



VAASAN YLIOPISTO

NINA HERALA

Use of Qualitative Comparative Analysis  
(QCA) in Comparative Law

Comparison of the Legal Regulation of Sustainable  
Development in Physical Planning in Denmark and  
Finland

ACTA WASAENSIA

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No. 124

Jurisprudence 2  
Public Law

UNIVERSITAS WASAENSIS 2004

Referees

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## PREFACE

I got interested in qualitative comparative analysis (QCA<sup>1</sup>) on a summer course for doctoral students, held in Oslo in 1993 by Charles C. Ragin, Professor of Sociology and Political Science at the University of Arizona. The idea of applying in comparative law a method developed for comparative sociology was matured on the side of my doctoral thesis. In 1998, when I got a postdoctoral researcher post for three years at the Academy of Finland, I seized the opportunity to further develop the use of QCA on comparing legal regulation of sustainable development in physical planning in Denmark and Finland. The subject was familiar to me from my doctoral thesis I wrote on the division of competence in physical planning in the Nordic countries.

The generosity of the Academy of Finland<sup>2</sup> made it possible to concentrate on a time consuming project and to present the ideas for colleagues at conferences. I also had the chance, due to the funding from the Academy of Finland, to spend six months in 1999 at the University of Århus as a visiting researcher, to extend my knowledge of environmental law in Denmark. I would like to thank Jaakko Husa, Professor of Public Law at the University of Vaasa and Kimmo Nuotio, Professor of Law at the University of Helsinki for their comments on the manuscript. I owe thanks also to many colleagues at the University of Vaasa (Finland), especially Doctor Esa Hyyryläinen, and colleagues at the University of Århus (Denmark), who have been willing to discuss the themes of this book.

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Vaasa  
December 2003

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<sup>1</sup> To learn more about QCA see <http://www.compass.org/Didactic.htm>. The software can be downloaded at <http://www.u.arizona.edu/~cragin/software.htm>. The next version of QCA, FS/QCA software, which is under development, will correspond to qualitative leap as compared to the previous versions: it includes both "fuzzy sets" and QCA procedures; it allows one to use a broader range of algorithms; and it allows one to include a larger number of independent variables.

<sup>2</sup> The language check was funded by the Academy of Finland and made by Sheryl Hinkkanen from the AS-English Specialists Oy. The quotations of the Building Act and Building Decree are based on the translation of the English Centre, Helsinki; the quotations of the Land Use and Building Act are based on the booklet on Finnish Environmental Legislation 1 Land Use and Building by the Ministry of the Environment, Finland; the quotations of the Planning Act are based on the translation of David Breuer by the Ministry of Environment and Energy, Denmark.



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NKNO No 172 C. 1999  
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NKNO No 179 1999

Østre Landsrets dom 743/2000 (Court of Appeal, Denmark)  
Højesterets dom 1057/2001 (Supreme Court, Denmark)

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### ABBREVIATIONS

ASAC	Act on Supreme Administrative Court, 22 July 1918 no. 74 (Finland)
BA	Building Act (Finland, 16 August 1958 no. 370, in force until 31 December 1999)
BD	Building Decree (Finland 26 June 1959 no. 266, in force until 31 December 1999)
BKG	Bekendtgørelse (Denmark)
Cirk	National Plan Directives (Denmark)
ECHR	European Court of Human Rights
ESDP	European Spatial Development Perspectives
FOB	Folketings ombudsmanden (Danish Parliamentary Ombudsman)
FT	Folketingstidende (Danish Parliamentary documents)
GL	Danmarks Riges Grundlov (Constitution of Denmark, 5 June 1953 no. 169)
HE	Hallituksen esitys (Government Proposal of Finland)
HM	Suomen Hallitusmuoto 17 July 1919 no. 94 (Constitution Act of Finland, in force until 1 March 2000)
ICJ	International Court of Justice
KHO	Korkein hallinto-oikeus (Supreme Administrative Court of Finland)
LBKG 1997/563	Lovbekendtgørelse om planlægning 30 June 1997 no. 563 (consolidated Planning Act)
LUBA	Land Use and Building Act (Finland, 5 February 1999 no. 132 entered into force on 1 January 2000)
NKN	Naturklagenævnet (the Nature Protection Board of Appeal in Denmark)
NKNO	Naturklagenævnet Orienterer (References from Decisions of the Nature Protection Board of Appeal in Denmark)
PA	Planning Act (Denmark, 6 June 1991 no. 38, reprinted 28 June 1999 no. 551)
PL	Suomen perustuslaki 11 June 1999 no. 731 (Constitution of Finland, entered into force on 1 March 2000)
QCA	Qualitative Comparative Analysis

**ABSTRACT**

Herala, Nina (2004). Use of Qualitative Comparative Analysis (QCA) in Comparative Law. Comparison of the Legal Regulation of Sustainable Development in Physical Planning in Denmark and Finland. *Acta Wasaensia* No. 124, 188 p.

