservation strategies.



Illustration 8: Impressions from the international workshop at the Verband Region Rhein-Neckar in March 2012



## 10 Expert-Delphi

In August 2012, interim report no. 1 “Management of ecological compensation measures – Current methods and perspectives” was sent by mail to various experts within the newly created network “ecological compensation” of CODE24 in order to offer another opportunity to collaborate in the project and improve the quality of the report.

About 40 experts were included in the so-called “expert-delphi”: workshop participants, experts having answered the questionnaire (see annex 2) and other involved partners were asked to read the report and comment where required.

Especially the workshop participants made use of the situation and commented the workshop documentation. The results of the Delphi are already incorporated in the present final report.



## 11 Toolbox of compensation management

### 11.1 Objectives

A 'toolbox' for a successful compensation management provides different approaches for the process of ecological compensation. Based on part 1 of action no. 5 (see chapter 1 -10), continuous investigations and the information obtained during the regional workshop in September 2013 (see chapter 11.2), approved or promising instruments were selected and will be described more detailed. Serving as an initial information, the toolbox may assist to the transfer of efficient methods of compensation management in larger infrastructure developments affecting multifunctional and intensively used landscapes.

The following chapter 11.2 documents the second workshop of action no. 5 – now with a more regional focus on possible compensation strategies for the infrastructure corridor connecting the two metropolitan areas Rhein-Main and Rhein-Neckar.

As main part of the toolbox, the following six selected 'tools' will be described in detail in chapter 11.3 to 11.6:

- federal compensation decree
- compensation pool
- compensation agency
- compensation register
- integrated compensation measures
- monetary compensation.



## 11.2 Documentation Workshop No. 2

During a regional workshop on September 5<sup>th</sup>, 2013 at the Verband Region Rhein-Neckar in Mannheim, various German experts from Baden-Württemberg and Hessen discussed possible solutions for implementing an efficient compensation management in densely populated and highly used regions such as the area affected by the future high-speed railway connection Frankfurt-Mannheim. After getting a short introduction in the strategic project CODE24 funded by the European Union, central tasks and intermediate results of action 5 “Management of ecological compensation measures” were summed up. Afterwards, four experts of different professional background presented their individual point of view on compensation management and the local issue of lacking available space.

Professor Dr. Werk as the head of the department Landscape Architecture at the Hochschule Geisenheim University and deputy of the federal executive committee of the *Bundesverband beruflicher Naturschutz* (B.B.N; = Federal Association of occupational Nature Conservation) participated in the current evolution of the *Bundeseinheitliche Kompensationsverordnung (BKompVO*; = German Federal Decree on Environmental Compensation) by writing a statement on the first draw of the decree. In his presentation, Dr. Werk considers the chances, risks and needs regarding such a federal compensation decree.

Matthias Mähliß from the DB ProjektBau (subsidiary company of the German Railway company *Deutsche Bahn AG*) is responsible for the internal planning and implementation of compensation measures for the future high-speed railway connection Frankfurt-Mannheim. In his presentation he describes the findings, achievements and expectations deriving from the past six years of intensive planning process.

Matthias Pollmeier is the deputy director of the *Bundesforstbetrieb Schwarzenborn* (= Federal Forests Schwarzenborn) belonging to the *Bundesanstalt für Immobilienaufgaben (BImA*; = Institute for Federal Real Estate). The *Bundesforstbetrieb Schwarzenborn* offers ancient military ground for future ecological compensation and thus, offers an innovative solution to improve the compensation process.

Gerhard Eppler is the president of the *Naturschutzbund (NABU*; = Nature and Biodiversity Conservation Union) Hessen, the regional association of one of the largest German organizations. During his presentation, Mr. Eppler illustrates the requirements on an expedient ecological compensation management for the high-speed railway connection Frankfurt-Mannheim from a nature conservation point of view.

### 11.2.1 Workshop invitation





## INTERREG IV B-Projekt EU CODE 24 Corridor Development Rotterdam-Genoa

**:           Regionaler Workshop zum Kompensationsflächenmanagement-  
Fallbeispielraum Mannheim –Rhein-Neckar / Frankfurt Rhein-Main**

**Verband Region Rhein-Neckar (VRRN), Mannheim  
05.09.2013**

**Programmablauf**

*Moderation: Hr. Dr. Gonser, Baader Konzept GmbH*

10.00 Uhr:     Begrüßung VRRN (Leitender Direktor Herr Trinemeier)

10.15 Uhr:     Einbindung Kompensationsflächenmanagement in CODE 24-Gesamtprojekt, (Hr. Dr. Peinemann, VRRN)

10.30 Uhr:     Kompensationsflächenmanagement entlang des „Corridor 24“ – Zwischenfazit (Baader Konzept GmbH, Fr. Nagel)

10.45 Uhr:     Entwurf/Stand Bundeskompensationsverordnung (Prof. Werk, Hochschule Geisenheim University - Zentrum Landschaftsarchitektur und urbaner Gartenbau)

**Diskussion**

11.30 Uhr:     Kompensationsmaßnahmenplanung bei der Neubaustrecke Rhein/Main - Rhein/Neckar - von der Raumordnung bis heute. Erkenntnisse, Erfolge, Erwartungen (Hr. Mähliß, DB ProjektBau GmbH)

**Diskussion**

12.45-13.30:   **Mittagspause/ Imbiss**

13.30 Uhr:     Grüne Konversion – eine Chance für Großeingreifer (Herr Pollmeier, Bundesanstalt für Immobilienaufgaben, Bundesforstbetrieb Schwarzenborn)





14.15 Uhr:     Sinnvolle Kompensationsmaßnahmen für die NBS Rhein/Main – Rhein/Neckar aus Sicht des Naturschutzes (Herr Eppler, NABU Hessen)

15.00 Uhr:     Zusammenfassung und Ausblick (VRRN/Baader Konzept)

[www.vrrn.de](http://www.vrrn.de)  
[www.code-24.eu](http://www.code-24.eu)



### 11.2.2 Handout



**Für ein verbessertes Kompensationsflächenmanagement in von hohem Flächendruck betroffenen Räumen bedarf es aus Ihrer Sicht:**

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INTERREG IV B-Projekt EU CODE 24 - Corridor Development Rotterdam-Genoa  
Regionaler Workshop zum Kompensationsflächenmanagement-  
Fallbeispielraum Mannheim –Rhein-Neckar / Frankfurt Rhein-Main  
Verband Region Rhein-Neckar (VRRN), Mannheim (05.09.2013)

### Translation of handout

“In areas of high surface pressure, an improved compensation management requires from your point of view:”

### Responses of workshop participants

- Considering the German impact mitigation regulation (*Eingriffsregelung*) (and not CEF- or coherency measures): making use of
  - avoidance and minimization measures
  - eco-account measures
  - large scale application areas as e.g. natural region (*Naturraum*),
- Broad communication with all involved stakeholders at an early stage of the project,
- Making use of integrated compensation measures (ICM) but focusing on a real and durable ecological gain of the measures,
- Harmonizing species conservation measures with the existing eco account system,
- Creating an overall concept for species conservation exceeding the federal state borders (e.g. sand dunes in the upper Rhine valley),
- Up-to-date landscape- and land-use planning taking into account the demographic change,
- Improving transparency of existing farm structures and their future developments,
- Coherent financing concepts,
- Considering the project developer (‘polluter’): a consistent and stringent project planning and -management is needed,
- Improve the communication process (“talk to each other!”),
- Implementation of a nature conservation fund (fed by the money deriving from compensatory payments and supplied with appropriate staff) which is responsible for setting up compensation measures in advance,
- Harmonizing measures being required by the water framework directive (*WRRL*) and those being necessary for ecological compensation, since sites for WRRL are usually available,
- Appropriate tools for financing ecological compensation,
- Flexibility, cooperation and willingness to compromise, especially on the part of public authorities,
- Untighten the regulations demanding a 100 % functional compensation,
- Concentrate on highly endangered species,
- Create possibility to implement species conservation measures in advance,
- Concentrate on „eco-bridges“ (*Grünbrücken*) in order to improve ecological corridors (minimizing fragmentation),
- While seeking for appropriate sites for compensation measures, focus on land owners being open-minded for your ideas,
- Study and record the initial state (species and habitats) of future compensation sites at an early stage,
- Safeguard sites and implement appropriate compensation pools in advance. Provide the required financial means opportunely,
- Also make use of state-owned sites (e.g. Hessen-Forst).



### 11.2.3 Presentations at the regional CODE24-workshop at the Verband Region Rhein Neckar, Mannheim

#### 11.2.3.1 Demands on the new federal compensation decree

##### *Anforderungen an die naturschutzrechtliche Kompensationsverordnung des Bundes* Prof. Dr. Klaus Werk (Hochschule Geisenheim University/ B.B.N)

In general, a federal compensation decree (*BKompV*) would be a benefit for all stakeholders being involved in compensation management: a consistent framework for the evaluation of inventory and impact as well as standardized financial compensation would create uniform conditions and improve the acceptance of ecological compensation.

But the current discussion about the first draft of the German *BKompVO* reveals numerous cruxes of a nationwide compensation decree.

A contentious point for example is whether or not deviations from the *BKompV* should be allowed in favor of distinct industries (e.g. energy branch) and whether or not the *BKompV* should only be relevant for distinct developments as e.g. power line construction. The B.B.N. is against both special agreements.

It is furthermore of crucial importance to retain some regulatory aspects in the responsibility of the federal states (*“Öffnungsklauseln”*) instead of allowing deviances. This represents another crux, taking into account that some federal states (e.g. Hessen) wish to keep their existing compensation decrees, sticking to the known rule “never change a running system”.

From the B.B.N.’s point of view, a broad communication and consultation process also involving the relevant occupational areas, as well as an exhaustive testing of feasibility and capacity of the decree would guarantee success. The primary objective remains to obtain an agreement and to result in an enforceable and stable decree.

#### 11.2.3.2 Ecological Compensation management of the high-speed railway line Frankfurt – Mannheim (Kompensationsmaßnahmenplanung bei der Neubaustrecke Rhein/Main - Rhein/Neckar - von der Raumordnung bis heute. Erkenntnisse, Erfolge, Erwartungen) Matthias Mähliß (DB ProjektBau GmbH)

The planned high-speed railway connection Frankfurt-Mannheim requires compensation measures on about 1000 ha. But in southern Hessen there is no more available ground since the need of space deriving from other realized or planned projects is huge.

The dynamic of the nature conservation regulations represents one problem of the project ICE-trace Frankfurt-Mannheim, the planning having started in 1993. More stringent rules for impact compensation came up with the European Birds and Habitats directive. Besides compensatory needs deriving from the German impact mitigation regulation, compensation tasks result of more stringent European law e.g. on species conservation and environmental damage (Directive 2004/35/EC, in Germany: *Umweltschadensgesetz*). The simple rule: avoidance, minimization, compensation is no more sufficient.

Even though the compensation management was initiated at an early stage of the project, the lack of available sites for compensation occurred. This was due to the discrepancy among original compensation planning and real availability of sites.



Furthermore, the German eco-account system is not applicable on species conservation and coherency measures: there is no legal basis for building stocks of those types of measures.

The experience obtained from years of compensation planning is the following:

- focus should be on large-scale, coherent and ecologically reasonable compensation measures,
- implementation should be planned at an early stage and with a long-term view,
- avoid using third party ground,
- caution with colliding municipal land use-planning and sometimes colliding nature conservation interests,
- eco-bridges as ‘space-saving’ measure.

Keynotes on Best Practice Example ‘Campo Pond’ (large compensation measure for ice-trace FRA-MA):

- compensation pool consisting of species conservation measures was build,
- central points of agreement: 100% state ground, 100% availability of sites, 100% guaranty for implementation and maintenance through *Bundesforst*,
- no purchase of land,
- overall cost = monetary compensation.

### 11.2.3.3 Green Konversion – an opportunity for project developers

#### *Grüne Konversion – Eine Chance für Großeingreifer*

**Matthias Pollmeier (Institute for Federal Real Estate (*BImA*), Bundesforstbetrieb Schwarzenborn)**

Keynotes: *Bundesforstbetrieb Schwarzenborn*

Operational area	Hessen
Total area (fraction open land)	17.000 ha (10.000 ha)
Number of properties	130
Main tasks	Conception and implementation of compensation measures
Offer	Entire properties for compensation species conservation
Clients	Developer of large projects
Current sites for compensation (number properties)	1.600 ha (36)
Remaining potential (number properties)	3.500 ha (38)

‘Green conversion’ describes the civil conversion of former military ground (mostly untilled training areas) in favor of nature conservation purposes. A designation of high value use (e.g. residential or commercial area) is prohibited on those sites.

The *Bundesforstbetrieb* belongs to the *Bundesanstalt für Immobilienaufgaben (BImA)*, the German Institute for Federal Real Estate. Its responsibility is all untilled ground owned by the *BImA* such as forested and open land areas. The *Bundesforstbetrieb Schwarzenborn* discovered a new work field, offering concepts and implementation of ecological compensation measures, always working in close relation to the local nature conservation authorities. Offering entire properties (up to 250 ha) for mainly compensation and conservation



tasks, the *Bundesforstbetrieb* is especially relevant for developers of larger infrastructure projects. Since 130 properties are dispersed all over Hessen, compensation sites are usually available close to the developments.

Currently, an area of more than 1.600 ha is occupied of compensation and species conservation measures.

Even though the name *Bundesforstbetrieb* contains the word ‘forest’, the landowner is mostly active in open spaces, where he implements the main part of the ecological measures. Organization and realization of those measures are the main task of the federal state forest districts (*Bundesforstreviere*). Required expertise is involved through close cooperation with specialized planning agencies, nature conservation administration and volunteers.

At the beginning of a new project a record of initial habitats and a modeling of target biotopes take place. Considering the implementation as well as long-term management and maintenance of the sites, an economic efficiency calculation is carried out. Subsequent to a successful calculation the financial means are released.

The *Bundesforstbetrieb* is aware of the long-term responsibility for maintaining the target habitats and of related financial risks. The financial management of the *BImA* had to adapt to the one-off payment, the long-term saving of costs for maintenance and the risk costs which need to be retained.

Until now, generally positive experiences have been made with the commercialization of ecological compensation measures. Currently, it is considered to enable project developers to make reservations of unplanned properties.

#### **11.2.3.4 Suitable compensation measures for the high-speed railway line Frankfurt – Mannheim from a nature conservation point of view**

##### ***Sinnvolle Kompensationsmaßnahmen für die NBS Rhein/Main – Rhein/Neckar aus Sicht des Naturschutzes***

**Gerhard Eppler (NABU Hessen)**

The planned high-speed railway connection Frankfurt-Mannheim will pass a region of high ecological value, a so called ‘biodiversity hotspot’. Numerous species and habitats of the birds and habitats directive as well as endangered species will be affected by the project through

- habitat loss,
- reduction of habitat quality alongside the railway line,
- fragmentation, isolation, SLOSS and
- loss of individuals (ecological trap, source sink).

Ecological compensation is regulated in different legal frameworks, e.g.

- Natura 2000 (Birds and habitats directive),
- species conservation in terms of §44 of the German Federal Nature and Landscape Conservation Act (*BNatSchG*),
- compensation decree →Eco-account,
- forestry law.

Ecological compensation needs to have a functional, temporal and spatial relation to the harmed component of nature. Problems occur first of all when long-living ecosystems (e.g. forests) are affected by development



(less problematic when pioneer habitats like neglected sand grasslands are touched).

Compensation measures need to result in a real ecological enhancement. Measures being related to negative impacts themselves need to be avoided, adapted maintenance and monitoring are necessary.

#### Current problems related to compensation

- availability of sites and no suitability of available sites,
- colliding interests with agricultural sector, forestry and nature conservation,
- trade-off within nature conservation (afforestation of poor grasslands, enhancement of one species can harm another species).

The NABU criticizes, that often more effort (time, money etc.) seems to be put in the avoidance of compensational obligations than the immediate realization of compensation would have cost (sluggishness of administration).

#### Opportunities of Compensation

- organization of coherent compensation measures by compensation agency Öko-Agentur (Best practice „Ried und Sand“ in cooperation with the German Federal Agency for Nature Conservation (*Bundesamt für Naturschutz - BfN*))
- large-scale impacts require large-scale compensation!
- Integration of compensation measures in existing land use (forestry, agriculture) but: integrated compensation should not mean ‘hidden compensation’ → measures need to be visible and tangible
- concentrate on species suffering from cumulative negative effects (e.g. Red kite as a victim of the transformation of the energy system)
- integration of compensation in existing or already planned species conservation programs
- involvement of public at an early stage results in enhanced public acceptance.

#### Conclusion of the NABU Hessen concerning compensation

- make use of external knowledge (local nature conservation authorities, nature conservation organizations)
- support species conservation programs
- create synergies between conservation of species and habitats
- target species for high-speed railway connection Frankfurt-Mannheim: European Nightjar, forest related bat species, red kite, Yellow-bellied toad, hamster...
- linking-up vs. fragmentation as fundamental idea for compensation of larger infrastructure projects
- support existing regional nature conservation programs (‘Ried und Sand’, Weschnitzinsel, Ökoagentur)
- keep functional relation between impact and compensation
- implementation of compensation prior to construction
- sometimes compensation can consist of maintenance of existing structures (management of ancient meadow orchards etc.)
- compensation measures for pioneer species and habitats (neglected sand grasslands, amphibians etc.)
- process conservation instead of afforestation for some long-living habitats (forests).



Illustration 9: Regional workshop at the Verband Region Rhein-Neckar in Mannheim, September 2013

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## 11.3 Federal compensation decree

### 11.3.1 Description

In the past the coexistence of various approaches and guidelines for ecological compensation was criticized by numerous stakeholders, beginning from project developers and reaching to planning agencies and land users. The heterogeneity of relevant regulations resulted in a reduced public acceptance for ecological compensation. Since the German energy transition (*Energiewende*) requires various developments for power supply (wind energy plants, power lines, photovoltaic installations etc.), the political will to accelerate authorization procedures and standardize the obligations for ecological compensation rose appreciably.

Since the amendment of the German Nature Conservation Act in 2010, the Federal Minister of the Environment is authorized to regulate type and extent of ecological compensation measures within a separate federal decree. The decree (*Verordnung über die Kompensation von Eingriffen in Natur und Landschaft= Bundeskompensationsverordnung - BKompV*) must be approved by the Federal Ministry of Transport, Building and Urban Development and the Federal Ministry of Food, Agriculture and Consumer Protection as well as by the Federal Council (*Bundesrat*).

The first draft of the German *BKompV* was presented in November 2011. In December 2012, various statements of relevant organizations were heard and the decree was hardly criticized. In summer 2013, the relevant commissions (for nature conservation, agriculture and economy) proposed to adapt the decree concerning its area of application. From the commission's point of view, the decree should be exclusively operative for federal projects of the energy transition. If this happens, the initial objective of creating a common regulative basis for ecological compensation would not be achieved.

In summer 2013 the approval of the *BKompV* at the Federal Council failed since the federal government cannot accept the mentioned proposal of the commissions. The approval procedure of the German *BKompV* was stopped before the *Bundestag* elections took place in September 2013. The future for a nationwide binding decree on ecological compensation is now uncertain and a huge effort is needed in order to develop a practicable and fully accepted version of the decree.

#### Objective and possible contents of the draft version

Superior objective of the federal compensation decree is to render the application of the German impact mitigation regulation more efficient and transparent.

The draft of the *BKompV* aims to

- improve the conditions for investments,
- accelerate administrative procedures,
- increase transparency of administrative decisions and
- raise planning and legal security for public and private developments
- contribute to the reduction of land consumption.

The draft version of the decree is composed of 5 main sections. Section 1 contains general instructions defining the spatial and technical application area of the decree as well as general requirements on ecological compensation (resulting in reduced space consumption). Section 2 defines rules for the initial record of the

affected sites and for the evaluation of the expected impact. Section 3 contains fundamental standards for offsetting environmental damage and therefore distinguishes impacts causing a severe environmental damage (*Beeinträchtigungen besonderer Schwere*) from impacts without a severe environmental damage (*Beeinträchtigungen ohne besondere Schwere*). Impacts of type I require a functional compensation within the same functional area/natural region, impacts of type II require a habitat-related compensation based on a “habitat-value-method” (*Biotopwertverfahren*) within the same natural region. According to section 3 of the *BKompV* agricultural and forested land requires a special consideration when affected by ecological compensation (*besondere Rücksichtnahme und Prüfpflichten*). Section 3 also regulates maintenance and safeguard of compensation measures. Section 4 includes provisions on compensatory payments. Section 5 contains a temporary regulation and defines the legal validity.

### 11.3.2 Evaluation

The following table points out some advantages and disadvantages of a national compensation decree.

Table 2: Pros and cons of a federal compensation decree

Advantages	Disadvantages
Consistent framework for the evaluation of initial state and impact as well as standardized financial compensation would create uniform conditions and thus improve the public acceptance of ecological compensation	Overall standards may result in non-binding expressions allowing different interpretations → main objective of decree (i.e. given similar preconditions, different users should get similar results for compensatory needs) would not be achieved
Higher sustainability of compensation measures	Existing regulations of federal states need to adapt to <i>BKompV</i> (position of federal states: “never change a running system”)
Acceleration of administrative procedures	Compensatory obligations for severe impacts may be reduced → a nature-conservation-compatible planning (comparison of variants) might get less appealing
Increased transparency of administrative decisions	
Raise of planning and legal security for public and private developments	
Contribution to the reduction of land consumption	

The first draft of the German *BKompV* was hardly criticized by numerous involved stakeholders and organizations and the discussions about the decree stopped since late summer 2013, prior to the *Bundestag* elections. A broad communication and consultation process also involving the relevant occupational areas, as well as

an exhaustive testing of feasibility and capacity of the decree would guarantee success. The primary objective remains to obtain an agreement and to result in an enforceable and stable decree. In general, the idea of a nationwide binding decree on ecological compensation is a positive evolution in German nature conservation legislation.

## 11.4 Compensation pool

[Chapter 11.4 and 11.5 also relate to chapter 3.4.1 about 'eco-accounts' as innovative instrument of nature conservation in Germany]

### 11.4.1 Description

[The following description is based on a German presentation of Martin Szaramowicz, Flächenagentur Brandenburg GmbH from 2011: 'Flächenpools in Brandenburg – Bündelung mit großer Wirkung'; [www.lpv.de](http://www.lpv.de)]

A 'compensation pool' is a spatial concentration (bundling) of ecological compensation measures on a usually coherent area. One pool may contain compensation measures of several developments requiring an offset of ecological damage. Compensation measures in such pools are often in temporal and spatial independence of an impact, meaning that measures are realized in advance of the damage of nature and landscape. Hence, compensation pools may only be applied when in-kind/in-site compensation is not possible. In Germany, compensation pools appeared first around year 2000.

Depending on the socio-economic preconditions and the relevant natural region, compensation pools are embedded in different structures and are organized in different ways. In the past, it has been proven that a stewardship being present and responsible at long-term is most important and successful. The responsible body should ideally be specialized on developing, implementing and maintaining such compensation pools, for example as a so called 'compensation agency' (e.g. *Flächenagentur Brandenburg GmbH*, *Ökoagentur Hessen*; also see chapter 11.5).

Steps for creating a compensation pool:

- design a rough concept of ecological measures
  - definition of fundamental ideas and check of feasibility (communication with important stakeholders) tip: make use of already existing local/regional concepts
- commissioning of experts
  - expertise about flora/fauna/habitats, measurements, planning of measures and later of execution
- accordance with land users
  - information of relevant land users at an early stage, incorporation of land users in pool concept through contracts regulating the maintenance
- securing land
  - pool site needs to be available at long-term, meaning that either purchase of land or a registration of a servitude (*Dienstbarkeit*) in the land register is required
- approval procedure, accordance with nature conservation authorities
- realization.

The German Assembly of Compensation Agencies (*Bundesverband der Flächenagenturen in Deutschland e.V. - BFAD*) published the following quality standards for compensation pools:

- real improvement from a nature conservation point of view

- long-term stewardship and site management
- documentation/ monitoring
- integration and alignment into/with regional plans and superior strategies
- state of the art planning quality.

#### 11.4.2 Legal background

The introduction of compensation pools as an instrument of the German impact mitigation regulation required an adaption of the German nature conservation law. Those changes, also called “flexibilization of the impact mitigation regulation” were discussed for years. A central aspect of such flexibilization is the possibility to stock compensation measures, i.e. to implement measures prior to the afterwards assigned impact (*vorlaufende Kompensationsmaßnahmen/ Ökokonto-Maßnahmen* = ‘preparatory compensation measures’/ ‘eco-account-measures’). In Germany, par. 16 of the *BNatSchG* defines a legal frame for the admission of preparatory compensation measures, whereas the federal state law regulates the related details.

According to par. 16 of the *BNatSchG*, the compensation measures in the pool

- have to meet the common rules of ecological compensation (par. 15, no. 2 *BNatSchG*)
- must not be subject of any other legal obligation
- must not make use of public subsidies
- must not encounter existing superior plans and programs
- require a documentation of the initial status of the sites (the federal states may have distinct regulations for the documentation).

Other provisions respective initial record, evaluation and booking in eco-accounts, approval and fungibility of preparatory compensation measures are subject of the Nature Conservation Acts of the German federal states, e.g. in Baden-Württemberg the ‘eco-account decree’ = *Ökokonto-Verordnung - ÖKVO*. Those federal decrees define common standards for evaluating existing and (within compensation management) planned habitats – an important precondition for every concept making use of preparatory compensation measures.

#### Pool owner

Compensation pools are often owned by so-called ‘compensation agencies’ (see chapter 11.5) – an innovative service provider for nature conservation specialized on compensation measures. But also other institutions and land holders, e.g. forest enterprises or the *BiMA* can act as pool owner: State forest enterprises (e.g. HessenForst) offer their land in favor of mainly forest related compensation measures such as process conservation (enhancing natural processes by abandoning all forestry action - “*Prozessschutzwald*”), removal of non-indigenous tree species etc. Another pool owner in Hessen is the *Bundesforstbetrieb Schwarzenborn* (also see chapter 11.2.3.3) belonging to the *Bundesanstalt für Immobilienaufgaben (BImA)*, the German Institute for Federal Real Estate, owning ancient military ground. The responsibility of *Bundesforst* is all un-tilled ground owned by the *BiMA* such as forested and open land areas, which are very suitable as sites for ecological compensation and are consequently offered to developers of larger infrastructure projects.