This book concentrates on comparing the meaning of the expression sustainable development in physical planning in Denmark and Finland by using a particular technique of computer-aided analysis, the so-called Qualitative Comparative Analysis (QCA). The substance of the analysis consists of legal regulations on sustainable development in physical planning legislation. The concept of sustainable development stresses the effects that land use has on environment and human well-being. What kinds of rules have been stipulated to co-ordinate and weigh different interests that are directed on land use? To find out how sustainable development is regulated in planning legislation I have focused on the material provisions regulating land use planning.

Different aspects of sustainable development are sometimes in conflict with each other. For example human rights perspective on sustainable development can be in conflict with the ecological balance when the right to use land for construction is limited by arguments to protect nature. This book attempts to show how Qualitative Comparative Analysis can be used to identify patterns in emphasizing different aspects of sustainable development. QCA unites empirical and logical aspects of legal thinking in allowing analysis of empirical facts, taken into account the way they are represented in court decisions, to be analysed by logical processes of John Stuart Mill's method of agreement and indirect method of difference and Boolean algebra.

The criteria for the analysis are based on legal sources. Both the Danish Nature Protection Board of Appeal and the Finnish Supreme Administrative Court have only taken into consideration interests that have been stipulated in legislation. The research shows that sustainable development hasn't been applied as a principle in either of the two countries. Merely different aspects of sustainable land use planning, which have been prescribed in physical planning legislation have been taken into consideration. These aspects of sustainable land use planning are protection of nature and cultural values, especially open shores and undeveloped areas, location of human activities to reduce traffic, especially location of commercial services and quality of human environment, including adequacy for health and amenity values.

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**Keywords:** Qualitative Comparative Analysis, comparative law, environmental law, sustainable development, town and country planning

## 1 QUALITATIVE COMPARATIVE ANALYSIS IN COMPARATIVE LAW

### 1.1 Why use qualitative comparative analysis in comparative law?

The flow of information in the society is increasing in a way that makes it necessary to use some aid to help to organise it. Until the 1980s' the computers where developed in the branch of jurisdiction to manage as decision-makers (called expert systems) provided only with relevant information<sup>3</sup>. Currently the development rather stresses the role of the decision-maker as interpreter of the available information. But the decision-maker (or researcher) needs aids to organise the flow of information. This is where computers have proved useful, not only to help distribute information via the World Wide Web, but also to organise it according to different needs. Software that processes data for qualitative research<sup>4</sup>, and in this case makes comparisons, like Qualitative Comparative Analysis does, helps organise information, but does not do the interpretations for the researchers.

The study of a complex social phenomenon, such as *sustainable land use*, requires that the conditions involved in the phenomenon in general, and the combinations of conditions involved in specific cases are recognized. Social phenomena are complex, and the various conditions related to the phenomena can be combined in a variety of ways. It is the specific combinations of conditions in a particular situation that produce most qualitative changes, not the single conditions in themselves (Ragin 1987: 25–26), and this is what QCA concentrate on.

The construction of the legal materials compared is much the same in both legal doctrine and comparative law.<sup>5</sup> The difficulty encountered in comparative law is how to reveal

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<sup>3</sup> There is still current interest to develop artificial legal intelligence. See e.g. Gray 1997.

<sup>4</sup> The software for management and analysis of qualitative data, e.g. QSR NUD\*IST Vivo (NVivo), process text without having to code documents, but lack the comparative elements that QCA comprises. On using NVivo, see Richards 1999.

<sup>5</sup> It is widely supposed that the comparability of legal systems depend mainly on cultural, political, and economic factors, including historical and religious features and adding geographical factors (Grossfeld 1990: 72–74). The compared countries in this research, Denmark and Finland, have traditionally close political and cultural ties. The Nordic countries co-operate within the Nordic Council and the Nordic Council of Ministers with the aim of developing and consolidating contacts among the five countries of the Northern region (Sweden, Norway, Denmark, Finland, Iceland and the autonomic territories of Greenland, the Faeroes and the Åland Islands), see <http://www.norden.org/start/>. Both countries are participating in the political and economic integration of Europe (EU) and are highly industrialized modern market economies. The prevailing

elements that determine the way law is perceived, interpreted and applied in a foreign legal system.<sup>6</sup> We need to ascertain both the legal structure and the material regulations of the phenomenon in question. A comparison at the level of secondary rules gives a picture of the formal structures of the law, whilst primary rules govern the behaviour (Van Hoecke & Warrington 1998: 497, 521–522). Comparative law should, as well as legal dogmatics, look beyond the primary rules to the structures that make up the dimensions of legal problem-solving (Samuel 1998: 832).<sup>7</sup> In the regulation of sustainable land use, the structure of legal problem-solving involves the extent of the right of property<sup>8</sup> and the competence of the authorities as well as the legal status of different land use plans in the countries being compared. In this research the primary rules consist of the rules on the content of the physical plans in the two countries.