#### 11.4.3 Evaluation

A detailed study on how compensation pools may be build up, related chances and risks as well as broad information about how the stewardship of compensation pools may be organized can be found in an exhaus-



tive publication of the BfN from 2006. The following table contains an excerpt of this publication, naming some pros and cons of compensation pools.

Table 3: Pros and cons of compensation pools (based on Jessel et al. 2006)

Advantages	Disadvantages
Implementation of the impact regulation principle gets more efficient	functional and spatial relation of impact and compensation is loosened
Spatial improvement of compensation effects through size and/or coherency of areas	risk that compensation pools will get unique financier of nature conservation projects (considering tight budgets in governmental nature conservation authorities → failure of state controlled nature conservation")
More cost efficiency since bundled measures result in less maintenance and monitoring costs. Integration of maintenance in economically sustainable and reasonable land use concepts	priority of avoiding impacts and implementing compensation close to damage might be neglected
Measures are planned in an ecologically sensible way (not according to available sites and under time-pressure)	
Safeguarding of site at early stage and in a resilient way	
The implementation and monitoring of compensation measures can be assured	
Measures are more sustainable (long-term stewardship)	
Better integration of compensation measures in larger planning aims (e.g. habitat connectivity projects, which wouldn't be carried out within normal administrative practice)	
Impression of worthwhile investment through visible sustainable effects deriving from compensation measures → Higher public acceptance, and less conflicts, especially with farmers.	
Discharge of project developer concerning ecological compensation and planning reliability → avoids retard in approval procedure	
Less effort for supervising nature conservation authority (ratio of ecological gain to administration effort)	

#### 11.4.4 Example 1

The project described below is a Hessian example of ‘Green Conversion’ (see also chapter 11.2.3.3) - the civil conversion of former military ground in favor of nature conservation purposes. The ecological gain obtained through the conversion was translated in eco-points which were sold to the *DB Netz AG*, the latter planning a new high-speed railway line from Frankfurt to Mannheim. A classic win-win-situation was achieved.

<b>Compensation management of planned high-speed railway line Rhein/Main – Rhein/Neckar Cooperation of DB Netz AG and BiMA at Compensation Pool ‘Campo Pond’</b>	
Location	Nature reserve/Special Area of Conservation ‘Campo Pond’ in Großauheim (District of Hanau, Hessen) → ancient US-military ground
Investor	<i>Bundesanstalt für Immobilienaufgaben – BiMA</i> (German Institute for Federal Real Estate), district ‘ <i>Bundesforst</i> ’ [ <i>DB Netz AG</i> → purchase of eco-points from <i>Bundesforst</i> to offset impacts deriving from the future high-speed railway line Frankfurt – Mannheim]
Type of compensation	Species Conservation measures
Safeguarding	Land owned by <i>BiMA</i> ; treaty among <i>BiMA</i> and <i>DB Netz AG</i>
Owner of site	<i>BiMA</i> , district ‘ <i>Bundesforst</i> ’
Implementation	Started in September 2009
Description	<p><i>Bundesforst</i> converted ancient US-military ground to nature conservation area with an extensive Przewalski horse grazing management on 70 ha. Maintenance and enhancement of a large complex of dry sand grasslands through removal of nutrients, reducing and avoiding development of undesirable shrubs, maintaining open sand surfaces and related endangered species.</p> <p><i>Bundesforst</i> owns the ground, plans and implements the management in close cooperation with local nature conservation authorities and other experts (before, an assigned planning agencies collect initial data and estimate the potential upgrading of area for creating eco-points). More than 7 Mio. eco-points were created through the implementation of measures and were sold to a project developer requiring eco-points, in this case the <i>DB Netz AG</i>, who is planning a high-speed railway line from Frankfurt to Mannheim.</p> <p>Advantages for <i>DB Netz AG</i>:</p> <ul style="list-style-type: none"> <li>– avoids purchase of ground for compensation measures</li> <li>– implementation of measures at an early stage of the development</li> <li>– more planning security since sites are 100 % available, implementation and maintenance are in 100 % responsibility of <i>Bundesforst</i></li> <li>– overall costs are equal monetary compensation</li> </ul> <p>Advantages from nature conservation point of view:</p> <ul style="list-style-type: none"> <li>– Coherent, ecologically valuable and large compensation measure was created</li> <li>– functioning of compensation measure is assured</li> <li>– bundling of measures within a Natura 2000 area</li> </ul> <p>Advantages concerning public acceptance:</p> <ul style="list-style-type: none"> <li>– visible measures in behalf of popular Przewalski horses</li> <li>– guided tours for visiting area</li> <li>– improved relation between <i>Bundesforst</i> and the City of Hanau</li> <li>– improved image of the City of Hanau as “Green City” (the city received several awards)</li> </ul>
Management of site	Grazing management with approximately 8 horses on two paddocks, without additional feeding and stabling. A narrow link between the two paddocks allows the alternating use for grazing and veterinary inspections. An accompanying monitoring of target species and plant communities ensures a proper functioning of compensation measures on long-term.
Involved	<i>BiMA</i> (owner/investor/main responsible)

Compensation management of planned high-speed railway line Rhein/Main – Rhein/Neckar Cooperation of DB Netz AG and BiMA at Compensation Pool ‘Campo Pond’	
stakeholder	Zoo Hellabrunn + Zoo Nürnberg (provision of horses) Zoo Frankfurt (veterinary assistance) EEP (European Endangered Species Program = <i>Europäisches Erhaltungszuchtprogramm für Przewalskipferde</i> ; consultation) DB Netz AG (co-financing project via purchase of related eco-points) City of Hanau (lower nature conservation authority: technical assistance, public relations (flyer); employment of a veterinarian) Environment Centre of Hanau (public relations periodic guided tours at Campo Pond)
Website	<a href="http://www.bundesimmobilien.de/4758531/hanau_campo-pond">http://www.bundesimmobilien.de/4758531/hanau_campo-pond</a> <a href="http://www.hanau.de/lih/natur/arten/013776/">www.hanau.de/lih/natur/arten/013776/</a>



Illustration 10: Special Area of Conservation DE-5819-309 ,US-Militärgelände bei Großauheim’



Illustration 11: Przewalski horses at Campo Pond

### 11.4.5 Example 2

In Baden-Württemberg, a regional compensation pool was created in a cooperative way by the regional planning association Bodensee-Oberschwaben, fourteen communes and the two relevant administrative districts Bodenseekreis and Ravensburg. This concept - although still in construction- is of high interest for the bottleneck region Rhein-Main/ Rhein-Neckar, since it is especially laid out for larger infrastructure project in densely populated regions.

Regional Compensation Pool Bodensee-Oberschwaben <i>Regionaler Kompensationspool Bodensee-Oberschwaben (ReKOBO)</i>	
Location	Area of cooperation: urban agglomeration of Friedrichshafen-Ravensburg-Weingarten (14 cities and communes + administrative districts Bodenseekreis and Ravensburg)
Project initiator	<i>Regionalverband Bodensee-Oberschwaben</i> (Regional Planning Association Bodensee-Oberschwaben)
Organizational structure	<i>Regionaler Kompensationsflächenpool Bodensee-Oberschwaben (ReKOBO) GmbH</i>
Start of project	2009 (foundation of <i>GmbH</i> in April 2014)
Description	<p>Initial situation: Within the next 15 years the area of cooperation will need approximately 400-500 ha of land for ecological compensation. Furthermore, there is a rising spatial pressure on open land through demands from agriculture, energy industry, settlements, transport, commerce and tourism. A result is less available space and a high price of land.</p> <p>Main objectives of <i>ReKOBO</i> are thus:</p> <ul style="list-style-type: none"> <li>– Establishing a intermunicipal pool concept for safeguarding compensation on legally binding sites (30 years)</li> <li>– Creating a regional eco-account</li> <li>– Implementing compensation measures on ecologically reasonable, large and coherent sites (biotope network etc.)</li> <li>– Preserving high value farmland for food production</li> <li>– Achieving a higher market power through bundling of demand</li> </ul> <p>In 2012 an environmental planning agency was assigned to prepare the conception of a regional compensation management. The following work steps were completed:</p> <ul style="list-style-type: none"> <li>– Building a cadastre of already implemented compensation measures and entering the relevant data in a compensation register</li> <li>– Establishing a common regional model for the evaluation of habitats/biotopes</li> <li>– Selection of five pool sites. Selection criteria: sites 1. have to be of regional importance, 2. should be suitable for being integrated in a regional biotope network and 3. should have a large potential for ecological upgrading for as many nature goods as possible.</li> </ul> <p>The results of this work will be integrated in the landscape framework plan in order to form a qualified biotope connecting concept.</p> <p>The regional compensation pool is organized within a limited liability corporation (<i>ReKOBO GmbH</i>; foundation in April 2014) which is shared in between the regional planning association and all participant communes/cities/ administrative districts, depending on their spatial portion of the cooperation area (seed funding: 200.000 €) . The operating business, the management of purchase, selling and development of compensation sites is carried out by the compensation agency Baden-Württemberg as a qualified and specialized partner. Currently, two large-scale bog-renaturation projects are in planning process. The demand for eco-points is generally high (2014: 1 mio eco-points, 2015 1 mio eco-points).</p>

<b>Regional Compensation Pool Bodensee-Oberschwaben</b> <b><i>Regionaler Kompensationspool Bodensee-Oberschwaben (ReKOBO)</i></b>	
Advantages of <i>ReKOBO</i>	<ul style="list-style-type: none"> <li>– Safeguarding of an ecologically reasonable compensation within the region</li> <li>– Temporal and spatial flexibilization of impact and compensation through coordination and bundling</li> <li>– Speed-up of planning and authorization procedures, especially concerning larger, intermunicipal infrastructure developments</li> <li>– Avoids conflicts with other land users, especially agriculture</li> <li>– Reduces temporal and spatial pressure within dense communes</li> <li>– technical support for smaller communes without specifically qualified staff</li> <li>– safeguarding system with low risk of loss for eco-point provider (relates to potential financial advantages for customer)</li> <li>– Development of an integrated compensation concept, in line with regional planning and superior conservation projects (biotope networks etc.)</li> <li>– Bundling of measures allows a more rational and cost-efficient implementation of compensation</li> </ul>
Financing	<p>Start-up financing through participant partners (cities, communes, administrative districts) → 200.000 Euros</p> <p>Objective: a return flow of investments via created eco-points within 10 years</p>
Involved stakeholder	<p>Regional Planning Association Bodensee-Oberschwaben <i>Regionaler Kompensationsflächenpool Bodensee-Oberschwaben (ReKOBO) GmbH</i>: Society which assures the purchase of eco-points on a long-term</p> <p>Cities, communes and administrative districts mentioned above</p> <p>Compensation agency Baden-Württemberg (<i>Flächenagentur Ba-Wü</i>): adopts operating business, manages the purchase, selling and development of compensation sites.</p> <p>Environmental Planning agency 365° Freiraum + Umwelt</p>
Website	<p><a href="http://www.bodensee-oberschwaben.de/614_Projekte__Kompensationsflaechenmanagement.RVBO">http://www.bodensee-oberschwaben.de/614_Projekte__Kompensationsflaechenmanagement.RVBO</a></p>

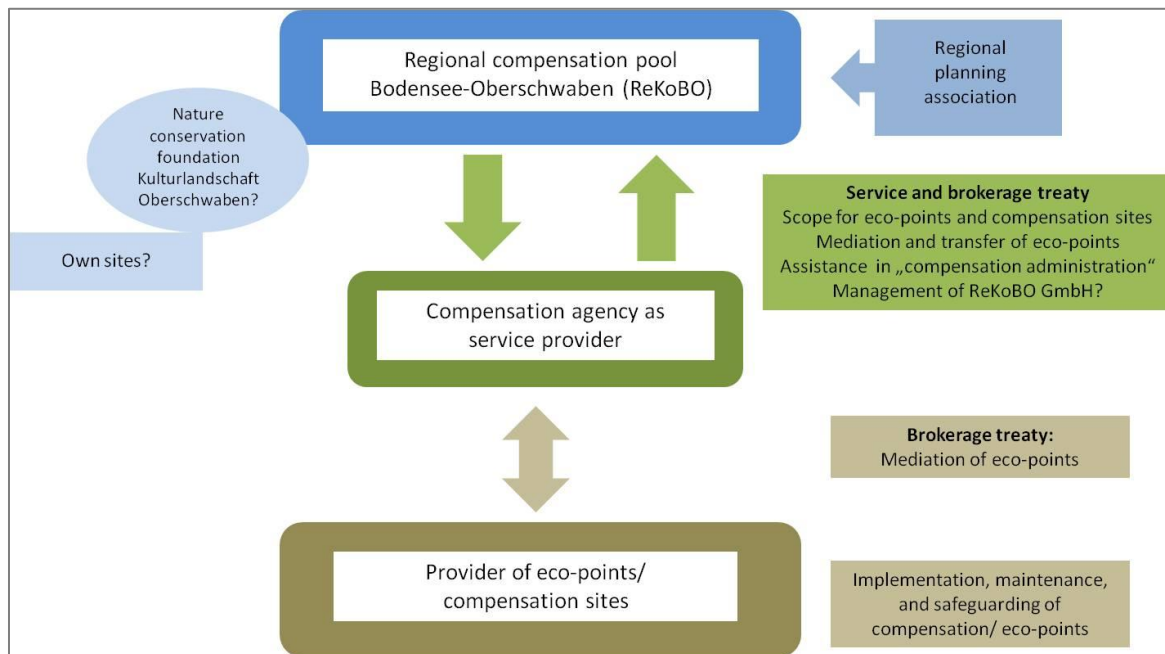


Illustration 12: Draft of concept for the regional compensation pool *ReKoBO*  
(Source: LBBW Immobilien Landsiedlung, modified illustration based)

## 11.5 Compensation agency

### 11.5.1 Description

Compensation agencies are innovative service providers for nature conservation offering the planning, realization, safeguarding and management, as well as the monitoring of compensation measures through creation of compensation pools. Therefore, the agency offers “one-stop solutions” for investors or planning offices including the implementation of compensation measures and a long-term-stewardship (25 years). The investor can pursue the authorization procedure of his project and saves precious time and energy.

Compensation agencies emphasize on a broad communication process with nature conservation authorities, project developers and regional stakeholders, allowing to development optimized compensation strategies at an early stage.

Main task of the agency is to find, acquire and manage sites for compensation (see Illustration 13). The best way to guarantee the sustainability of compensation measures is to purchase the land for the nature conservation trust. If this is not possible, management schemes are fixed in the cadastre (*Grundbuchsicherung*) or lease contracts (*Pachtverträge*) are signed. Nevertheless, it has been proven that land ownership is the best way to develop continuous compensation measures since it allows managing the site in an adapted way (water level, hunting etc.). In case of the Compensation Agency Brandenburg, most of the purchased sites were and often stay under agricultural use. For the maintenance of compensation sites, the agency signs management treaties with the farmers fixing the kind and frequency of land use and the amount of money that is being paid to the farmers on an annual basis. Thus, the local agriculture (or forestry) is involved in the site management.

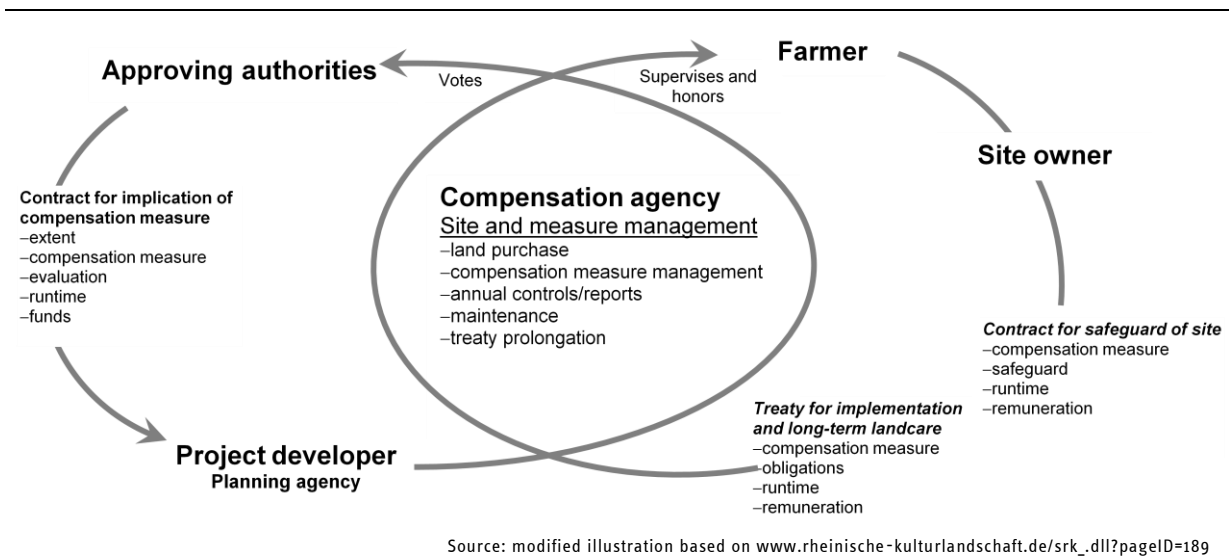


Illustration 13: Schematic functioning of compensation agencies

Most compensation agencies offer online trading platforms bringing together stakeholders searching for existing eco-points or compensation sites and those offering sites for ecological compensation. Some agencies (e.g. the compensation agency of Baden-Württemberg) also manage existing compensation sites on a larger scale on behalf of specific GIS-supported database-software called ‘compensation registers’ (see chapter 11.6).

In order to support the dispersion of compensation pools and -agencies in terms of nature conservation and economic interests, the German Assembly of Compensation Agencies (*Bundesverband der Flächenagenturen in Deutschland e.V. - BFAD*; [www.verband-flaechenagenturen.de](http://www.verband-flaechenagenturen.de)) was created in 2006. The *BFAD* is responsible for lobbying, public relations and the organization of conferences. Until now, about 20 compensation agencies belong to the *BFAD*, sharing experiences and developing the tool compensation pool as a high quality service for nature conservation within the German impact mitigation regulation.

A less developed but similar approach is currently tested in the Province of Utrecht where the so-called ‘Compensatieloket’ serves as a platform aggregating supply and demand of suitable sites for ecological compensation (see chapter 5.4.3).

### 11.5.2 Legal background

As already mentioned in chapter 11.4.2, in Germany, par. 16 of the *BNatSchG* defines a legal frame for the admission of preparatory compensation measures, whereas the federal state law regulates the related details. For example, in Baden-Württemberg the ‘eco-account decree’ (*Ökokonto-Verordnung - ÖKVO*) is the legal framework for compensation agencies: it regulates in par. 11 what kind of institution is accepted for eco-point creating, gathering, managing and trading and also defines in appendix 1 valid compensation measures for eco-accounts.



Vast information about how compensation agencies may be build up, about legal and economic aspects and common constraints of the ‚pool business‘ offers the BfN-publication „*Flächenpools und Flächenagenturen: Handbuch für die Praxis*“ (Schöps et al. 2007) (= ‚Compensation pools and -agencies – A practical handbook‘). The publication documents a fundamental part of the experimental project (*E+E-Vorhaben*) „*Kulturlandschaft Mittlere Havel*“, within which the Compensation Agency Brandenburg was created. The following part is a translated summary of most important results deriving from the related legal and economic consultation process:

- It has been proven that the foundation of a limited liability company (*GmbH*) represents a well adapted organizational form for a compensation agency, also in terms of legal accountability. On the other hand, creating a GmbH of common public interest appeared to be not reasonable, since achieving and keeping the status of a structure of common public interest turned out to be complicated. Due to the clear binding regulation for a *GmbH*, nature conservation interests may very well control the corporate policy.
- The Compensation Agency Brandenburg is owned by an organization regulated by public law: the Nature Conservation Trust of Brandenburg (*NaturSchutzFonds Brandenburg*). Now, the trust disposes of an efficient instrument for complying its legal tasks related to the creation of compensation pools, without underlying limitations of a GmbH of common public interest. A compensation agency planning to work on larger projects should dispose of sufficient capital resources. Other problems in terms of commercial and tax law are controllable. Sample contracts for all important business relations were developed and attached to the BfN-publication.
- The best way to safeguard compensation sites is the purchase of land. Alternative solutions offering a sufficient legal security are management schemes being fixed in the cadastre (*Grundbuchsicherung*) or lease contracts (*Pachtverträge*).
- Transferring compensatory obligations of project developers to pool-owners meeting the quality standards cited above is reasonable and beneficial.

In some cases several owners share the responsibility for a compensation agency. The compensation agency of Baden-Württemberg e.g. is owned by three parties: the Nature Conservation Trust (*Stiftung Naturschutzfonds*), the association of rural development Baden-Württemberg (*LBBW Immobilien Landsiedlung GmbH*) and a company of the Building Materials Association of Baden-Württemberg (*Steine und Erden Service Gesellschaft GmbH*).

Other institutions and land holders acting as pool-owners, e.g. forest enterprises or the *BiMA*, can fulfill tasks similar to those of official compensation agencies. But in contrast to the *Ökoagentur Hessen* those pool-owners cannot release a project developer from its legal compensatory obligations (*Freistellungserklärung*). On the other hand, the advantage of state forest enterprises and the *Bundesforstbetrieb* consists of their position as large land owners. This contrasts to the concept of most official compensation agencies in Germany, who search for suitable land for ecological compensation and have to purchase sites for building up larger pool concepts.



### 11.5.3 Evaluation

The growing number of compensation agencies in Germany attests this tool as a successful way of encountering a multitude of specifications in terms of ecological compensation. To cite Prof. Dr. Beate Jessel, president of the BfN: “in times of competing land use interests causing an extremely high pressure on space within our cultural landscape, concepts focusing on dialogues and agreements with land users and other project related stakeholders (...) are indispensable” (translated from [www.verband-flaechenagentur.de/ über-uns](http://www.verband-flaechenagentur.de/uber-uns)). The compensation agencies of the *BFAD e.V.* provide such concepts for managing ecological compensation. Table 4 points out some advantages and disadvantages of the instrument ‘compensation agency’. But since compensation agencies are closely related to the pool concept, the evaluation in chapter 3.3 should also be retained in this context.

Table 4: Pros and cons of the instrument “compensation agencies”

Advantages	Disadvantages
Pool management in responsibility of an experienced institution; project developer released from maintenance tasks	Time-lag in between investment for land purchase and payment of project developer bears a certain economic risk
Secured long-term maintenance and monitoring of compensation sites thank of clear responsibilities	
legal security for project developer	
high acceptance of all involved stakeholders thank of contractual indentation of project developer, provider of land and compensation agency	
depending on the nature conservation acts of the federal states: possibility for developer to be ‘released’ from all compensatory obligations ( <i>Freistellungserklärung</i> )	
In case of nature conservation trust as owner: possibility to use mixed financing of large scale nature conservation projects by investing a) own resources of the trust, b) resources of the compensation agency obtained from project developers, c) third-party-funds and d) earmarked funds deriving from monetary compensation in the context of the impact mitigation regulation being managed and invested by the trust (depending on federal state law)	

#### 11.5.4 Example

The compensation agency presented below – the ‘*Ökoagentur Hessen*’ – was chosen due to its long-standing experience in ‘compensation business’. The *Ökoagentur* is involved in large infrastructure projects, e.g. the high-speed railway line Köln/Rhein-Main and the expansion of airports in Frankfurt and Kassel-Calden. The office is located in Southern Hessen, next to the transport axis of CODE24.

<b><i>Ökoagentur der Hessischen Landgesellschaft GmbH (= Eco-agency of the Association of rural development Hessen)</i></b>	
Location	Mörfelden-Walldorf in Southern Hessen (close to Frankfurt airport)
Owner	Association of rural development Hessen ( <i>Hessische Landgesellschaft mbH</i> )
Description	<ul style="list-style-type: none"> <li>– Since 2006 officially admitted agency for supply and trade with compensation measures according to § 5 of the Hessian compensation decree</li> <li>– Offers bundled compensation measures (pool owner) in forests, open land (including production integrated compensation measures, also see chapter 11.7) and species conservation related compensation. Offers furthermore all kind of assistance and expertise concerning ecological compensation, procedural assistance, eco-point-trading, maintenance and monitoring of compensation measures. Manages a data-base of compensation measures on federal state level.</li> <li>– Is able to release a project developer from its legal compensatory obligations by handing out a certificate stating that compensation was done according to law (<i>Freistellungserklärung</i>).</li> <li>– Disposes of land portfolio of about 1.000 ha</li> <li>– Member of the German Assembly of Compensation Agencies (<i>Bundesverband der Flächenagenturen in Deutschland e.V. - BFAD</i>) and thereby creating pools according to quality standards of the <i>BFAD</i></li> </ul>
Involved stakeholder	Compensation agency mediates between initial land owner, land user (agriculture/forestry etc.), responsible land caretaker, nature conservation authorities, project developers
Website	<a href="http://www.hlg.org/oekoagentur/">www.hlg.org/oekoagentur/</a>



Illustration 14: Operational areas of the *Ökoagentur Hessen* (Source: [www.hlg.org](http://www.hlg.org))

## 11.6 Compensation register

### 11.6.1 Description

A compensation register is an instrument of German nature conservation legislation intending to

- avoid the double use of already assigned compensation measures
- avoid the use of compensation sites for other planning occupancies (*Überplanung*)
- facilitate the verification of proper implementation of compensation measures
- stock compensation measures which are implemented prior to the afterwards assigned impact (*vorlaufende Kompensationsmaßnahmen*)
- create a transparent market for eco-point-trading (Source: Begründung zur KompVzVO).