Legal decision-making traditionally consists of a principal rule and exceptions to this rule. The field of administrative law, which the part of environmental law that regulates land use planning is belonging to, has few principal rules. Administrative law consists of legal principles, aims and interests, and often involves the balancing of interests, which is realized within the criteria on the basis of legal sources<sup>9</sup> (Herala 1997). The balancing

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religion (around 90 %) in both Finland and Denmark is Evangelical Lutherans (<http://www.cia.gov/cia/publications/factbook/>).

<sup>6</sup> When comparing two Nordic countries like Denmark and Finland that belong to the same Nordic Law family, the risks for misunderstandings are smaller than when one compares countries of different legal background. The most common opinion today is that the Nordic legal systems are a separate legal family distinct from both civil and common law even if it is admitted that there has been a considerable influence from continental legal thinking (Zweigert and Kötz 1994: 287, Tamm 1998: 17). The Roman law took a weak form in the Nordic countries even though comprehensive codes were produced in Denmark as the 'Danske Lov of King Christian V', which came into force in 1683 and in Finland (as a part of Sweden at the time) the Swedish code 'Sveriges rikes lag', which came into force in 1734. (Zweigert and Kötz 1994: 288–289.) The Swedish law was applied in Finland also during the time as a grand-duchy of Russia (Aarnio 2002: 3). Both countries apply the civil law tradition in a more concrete and practical way as opposed to the more abstract and systematic way of thinking in continental European countries. Of historical reasons Denmark and Norway have a more similar system while Sweden and Finland have similar basis within the Nordic countries (Tamm 1998: 15–17).

<sup>7</sup> Comparative law may be divided into macro comparison and micro comparison. In macro comparisons the spirit and methods of different legal systems are compared, while in micro comparisons specific legal institutions or problem-solving is being compared. However, in micro comparisons also the general institutional context in which the rules have been developed and applied must be taken into consideration. (Zweigert and Kötz 1994: 4–5.)

<sup>8</sup> The interests to be balanced here are ownership rights' and general welfare. Unless there are environmental restrictions on landowners' rights one owner might contaminate or other wise ruin the environment of others. How far the restrictions may reach is the key issue, which has been interpreted based on precautionary principle. (Stallworthy 2002: 77–82.)

<sup>9</sup> As belonging to the civil law tradition, legislation is the primary source of law in the Nordic countries (De Cruz 1995: 28, 36–37). The legislation represents the political will of the parliament to regulate different



between public and private interests mainly takes place in each individual decision made by the authorities, and there are usually no provisions on how these interests should be weighed against each other. In order to ascertain the prevailing legal interpretation with regard to the balancing of interests, I have used the highest court decisions to reflect the interpretation of the legal regulation of sustainable land use planning<sup>10</sup>.

Qualitative comparative analysis, or QCA, combines two ways of simplifying complexity: it both examines similarities and differences between a limited number of cases, and it inspects relations between variables (Ragin 1987:XIII). QCA could be described as a variable-oriented qualitative comparative method. In QCA, relations between the parts are understood within the context of the whole (Ragin 1987:X). Attributes (variables<sup>11</sup>) represent the facts and configurations represent the structures used to analyse the legal problems being compared. In this case, construction of the model of facts means definition of the attributes that determine sustainable development in land use planning. Integration of this model into the construction of social reality can be accomplished on the level of analysing court decisions within the context of legal sources. Court decisions reflect the social reality that is attained by legal regulation (Strömberg 1996: 120). The use of QCA will enable us to analyse the application of legal regulation by court decisions and to determine how the elements and relationships contained in knowledge systems function within sets of facts. In other words, we can determine how criteria promoting sustainable land use are weighed against each other in land use planning. QCA thus unites empirical and logical aspects of legal thinking.

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aspects of the society in advance. Thus *travaux préparatoires* is an important source when interpreting the law and finding out the will of the legislator. Precedents merely represent the written law in practice and the courts are bound to apply the legislation whenever the legislators will can be interpreted. Even though the precedents are not a legally binding source, the courts tend *de facto* to follow the interpretation of law applied by the court itself or a higher court. (von Eyben 1991: 20–22, Timonen 2002: 26–30.)