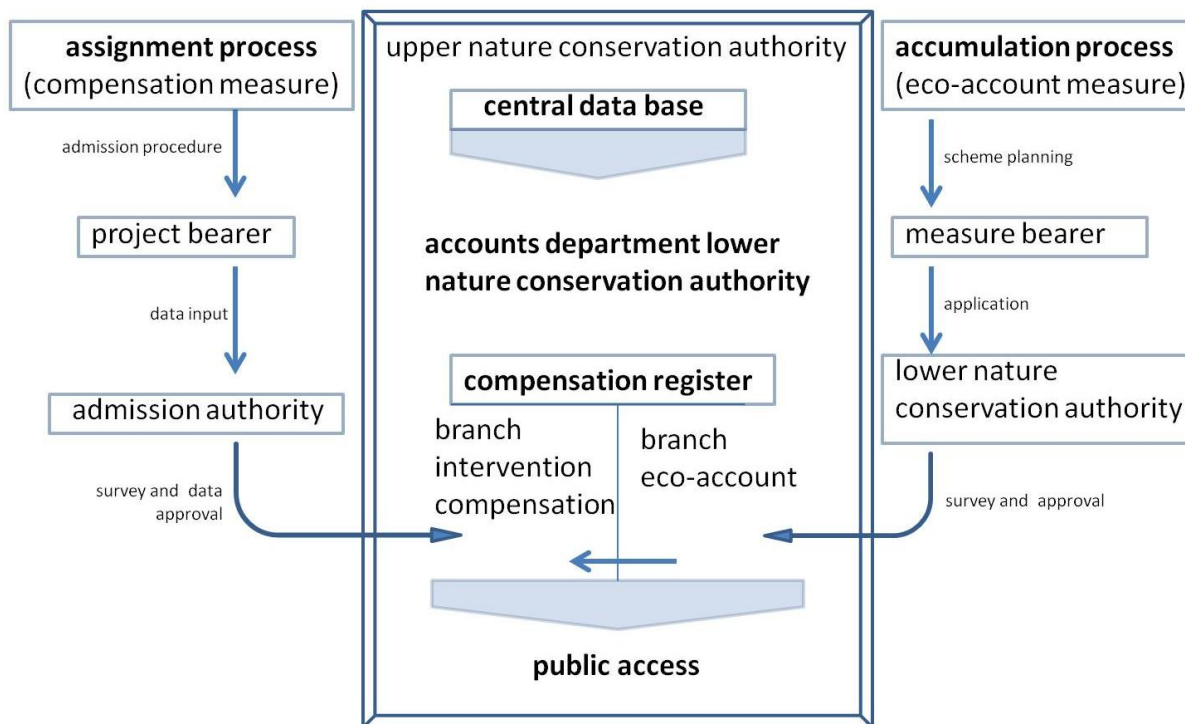
The compensation register (e.g. in Hessen *Natureg*), in responsibility of the relative Ministry for Environment, is linked to the lower nature conservation authorities who feed the database with different types of measures being announced by the approving institution (higher nature conservation authority, Federal Railway Authority etc.) via electronic forms:

1. Realized, classic compensation measures (including concerned plot and assignment of impact and compensation)
2. Eco-account-measures which were already assigned to an impact (including concerned plot and assignment of impact and compensation)
3. Eco-account-measures which are available for being assigned to an impact (including location, type, expected compensational value and availability) and

4. Suitable sites which are available for future compensation measures.

Measures for avoidance or minimization of impacts, measures for use of monetary compensation and compensation measures for impacts deriving from urban land-use plans are not documented in the compensation register.

The web-based compensation register is completely visible for third party. Possible users of the compensation register are suppliers of compensation measures/ sites, approving institutions (lower nature conservation authorities, approving institutions (EBA etc.), project developers ('polluters') and of course the public.



(Source: modified illustration based on LUBW (2012))

Illustration 15: Functioning of the compensation register

11.6.2 Legal background

Since the amendment of the German Nature Conservation Act (BNatSchG) in 2010, all assigned compensation measures (including compensation measures which are realized in advance of the damage of nature and landscape) need to be documented in a compensation register (par. 17, no. 6). Currently, all federal states dispose of a compensation register, even though the denomination differs on federal level (*Kompensationsverzeichnis, Kompensationsflächenkataster, Kataster für Ausgleichs- und Ersatzmaßnahmen, Digitales Naturschutzregister, Ökoflächenverzeichnis/-kataster*). Again, the federal state law regulates all details, e.g. the institution being responsible for the compensation register (e.g. in Hessen par. 4 of HAGBNatSchG, in Baden-Württemberg KompVzVO).

### 11.6.3 Evaluation

The following table points out advantages and disadvantages of a compensation register.

Table 5: Pros and cons of the instrument “compensation register”

Advantages	Disadvantages
The register allows a complete and well structured documentation of compensation measures within an administrative region	Bears a certain documentation work
Avoids the double use of already assigned compensation measures	
Avoids the use of compensation sites for other planning occupancies	
Facilitates the verification of proper implementation of compensation measures	
Creates a transparent market for eco-point-trading	
Enables the stocking of compensation measures which are implemented prior to an afterwards assigned impact (preparatory comp. measures)	

Since the register relies on a web based application, the effort to enter the measures is rather reasonable. Usually the task of documenting compensation measures is transferred to those private agencies having planned the compensation concept.

### 11.6.4 Example

The compensation registers of the lower nature conservation authorities in Baden-Württemberg contain exhaustive information respective (planned) compensation measures /sites. The information is accessible to the public by means of a uniform web view (see Illustration 16 and Illustration 17).

<b>Kompensationsverzeichnis of the federal state Baden-Wurttemberg</b>	
Documented information within compensation register	<p>The following details concerning the information which needs to be entered in the comp. register is based on a presentation of Wolfgang Kaiser (Ministerium für Umwelt, Naturschutz und Verkehr, Referat 26; “Das Kompensationsverzeichnis - Inhalt und Zweck”*)</p> <p>In case of compensation measures being already assigned to an impact, the latter has to be specified by indicating:</p> <ul style="list-style-type: none"> <li>– Name of the approving authority (e.g. higher nature conservation authority, Federal Railway Authority etc.)</li> <li>– Date of the approval</li> <li>– Name of the project</li> <li>– Type of impact (e.g. railway project, power plant etc.)</li> </ul>

<b>Kompensationsverzeichnis of the federal state Baden-Wuerttemberg</b>	
	<ul style="list-style-type: none"> <li>- Name and address of the project developer.</li> </ul> <p>The compensation measure itself is specified through:</p> <ul style="list-style-type: none"> <li>- Location of compensation site</li> <li>- Short description (initial state, intended state, details concerning maintenance and required land use and - in case of CEF-measures - relevant species, specific enhancing measures etc.)</li> <li>- File number and assigned eco-points in case of eco-account measures:</li> <li>- Schedule for implementation of compensation measures (especially for species conservation measures as e.g. CEF-measures)</li> <li>- Required period of maintenance according to par. 15 no. 4 BNatSchG:</li> <li>- Information concerning state of implementation (including important monitoring results, main findings of official control etc.)</li> <li>- In case of coherency measures for Natura 2000 some additional information is required: type, number and name of Natura 2000-site, severely affected natural habitats and species, location, size and short description of coherency measure.</li> </ul>
Involved stakeholder/ user	<ul style="list-style-type: none"> <li>- Suppliers of compensation measures/ sites</li> <li>- Responsible nature conservation authorities managing the register</li> <li>- Approving institutions (nature conservation authorities, EBA etc.)</li> <li>- Project developers ('polluters')</li> <li>- Public</li> </ul>
Website	<p><a href="http://www.mlr.baden-wuerttemberg.de/Kompensationsverzeichnis_Verordnung/100340.html">http://www.mlr.baden-wuerttemberg.de/Kompensationsverzeichnis_Verordnung/100340.html</a></p> <p><a href="http://rips-dienste.lubw.baden-wuerttemberg.de/rips/ingriffsregelung/apps/oekokonto/unb/massnahmen.aspx?app_id=b3f80a94-cd9d-4c09-bcd7-2683a39caee0&amp;KreisNr=8212&amp;showOek=&amp;showKvz=1&amp;showBa=&amp;showBo=">http://rips-dienste.lubw.baden-wuerttemberg.de/rips/ingriffsregelung/apps/oekokonto/unb/massnahmen.aspx?app_id=b3f80a94-cd9d-4c09-bcd7-2683a39caee0&amp;KreisNr=8212&amp;showOek=&amp;showKvz=1&amp;showBa=&amp;showBo=</a></p>

\*) [www4.um.baden-wuerttemberg.de/servlet/is/79070/KompVzVO\\_Wolfgang%20Kaiser.pdf?command=downloadContent&filename=KompVzVO\\_Wolfgang%20Kaiser.p df](http://www4.um.baden-wuerttemberg.de/servlet/is/79070/KompVzVO_Wolfgang%20Kaiser.pdf?command=downloadContent&filename=KompVzVO_Wolfgang%20Kaiser.pdf)

**Naturschutzrechtliches Kompensationsverzeichnis**  
**Aktenzeichen 364.5031.0124: Erweiterung von Stellplatzflächen, Rintheimer Querallee**

**Eingriff**

<b>Bezeichnung der Zulassungsbehörde</b>	Stadt Karlsruhe - Bauordnungsamt
<b>Aktenzeichen der Zulassungsbehörde</b>	02502-11-01
<b>Aktenzeichen der am Zulassungsverfahren beteiligten Unteren Naturschutzbehörde</b>	364.5031.0124
<b>Datum des Zulassungsbescheids</b>	16.08.2011
<b>Bezeichnung des Vorhabens durch die Zulassungsbehörde</b>	Erweiterung von Stellplatzflächen, Rintheimer Querallee
<b>Eingriffsart</b>	1 Straßen- und Wegebau
<b>Vorhabenträger Name</b>	Deutsche Flugsicherung GmbH
<b>Vorhabenträger Anschrift</b>	Am DFS-Campus 10 63225 Langen

**Kompensationsmaßnahmen**

lfd.Nr.	Maßnahmentyp	Bezeichnung	verwendete Ökopunkte
2	Ausgl.Ers.	<b>Erstellen eines Zauneidechsenbiotops</b>	<a href="#">Detail</a>
1	Ausgl.Ers.	Neupflanzung autochthoner Gehölze	<a href="#">Detail</a>

**Kompensationsmaßnahme Nr.2 (Ausgleichs- und Ersatzmaßnahme)**

<b>Bezeichnung</b>	Erstellen eines Zauneidechsenbiotops																		
<b>Kurzbeschreibung (Ausgangszustand, Zielzustand, Entwicklungs- und Unterhaltungsmaßnahmen)</b>	Das Eidechsenbiotop wurde auf einer Rasenfläche auf dem Gelände der Deutschen Flugsicherung errichtet. Dabei wurde eine Rohbodenfläche mit Sandinseln, Bohrlöchern und Totholz geschaffen. Die Fläche wird 2x jährlich gemäht und Gehölze werden mit Wurzel entfernt. Dabei wird immer ein Rückzugsraum stehen gelassen.																		
<b>Maßgaben zur fristgerechten Umsetzung der Kompensationsmaßnahme und festgesetzter Unterhaltungszeitraum</b>	Die Maßnahme wird am 28.09.2011 fertiggestellt und die Entwicklungspflege findet bis 2013 statt.																		
<b>Lage (Flurstücksliste)</b>	<a href="#">Karte anzeigen</a>																		
<b>Flurstücksliste</b>																			
<table border="1"> <thead> <tr> <th>Gemeinde</th> <th>Gemarkung</th> <th>Flur</th> <th>FlstNr</th> <th>Fläche [m<sup>2</sup>]</th> <th>Anteil [%]</th> </tr> </thead> <tbody> <tr> <td>Karlsruhe</td> <td>Karlsruhe</td> <td>0</td> <td>6543/0</td> <td>206,4</td> <td>0,6%</td> </tr> <tr> <td colspan="4">Gesamtflächengröße in m<sup>2</sup> (ermittelt durch Eingabe der Flurstücksnummern bzw. durch Digitalisierung in der Karte)</td> <td><b>Σ 206,4</b></td> <td></td> </tr> </tbody> </table>		Gemeinde	Gemarkung	Flur	FlstNr	Fläche [m <sup>2</sup> ]	Anteil [%]	Karlsruhe	Karlsruhe	0	6543/0	206,4	0,6%	Gesamtflächengröße in m <sup>2</sup> (ermittelt durch Eingabe der Flurstücksnummern bzw. durch Digitalisierung in der Karte)				<b>Σ 206,4</b>	
Gemeinde	Gemarkung	Flur	FlstNr	Fläche [m <sup>2</sup> ]	Anteil [%]														
Karlsruhe	Karlsruhe	0	6543/0	206,4	0,6%														
Gesamtflächengröße in m <sup>2</sup> (ermittelt durch Eingabe der Flurstücksnummern bzw. durch Digitalisierung in der Karte)				<b>Σ 206,4</b>															
<b>Kohärenzsicherungsmaßnahme nach § 34 Abs. 5 BImSchG</b>																			
<b>Stand der Umsetzung der Kompensations- und Unterhaltungsmaßnahmen</b>	Kompensationsmaßnahme vollständig umgesetzt, Unterhaltung erforderlich																		

Illustration 16: Web view of a compensation measure in the ‚Kompensationsverzeichnis‘ of Baden-Württemberg, City of Karlsruhe (1)

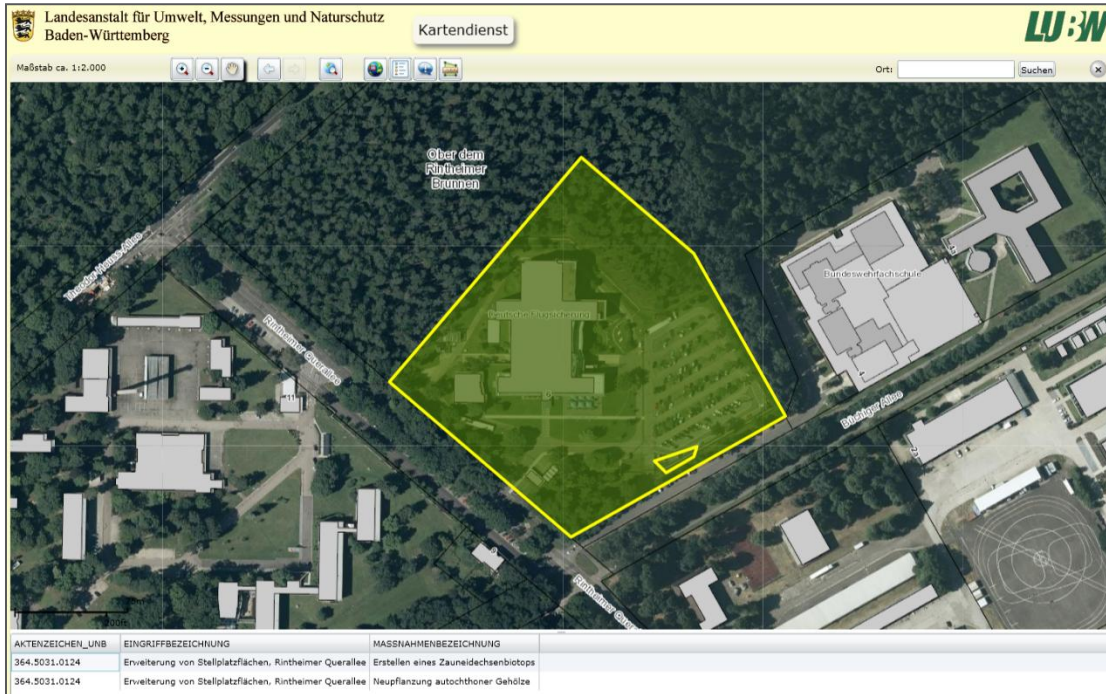


Illustration 17: Web view of a compensation measure in the ‚Kompensationsverzeichnis‘ of Baden-Württemberg, City of Karlsruhe (2)

## 11.7 Integrated compensation measures

[The following chapter is based on the handbook „Produktionsintegrierte Kompensationsmaßnahmen – Umsetzungs-handbuch für die Praxis“ published by the Stiftung Westfälische Kulturlandschaft (2012)]

### 11.7.1 Terminology

Production integrated nature conservation measures, or in German *Produktionsintegrierte Naturschutzmaßnahmen (PIN)*, is a general term for nature conservation measures which are integrated in a running farming system. Those measures can be implemented on different levels:

1. as **agri-environmental measures (AEM)** (second pillar of EU agrarian payments),
2. as CEF-measure (CEF = **continued ecological functionality**) for species conservation basing on the Habitats and Birds Directive,
3. as compensation measures in relation to a project/ development affecting the environment (called: *Produktionsintegrierte Kompensationsmaßnahmen (PIK)* = production integrated compensation measures or shorter: **integrated compensation measures (ICM)**).

The following chapter is focusing on case 3: integrated compensation measures which are planned in relation to a project/ development.





### 11.7.2 Description

Integrated compensation measures – ICM (*produktionsintegrierte Kompensationsmaßnahmen – PIK*), developed and applied in Germany, consist of species- and nature conservation measures which are integrated in a running farming system and depend on an extensive land use practice to sustain. The measures especially enhance endangered open land plants and animal species, such as arable weeds, the red kite or hamsters (so called target species). Since the German Federal Nature and Landscape Conservation Act demands a functional correlation between impact and compensation measures, ICM are particularly relevant for projects affecting open land biotopes such as grasslands and fields. The farmer partly changing from intensive to extensive land use in favor of ICM is paid for the loss of yield by an investor (the project developer causing an impact on nature and landscape). ICM are a cooperative way of compensation management since the participation of regional stakeholders is a fundamental precondition.

#### Stakeholders

According to the ‘polluter pays’ principle of the German Federal Nature Conservation Act, the project developer (or his legal successor) is responsible for the implementation, maintenance and safeguarding of compensation measures, including ICM. The developer can sign a treaty with a local farmer, who will implement and maintain the ICM. In this case, the safeguarding and monitoring would remain the developer’s responsibility. The developer can also transfer all tasks to a competent service provider or another institution (e.g. compensation agency, nature conservation authority or nature conservation foundation) who, for his part, signs a treaty with a local farmer. The duration of the compensation measure is fixed by the competent nature conservation authority. In case of temporary impacts, the treaty with the farmer can be adjusted to the duration of the impact.

#### Safeguarding

Accordant to other compensation measures in Germany by:

1. a public easement (*Baulast*),
2. a registration of a servitude (*Dienstbarkeit*) or land charge (*Reallast*) in the land register,
3. an integration in the legally binding land-use plan (*Bebauungsplan*)
4. a treaty with a competent service provider.

### 11.7.3 Legal background

The German impact regulation requires a functional relation of impact and compensation measures. For impacts affecting open landscapes, the functional relation of impact and ICM is usually given.

The German Federal Nature Conservation Act (§ 15 III) demands a particular attention for agricultural concerns during the planning of compensation measures in order to avoid a double loss of arable land through 1. the impact itself and 2. the related compensation measures. For this reason, the same paragraph recommends to prior check whether it is possible to achieve compensation by unsealing sealed surfaces, by enhancing ecological corridors or by implementing nature conservation measures through adapted land management. ICM, consisting in adaption of land use systems for nature conservation concerns (exceeding the “good professional practice”), are thus in line with current German nature conservation legislation and have a strong legal support.

It is furthermore possible to combine ICM (and thus the related reimbursement of the developer) and EU-agricultural single farm payments of the first pillar. On the contrary, the combination with funding deriving from agri-environmental measures AEM (second pillar) will usually not be accepted.

#### 11.7.4 Evaluation

The following Table 6 points out some advantages and disadvantages of the instrument ‘integrated compensation measures’. In general, it is of major importance to integrate relevant farmers in the planning process at an early stage.

Table 6: Pros and cons of the instrument „integrated compensation measures“

Advantages	Disadvantages
Sites remain as arable land → reduce of spatial concurrence	Limited significance for larger infrastructure developments, rather useful for smaller projects.
Farmers have the possibility to control site selection for ICM (always in respect of nature conservation objectives) → on sites of marginal agricultural yield an additional income can be achieved	Complicated to control ICM (especially on rotating ICM sites)
ICM can be implemented on rotating sites (as long as its functionality from a nature conservation point of view is maintained) → usually raises willingness of farmers to participate	ICM are not particularly useful for an external presentation of compensation efforts, since they consist of rather small scaled and unimposing measures
Direct payments and ICM are combinable: even though a site is managed as ICM, the farmer can receive EU-agricultural single farm payments (first pillar) → additional income for farmers → raised willingness of farmers to participate → easier to find compensation sites	Insufficient legal safeguard of ICM
ICM are mostly realizable and functioning within a short period of time (often within 12 month) → also possible as CEF-measure	Willingness of farmers for cooperation is sometimes limited → planning insecurity
Multifunctionality of ICM: positive effects on soil, water and landscape	Lack of experience concerning long-term functioning of ICM
The farmer’s knowledge of the area and sites may be a benefit for the planner	

#### 11.7.5 Example

The red kite: Improved food supply by cultivation of Lucerne	
Location	Thuringia, Germany
Project Developer	Energy provider
Type of compensation	Species conservation measure for the red kite
Safeguarding	Treaty between investor and farmer

<b>The red kite: Improved food supply by cultivation of Lucerne</b>	
Owner of site	Third party (leased site)
Implementation	Started in 2012
Description	New wind energy plants affecting the red kite were compensated by developing a feeding habitat for the red kite through different harvesting dates in Lucerne fields and abandoning the usage of rodenticides. A lease agreement ( <i>Nutzungsvereinbarung</i> ) ensures the area for the period of the measure and a contract between investor and farmer (farmer receives payment every year) finances the measure. The measure was developed in a cooperative way involving the investor, the local nature conservation authority and the farmer.
Management of site	Cultivation of Lucerne on 20 hectare at least 3 cuts per year (first cut between May 15 and June 15) staggered cut on 50 % of the cultivated area; site can be splitted in several sites and cultivation can change within the crop rotation

## 11.8 Monetary compensation

### 11.8.1 Description

Monetary compensation remains a last resort solution for ecological compensation management and should only be applied if physical compensation is impossible. However, this tool is applied in all involved countries – of course in differing frequency and varieties. In most cases, the principle corresponds to the following:

Negative impacts which cannot be avoided, minimized and/or offset but will be authorized by reason of a high public interest may be compensated by financial means. This implies to the greatest possible extend an undocking of ecological compensation from the related development. The amount is fixed by the responsible approving institution and corresponds either to the average costs of the potential but non realizable compensation measures (including planning, maintenance, monitoring and management), or - if those costs are not assessable - the amount is calculated in consideration of duration and intensity of the impact and the resulting benefits for the developer. The money is paid in a specific nature conservation foundation (*Stiftung Naturschutz* of the relevant German federal state, *Nationaal Groenfonds* in the Netherlands, *Ersatzmaßnahmenfonds* of the Swiss cantons) who invest the amount in nature and landscape conservation projects (e.g. revitalization of streams, afforestation, and creation of specific habitats).

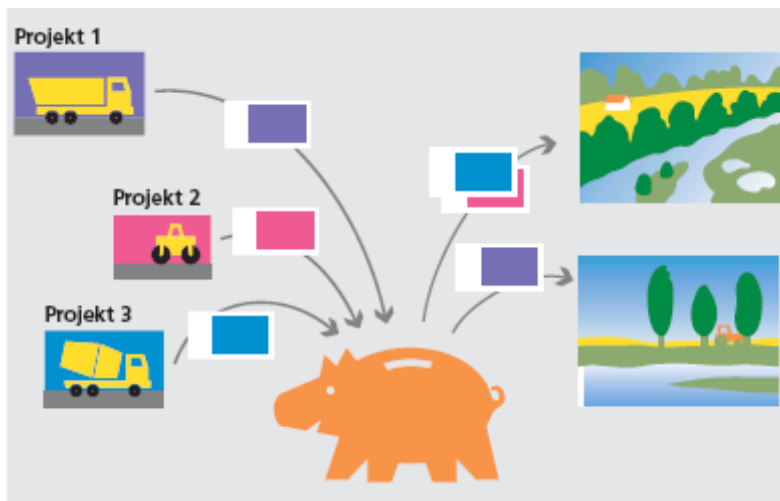


Illustration 18: Concept of financial compensation (Source: Kägi et al. 2002)

In Germany the following additional rules have to be met:

- the payment is made prior to the development
- the money is earmarked since it has to be spend in distinct nature conservation projects
- the projects must not depend on other legal obligations
- the projects have to be located within the same natural region of the impact.

In contrast to this, the Swiss compensatory payment is not related to distinct projects; the purpose of the money remains open while being deposited (no earmarking!). In the Netherlands, the *Nationaal Groenfonds* often supports projects being related to the EMS (see chapter EMS) while in Italy, the money is usually given to local authorities who spend it on specific projects after an agreement about them. The Italian, rather loosely regulated practice seems problematic, since local authorities may spend the money in projects of doubtful ecological gain (smaller, local infrastructure projects as e.g. new parking areas or cycle tracks). This is probably due to the already mentioned differing understanding of ecological compensation in Italy, comprising the offset of ecological and social functions being affected by a development.

In German practice, monetary compensation is rather applied within small developments. It is furthermore of higher importance, when negative impacts on the landscape need to be offset. Based on a publication of the Bavarian Agency for the Environment (Bayrisches Landesamt für Umwelt 2009) the following paragraphs list some suitable and some not accepted measures for financial compensation in Germany.

Appropriate measures for monetary compensation:

- Purchase of suitable sites for ecological valorization
- Measures of ecological valorization (e.g. removal of shrubs on abandoned dry grasslands)
- Measures of renaturation (e.g. rewetting measures for creating wetland meadows, renaturation of streams)
- Species conservation measures (e.g. development and maintenance of bat quarters)

Improper measures for monetary compensation:

- Pure measures of environmental education or public relation
- Pure cartographical task without project relation
- Third party (other than nature conservation authority) tasks which are bound to other legal obligations (e.g. measures for traffic safety)
- Purchase of machines/ equipments (e.g. specific mowers)

### 11.8.2 Legal Background

Considering the potential danger of abuse (see chapter Evaluation) but meanwhile indispensability of monetary compensation, the latter should be clearly regulated in nature conservation law.

Since the amendment of the German Nature Conservation Act in 2010, par. 15 n.o.6 of the BNatSchG contains a national regulation for monetary compensation, whereas the legal details are fixed in federal state law (e.g. in par. 6 of the Hessian compensation decree). Before, monetary compensation was uniquely regulated in the nature conservation law of the federal states. The latter is still the case for all other CODE24-partner countries: the regions or cantons define rules for the application of monetary compensation.

### 11.8.3 Evaluation

From developer's point of view, monetary compensation is an attractive tool for the offset of ecological damages deriving from projects/developments: the loss of time and energy for planning ecological compensation measures is largely minimized and the number of stakeholders being touched by the planning of the development (meaning: potential opponents) is reduced. Nevertheless, the following listing of pros and cons demonstrates that the instrument of monetary compensation should not be understood as 'license to trash' and has to be applied with caution.

Table 7: Pros and cons of monetary compensation

Advantages	Disadvantages
For developer: No loss of time and energy for planning comp. measures → no postponement of the superior project schedule	Risk of complaints since legal demand is natural compensation prior to financial compensation
The use of third party ground can be avoided	Compared to natural compensation, a financial offsetting is less accepted by nature conservation organizations and the public (→ not usable for external presentation)
Extent of touched public interests is limited	Loss of credibility of nature conservation authorities accepting financial compensation, since the principle of 1. on-site/ in-kind, 2. off-site/ off-kind and 3. financial compensation as a 'last resort solution' is

Advantages	Disadvantages
	ignored → loss of professional standards
	Risk that compensatory payments cover rather costs for planning nature conservation projects instead of their actual implementation
	Related possibility of financing public projects by private means must not result in a cut of public means for nature conservation
	Reduces the awareness for nature and landscape representing a limited resource and a public asset of ethical value which cannot be remunerated/compensated in a simple way

#### 11.8.4 Example

A German publication of the Bavarian Agency for the Environment (Bayrisches Landesamt für Umwelt 2009) presents some best-practice-examples for projects financed by money deriving from monetary compensation. One example was chosen out of the presented case studies and is described below.

<b>Monetary compensation for the new urban railway line Nürnberg – Roth: Management of water-meadows within the Rednitztal</b>	
Location	Rednitztal in Northern Bavaria (close to Nürnberg)
Investor	German Railway company via Bavarian Nature Conservation Foundation (Bayrischer Naturschutzfonds)
Type of compensation	Monetary compensation
Safeguarding	Purchase of sites, maintenance treaties with local farmers
Owner of site	partly the Environmental Agency Nürnberg (lower nature conservation authority), farmers
Implementation	Planning started in 2007
Description	<p>The German Railway Company had to compensate negative impacts deriving from the new railway line Nürnberg – Roth in Bavaria. Since the sites of the original compensation planning were finally unavailable, the admitting Federal Railway Authority (<i>Eisenbahnbundesamt - EBA</i>) accepted a financial compensation, comprising 1,2 Mio Euro. The money was transferred to the Bavarian Nature Conservation Foundation. The Foundation forwarded the money to the Environmental Agency Nürnberg who invested it in a – in spatial terms closely related – nature conservation project enhancing existing, ancient water-meadows as a habitat for numerous endangered wildlife species as birds, dragon flies, amphibians and many others. The project site Rednitztal is furthermore classified as Natura2000-site of EU-wide interest and represents a focus area for the development of habitats and species conservation measures.</p> <p>The following activities were financed by the compensatory payment:</p> <ul style="list-style-type: none"> <li>– Planning of a fauna-related conservation measure concept (2007/2008) including inventory of existing species</li> <li>– Land purchase and implementation of planned measures (since 2007)</li> <li>– Project management</li> </ul>



Monetary compensation for the new urban railway line Nürnberg – Roth: Management of water-meadows within the Rednitztal	
	<ul style="list-style-type: none"> <li>– Maintenance treaties with local farmers</li> <li>– Public relation</li> </ul> <p>The field work contained steps like:</p> <ul style="list-style-type: none"> <li>– Renaturation of waterbased habitats</li> <li>– Enhancing measures for several present species (e.g. White Stork)</li> <li>– Preservation of the historical water-meadow management system (ditches etc.)</li> <li>– Creation smaller water bodies, interlinking of biotopes</li> </ul> <p>The project has best-practice character for the CODE24-project since in this case</p> <ul style="list-style-type: none"> <li>– A compensatory payment was applied for a larger infrastructure project</li> <li>– An integrated compensation was applied by making use of an existing nature conservation concept</li> <li>– Public acceptance was recognized as an important factor of success (environmental education, information signs etc.)</li> </ul>
Management of site	Long term maintenance treaties with local farmers
Involved stakeholder	<i>Bayrischer Naturschutzfonds</i> → received money and forwarded it to the → <i>Umweltamt Nürnberg</i> as responsible body for the project implementation who signs treaties with local farmers to ensure the long-term maintenance and safeguarding
Website	<a href="http://www.nuernberg.de/internet/umweltamt/storchenprojekt">www.nuernberg.de/internet/umweltamt/storchenprojekt</a> <a href="http://www.naturschutzfonds.bayern.de/projekte/">www.naturschutzfonds.bayern.de/projekte/</a>

Impressions from the water-meadows of the Rednitztal: ditch system, environmental education, maintenance works, Banded darter and ancient water wheel

Source: [www.nuernberg.de/internet/umweltamt/projektgebiet\\_storch.html](http://www.nuernberg.de/internet/umweltamt/projektgebiet_storch.html)



Illustration 19: Nature conservation project Rednitztal next to Railway track Nürnberg-Roth (dark blue border).





## 12 Conclusion

The Europe 2020 biodiversity strategy emphasizes “that our natural heritage is a major ecological asset which is fundamental to human well-being.” Therefore “all Member States should cooperate and coordinate their efforts in order to ensure more effective use of natural resources and avoid net losses in terms of biodiversity and ecosystem services.” The European commission furthermore “recognizes that infrastructure-building, urbanization, industrialization and physical intervention in the landscape in general are among the most significant drivers of the fragmentation of ecosystems and habitats.” Consequently, the Commission “calls on local, regional and national governments (...) to consider these factors – which pose a threat to ecosystems and habitats – in their planning and development projects on both a large and a small scale” (European Commission 2011).

As part of the EU biodiversity strategy, the European Commission will push the full implementation of the Birds and Habitats Directive by developing a green infrastructure (GI) across the EU. A GI is “a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services” (European Commission 2013). Amongst others, designated Natura2000 sites form the hubs of a European GI. Main target of the GI is to reduce the ongoing fragmentation of the European landscape, as main reason for the global loss of biodiversity.

Considering those excerpts of the EU 2020 biodiversity strategy including the Green Infrastructure network, it is obvious that a strategic enhancement of the European transport axis corridor 24 has to be in line with those strategies by including concepts and solutions for avoiding, minimizing and compensating negative impacts on the natural environment. But the bottleneck situation of Corridor 24 mentioned in the introduction (chapter 1) does not only apply to transport capacities. The bottleneck also exists from environmental point of view (‘ecological bottleneck’): a sustainable project implementation in respect of all existing nature conservation policies (e.g. the European directives concerning habitat and species conservation) becomes an increasingly challenging task - especially in densely populated and intensively used regions. Hence, space-saving mitigation and compensation measures focusing on the reinforcement or (re-)creation of ecological corridor functions (e.g. ecoducts, wildlife tunnels) are of fundamental importance.

In action no. 5 of the CODE24 project a quest for new, innovative and successful approaches for “managing ecological compensation measures” was carried out. Main objective remains to encounter the problem of finding suitable sites for compensation measures. Serving as a base of knowledge, a synopsis of current existing regulations, methods and instruments of environmental impact compensation along corridor 24 was carried out first (see chapter 3 to 8). The diversity of existing regulations concerning ecological compensation was found to be extremely high. Some partner countries currently discuss or even prepare common regulations for ecological compensation. This adoption of legal frameworks is a positive development in nature conservation regulation and should be enhanced in all partner countries.

Another central task of action no.5 was the identification of factors contributing to a successful and efficient planning and management of ecological compensation measures. In this context the following repeatedly occurring recommendations should be considered during the planning process:

- focus on large scale, coherent and ecologically reasonable compensation measures
- start planning implementation at an early stage and with a long-term view
- avoid the use of third party ground and ensure a long-term safeguard of compensation sites
- caution with colliding municipal land-use and trade-offs within nature conservation interests



- inclusion of local land users at an early stage of compensation planning
- seeking for an early reconciliation (intense communication process) creates win-win situations
- compensation management should be part of a regional land management
- making use of already existing concepts, plans and strategies (e.g. regional parks, management schemes (*Managementpläne*))
- favor low maintenance input for functioning of compensation measures
- compensation planning should be understood as management task
- include according and participative processes
- make use of public relations and image building for a successful external presentation (→ measures need to be visible and tangible)
- also consider control systems and monitoring concepts in compensation planning

Large-scale impacts require large-scale compensation. This is especially valid for large infrastructure developments. Broad concepts with coherent compensation sites (e.g. compensation pools related to green conversion) as they are created and offered by professional service providers (compensation agencies) usually meet the recommendations listed above. They represent a one-stop solution which allows proceeding with the planning of the original development project. Smaller compensation measures, for example integrated compensation measures, are especially useful for species conservation related compensation in open land habitats.

With focus on large infrastructure projects linking the metropolitan regions Rhein-Main and Rhein-Neckar green conversion represents a unique opportunity for large scale nature conservation projects and compensation pool building. Another large potential for coherent compensation concepts consists of forest related compensation as it is offered by the Hessian State Forest. Nevertheless, all compensation planning within the narrow corridor formed by the Rhine and the Odenwald should be part of a regional land management which has to be coordinated by a regional partner, e.g. the *Verband Region Rhein-Neckar - VRRN*. The latter could adopt and coordinate a regional compensation pool as built up in the Bodensee region (*ReKoBO* see chapter 11.4.5 Example 2).

In conclusion, a successful compensation management aims on effective and sustainable measures causing a real and visible habitat improvement. The efficiency of compensation can be optimized when measures are implemented on coherent sites. Following those standards of ecological compensation meets European environmental policies and ensures public acceptance.

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## Annexes

**Annex 1: Compensation management - Institutions, regulations and guidelines**

**Annex 2: Exemplary questionnaire on environmental compensation management**



## Annex 1: Compensation management - Institutions, regulations and guidelines

### Europe

Directive/ Convention
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SEA Directive 2001/42 EC, Annex I Strategic Environmental Assessment
Strategic Environmental Assessment Directive 2001/42/EC of the European Parliament and of the Council on the assessment of the effects of certain plans and programs on the environment
Water Framework Directive (WFD) Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy
Handbooks
MANAGING NATURA 2000 SITES - The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (2000).

## GERMANY

<b>Institutions and stakeholders</b>
Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (BMU) (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)
Bundesamt für Naturschutz (BfN) (Federal Agency for Nature Conservation)
LANA-Ausschuss Eingriffsregelung und Landschaftsplanung
<b>Rheinland-Pfalz (Rhineland-Palatinate)</b>
Ministerium für Umwelt, Landwirtschaft, Ernährung, Weinbau und Forsten Rheinland-Pfalz (Obere Naturschutzbehörde) (Ministry for environment, agriculture, nutrition, viticulture and forestry Rhineland-Palatinate, upper nature conservation authority)
Kreisverwaltungen und Bezirksregierungen (= Untere und Obere Landespflegebehörden) (Urban and rural districts, upper and lower nature conservation authority)
Landesamt für Umwelt, Wasserwirtschaft und Gewerbeaufsicht
<b>Nordrhein-Westfalen (North Rhine-Westphalia)</b>
Das Ministerium für Klimaschutz, Umwelt, Landwirtschaft, Natur- und Verbraucherschutz des Landes Nordrhein-Westfalen (Obere Naturschutzbehörde) (Ministry for climate protection, environment, agriculture, nature and consumer protection of North Rhine-Westphalia, upper nature conservation authority)
Landesamt für Natur, Umwelt und Verbraucherschutz Nordrhein-Westfalen (LANUV) (Regional Authorities for nature, environment and consumer protection North Rhine-Westphalia)
Alle unteren Landschaftsbehörden der Kreise und kreisfreien Städte (Untere Naturschutzbehörde) (Urban and rural districts, lower nature conservation authority)
<b>Hessen (Hesse)</b>
Hessisches Ministerium für Umwelt, Ländlichen Raum und Verbraucherschutz - HMULV (Obere Naturschutzbehörde) (Hessian Ministry for environment, rural areas and consumer protection, upper nature conservation authority)
Regierungspräsidium Darmstadt, Abteilung LFN, Obere Naturschutzbehörde

(Regional council Darmstadt, upper nature conservation authority)
Regierungspräsidium Gießen, Abteilung LFN, Obere Naturschutzbehörde (Regional council Gießen, upper nature conservation authority)
<b>Baden-Württemberg</b>
Ministerium für Umwelt und Verkehr Baden-Württemberg (Obere Naturschutzbehörde) (Ministry for environment and traffic Baden-Württemberg, upper nature conservation authority)
Regierungspräsidium Karlsruhe, Höhere Naturschutzbehörde (Regional council Karlsruhe, higher nature conservation authority)
Regierungspräsidium Freiburg, Höhere Naturschutzbehörde (Regional council Freiburg, higher nature conservation authority)
Regierungspräsidium Stuttgart, Höhere Naturschutzbehörde (Regional council Stuttgart, higher nature conservation authority)
Regierungspräsidium Tübingen, Höhere Naturschutzbehörde (Regional council Tübingen, higher nature conservation authority)
<b>Legislation and regulations</b>
Gesetz über Naturschutz und Landschaftspflege (Bundesnaturschutzgesetz - BNatSchG) (German Federal Nature and Landscape Conservation Act)
Gesetz über die Umweltverträglichkeitsprüfung (UVPG)
<b>Rhineland-Palatinate</b>
Landesgesetz zur nachhaltigen Entwicklung von Natur und Landschaft (Landesnaturschutzgesetz - LNatSchG) vom 28. September 2005
Einführungserlass - Ökokonto im Vollzug der Eingriffsregelung nach §§ 4 bis 6 Landespflegegesetz
<b>North Rhine-Westphalia</b>
Gesetz zur Sicherung des Naturhaushalts und zur Entwicklung der Landschaft in Nordrhein-Westfalen (Landschaftsgesetz - LG) vom 05. Juli 2007
Verordnung über die Führung eines Ökokontos nach § 5a Abs. 1 Landschaftsgesetz (Ökokonto VO)
<b>Hessen</b>
Hessisches Ausführungsgesetz zum Bundesnaturschutzgesetz (HAGBNatSchG) vom 20. Dezember 2010



<p>Verordnung über die Durchführung von Kompensationsmaßnahmen, Ökokonten, deren Handelbarkeit und die Festsetzung von Ausgleichsabgaben (Kompensationsverordnung - KV). Vom 1. September 2005</p>
<p><b>Baden-Württemberg</b></p>
<p>Gesetz zum Schutz der Natur, zur Pflege der Landschaft und über die Erholungsvorsorge in der freien Landschaft (Naturschutzgesetz - NatSchG). Vom 13. Dezember 2005</p>
<p>Verordnung des Ministeriums für Umwelt, Naturschutz und Verkehr über die Führung von Kompensationsverzeichnissen (Kompensationsverzeichnis-Verordnung – KompVzVO). Vom 17. Februar 2011 Begründung zur KompVzVO, vom 14.02.2011</p>
<p>Verordnung des Ministeriums für Umwelt, Naturschutz und Verkehr über die Anerkennung und Anrechnung vorzeitig durchgeführter Maßnahmen zur Kompensation von Eingriffsfolgen (Ökokonto-Verordnung – ÖKVO) vom 19. Dezember 2010, GBL. 2010 S. 1089-1123</p>
<p><b>Guidelines and handbooks</b></p>
<p><b>Rhineland-Palatinate</b></p>
<p>Hinweise zum Vollzug der Eingriffsregelung nach den §§ 4-6 des Landschaftspflegegesetzes</p>
<p>Hinweise zur Durchführung von Ausgleichs- und Ersatzmaßnahmen im Wald (Anlage zum Schreiben des Ministeriums für Umwelt und Forsten Rheinland-Pfalz vom 06.03.03)</p>
<p><b>Hessen</b></p>
<p>Arbeitshilfe zur Verordnung über die Durchführung von Kompensationsmaßnahmen, Ökokonten, deren Handelbarkeit und die Festsetzung von Ausgleichsabgaben (Kompensationsverordnung - KV) (Tool for the act of the implementation of compensation measures)</p>
<p>Hinweise für naturschutzrechtliche Kompensationsmaßnahmen im Wald vom 21.07.2009 (Referencies for compensation measures according to nature conservation law in forests)</p>

## ITALY

<b>Institutions and stakeholders</b>
Ministero dell'Ambiente e della Tutela del Territorio (Ministry for the environment and the protection of the territory)
ISPRA (Institute for environmental protection)
<b>Lombardia (Lombardy)</b>
Direzione Generale Ambiente, Energia e Reti (Common administration for environment, energy and nets)
Direzione Generale Infrastrutture et Mobilità (Common administration for infrastructure and mobility)
<b>Piemonte (Piedmont)</b>
Direzione Trasporti, Infrastrutture, Mobilità e Logistica - Settore Infrastrutture Strategiche (Administration for transport, infrastructure, mobility and logistics - department strategic infrastructure)
Direzione Ambiente – Settore Compatibilità Ambientale e Procedure Integrate (Administration for Environment)
<b>Liguria</b>
Ambiente in Liguria - sviluppo sostenibile: valutazione di impatto ambientale (via) (Environment in Liguria - sustainable development, evaluation of environmental impact)
<b>Legislation and regulations</b>
DECRETO LEGISLATIVO 3 aprile 2006, n. 152 “Norme in materia ambientale”
DECRETO LEGISLATIVO 12 aprile 2006, n. 163 “Codice dei contratti pubblici di lavori, servizi, forniture in attuazione delle direttive 2004/17/CE e 2004/18/CE
D.P.R. 8 settembre 1997, n. 357 (1). Regolamento recante attuazione della direttiva 92/43/CEE relativa alla conservazione degli habitat naturali e seminaturali, nonché della flora e della fauna selvatiche
<b>Lombardia (Lombardy)</b>
LEGGE REGIONALE 11 marzo 2005, N. 12 "Legge per il governo del territorio"
D.G.R. 27 dicembre 2007, n. 8/6420 “Determinazione della procedura per la Valutazione Ambientale di Piani e Programmi – VAS (art. 4, l.r.n. 12/2005; d.c.r. n.351/2007)”

<p>LEGGE REGIONALE 4 febbraio 2010, n. 5 “Norme in materia di valutazione di impatto ambientale”</p>
<p><b>Piemonte (Piedmont)</b></p>
<p>LEGGE REGIONALE 14 dicembre 1998, n. 40 e s.m.i.1 “Disposizioni concernenti la compatibilità ambientale e le procedure di valutazione”</p>
<p>DECRETO DEL PRESIDENTE DELLA GIUNTA REGIONALE 16 novembre 2001, n. 16/R Regolamento regionale recante: “Disposizioni in materia di procedimento di valutazione d’incidenza”</p>
<p>LEGGE REGIONALE 21 aprile 2011, n. 4 "Promozione di interventi a favore dei territori interessati dalla realizzazione di grandi infrastrutture. Cantieri - Sviluppo - Territorio"</p>
<p>Legge Regionale 10 Febbraio 2009, n. 4 Gestione e promozione economica delle foreste - articolo 19</p>
<p><b>Liguria</b></p>
<p>LEGGE REGIONALE 30 dicembre 1998 n. 38 “Disciplina della valutazione di impatto ambientale”</p>
<p><b>Guidelines and handbooks</b></p>
<p>Linee Guida VIA (2001).</p>
<p>Il risarcimento del danno ambientale: Aspetti teorici e operativi della valutazione economica (2006).</p>
<p><b>Lombardia (Lombardy)</b></p>
<p>Convenzione delle alpi e buone pratiche nei comuni italiani.(2010).</p>
<p>Ddg 4517 del 7 maggio 2007: criteri ed indirizzi tecnico progettuali per il miglioramento del rapporto fra infrastrutture stradali ed ambiente naturale.</p>
<p>Dgr 3838 del 20 dicembre 2006: linee guida di valutazione degli impatti delle grandi infrastrutture sul sistema rurale.</p>

## NETHERLANDS

<b>Institutions and stakeholders</b>
Ministry EL&I
Dienst Landelijke Gebied - DLG
Provincies b.v. Utrecht
Dienst Regelingen
Gemeenten
Staatsbosbeheer
Nationaal Groenfonds
<b>Legislation and regulations</b>
Natural Conservation Act (Natuurbeschermingswet-NbWet)
Forestry Act (Boswet)
Flora and Fauna Act / Wildlife Act (Flora- en faunawet)
Regulations on EHS (Main Ecological Structure) / Spatial Planning Act. National ecological network (Ecologische Hoofdstructuur-EHS) based on Structuurschema Groene Ruimte 1995, Nota Natuur en Mensen, Mensen voor Natuur 2000 en Nota Ruimte 2004
Tracewet

## SWITZERLAND

<b>Institutions and stakeholders</b>
Federal Department of the Environment, Transport, Energy and Communications (Eidgenössisches Departement für Umwelt, Verkehr, Energie und Kommunikation - UVEK)
Federal Office of Transport (FOT)
Federal Office for the Environment (Bundesamt für Umwelt - BAFU)
Federal Office for Spatial Development (ARE)
Swiss Federal Railways (Schweizerische Bundesbahnen - SBB)
<b>Communes</b>
Regional Planning Associations
Cantonal office for spatial development
Private planning agencies
Enterprises
Nature protection organizations
Agriculture and forestry
<b>Legislation and regulations</b>
NHG SR 451 Bundesgesetz vom 1. Juli 1966 über den Natur- und Heimatschutz (Federal Nature Conservation Act)
NHV SR 451.1 Verordnung vom 16. Januar 1991 über den Natur- und Heimatschutz (Act on nature and home protection)
USG SR 814.01 Bundesgesetz vom 7. Oktober 1983 über den Umweltschutz (Umweltschutzgesetz) (Federal law on environmental protection)
SR 814.011 Verordnung über die Umweltverträglichkeitsprüfung vom 19. Oktober 1988 (UVPV) (Environmental Impact Assessment Act)
RPG SR 700 Bundesgesetz vom 22. Juni 1979 über die Raumplanung (Raumplanungsgesetz) (Federal law on spatial planning)





SR 814.20 Bundesgesetz vom 24. Januar 1991 über den Schutz der Gewässer (Federal law on the protection of waterbodies)
Bundesgesetz vom 4. Oktober 1991 über den Wald (Waldgesetz, WaG)
Verordnung vom 30. November 1992 über den Wald (Waldverordnung, WaV)
Verordnung vom 28. Oktober 1992 über den Schutz der Auengebiete von nationaler Bedeutung (Auenverordnung, AuenV) - (Act on the protection of floodplains of national interest)
Verordnung vom 7. September 1994 über den Schutz der Flachmoore von nationaler Bedeutung (Flachmoorverordnung, FMV) - (Act on the protection of fens of national interest)
Verordnung vom 21. Januar 1991 über den Schutz der Hoch- und Übergangsmoore von nationaler Bedeutung (Hochmoorverordnung, H MV) - (Act on the protection of high bogs and transition bogs of national interest)
<b>Guidelines and handbooks</b>
Bundesamt für Umwelt 2009: UVP-Handbuch. Richtlinie des Bundes für die Umweltverträglichkeitsprüfung. Umwelt-Vollzug Nr. 0923, Bern. 156 S. (Environmental Impact Assessment handbook)
Wiederherstellung und Ersatz im Natur- und Landschaftsschutz (Restoration and replacement in nature and landscape conservation)



## Annex 2: Exemplary questionnaire on environmental compensation management



## Questionnaire –

### Environmental Compensation Management in the Netherlands

1. Which Dutch institutions/stakeholders (State- and Province level) take part in the environmental compensation management?
2. Which laws/instruments regulate the environmental compensation management and the environmental impact assessment at the different administrative levels (State, Province)?
3. Which environmental factors are taken into account by the environmental compensation regulation? (e.g. Main Ecological Structure, etc.)
4. Are there any specific instruments facilitating the environmental impact compensation, for example compensation-pools, eco-accounting etc.?
5. Are there any specific obligatory measures for the compensation of impacts? Which ones? (E.g. in Hessen, Germany: when a surface is sealed another one must be unsealed)
6. Which temporal and spatial coherence must exist between impact and compensation
7. How are the impact avoidance requirements implemented?
8. How are impacts and compensation measures balanced (method)?
9. Is there any difference between the compensation of impacts in the Dutch Provinces (Zuid-Holland, Gelderland, Noord-Brabant, Utrecht)? Which ones?
10. Is a monetary compensation possible? Which method is used in this case?
11. Are there particular laws/regulations concerning the compensation of impacts for linear infrastructure projects?
12. Do you know any manual about the compensation of impacts in the Netherlands or the concerned provinces (Zuid-Holland, Gelderland, Noord-Brabant, Utrecht)?

13. Are there specific approaches concerning the compensation of impacts in agglomerations?
14. Which role plays the NATURA 2000 Network for compensation management in the Netherlands? (E.g. in Hessen, Germany: the compensation measures should be preferentially implemented in the Special Areas of Conservation (SCA)).
15. Which role plays the Water Framework Directive for compensation management in the Netherlands?
16. Do you know any other contacts, corporations, web pages etc. concerning the compensation management in the Netherlands (especially from the Provinces of Zuid-Holland, Gelderland, Noord-Brabant, Utrecht)?
17. Do you know any larger linear infrastructure projects in the Netherlands, which could serve as a case study? (E.g. in Italy: "Autostrada Pedemontana" Lombardy)
18. How is the Main Ecological Structure ("Ecologische Hoofdstructur - EHS") taken into account when planning and impact compensation are carried out?
19. Which stakeholders are involved during the realization of compensation measures?
20. Are there any concepts to involve the public, the landholders, the farmers etc. in the process of project-planning, aiming at a higher acceptance of infrastructure projects?
21. Which are the deficits of compensation management in the Netherlands?