<sup>10</sup> All the materials of interpretative argument are used: the statutory texts, *travaux préparatoires* and precedents. For the sources of law in Finland see Aarnio 1991: 144–146 and in Denmark see von Eyben 1991: 15–22.

<sup>11</sup> Ragin calls the conditions or criteria variables. I prefer to call them attributes as this stresses the qualitative nature of the method as applied in comparative law.

## 1.2 Qualitative comparative analysis as a comparative method

QCA involves applications of Mill's method of agreement and his indirect method of difference<sup>12</sup>. These are methods of inductive inquiry that examine the similarities and differences concerning the preconditions of a specific outcome. The method does not work with statistical samples but can be applied to all instances the researcher considers relevant to the phenomenon of interest.<sup>13</sup> The method should be used to develop a dialogue between the researcher's ideas and the evidence involved in the cases. (Ragin 1987: 12, 15, 42.)

The critical key feature of the method is that comparison involves an intersection of a set of conditions producing outcomes, not the separate or independent conditions. Mill calls it "chemical causation"; the basic idea is that a phenomenon emerges from an intersection of appropriate preconditions. (Ragin 1987: 25.) In other words, the method reveals not only which conditions are present but also which conditions are absent at the same time when a certain outcome is produced.

Mill's method of agreement argues that "[i]f two or more instances of the phenomenon under investigation have only one circumstance in common, the circumstance in which all instances agree is the cause (or effect) of the phenomenon of interest". The method of agreement is a search for patterns of invariance and implies that whatever can be eliminated is not connected with the phenomenon by any law. (Mill 1970: 255–256.) This could be interpreted to refer to the *ratio decidendi*, or the statement of a legal principle, of the case. The researcher attempts to determine which of the circumstances is constant across all instances. Ragin claims that this single circumstance might be a recurrent combination of conditions. (Ragin 1987: 36–37.)

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<sup>12</sup> Mill (1970: 259) uses the expression joint method of agreement and difference of this third canon or method of experimental inquiry.

<sup>13</sup> QCA is a means for qualitative research, which enables to analyse the connections between different features of legal systems through case analyses, while quantitative research deals with statistics like the research conducted by Schäffer, Rácz and Rhode (1990), which investigates correlations of the various elements of analysed legal systems through the number and volume of normative acts.

Mill's indirect method of difference is a double application of the method of agreement. It is used to establish patterns of invariance as well. This method states that "[i]f two or more instances in which the phenomenon occurs have only one circumstance in common, while two or more instances in which it does not occur have nothing in common save the absence of that circumstance, the circumstance in which alone the two sets of instances differ is the effect, or the cause, or an indispensable part of the cause, of the phenomenon" (Mill 1970: 259)<sup>14</sup>. This method consists of three distinct phases. The first phase is to identify attributes of instances where the outcome is positive. The second phase is to recognize which attributes produce a negative outcome. The third phase involves the rejection of competing single-factor explanations through paired comparisons. The method uses negative cases to reinforce conclusions drawn from positive cases. (Ragin 1987: 39–41.) *Positive cases* in this research are cases where the outcome is that the land is used in accordance with the aim of sustainable development. The *negative cases* are cases where the land use has been assessed to be unsustainable. This is the situation when the plan has been overturned because of the attributes linked with sustainable development.

The main problem of Mill's methods, according to himself, is their inability to establish any link between cause and effect. This is typical of case-oriented methods that usually identify invariant relationships. They do not explain variation. (Ragin 1987: 42, 87.) If the method is not used in an explanatory way but more in an understanding way, as it is in this study, it is quite sufficient that the method primarily establishes the link between the presence and absence of attributes in relation to a certain outcome, even though it does not propose any link of cause and effect between them<sup>15</sup>.

QCA applies formal logic that uses techniques from mathematics to represent good reasoning and to analyse it. Mill's methods utilize Boolean algebra<sup>16</sup>, the algebra of logic and sets. According to Boolean algebra, the attributes and the outcome are transformed to nominal-scale measures by addressing them in cases as present, when they are given the

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<sup>14</sup> Jarrard (2001: 65) expresses the same in a less rigorous form: whether present or absent the variable in question always accompanies the consequent.

<sup>15</sup> Mill's Canons indisputably establish relationships; whether the relationships are causal is an independent problem (Jarrard 2001: 65).

<sup>16</sup> George Boole tied logic and mathematics together in his book of 1854 *An Investigation of the Laws of Thought, on Which are Founded the Mathematical Theories of Logic and Probabilities*. London: Walton and Maberley (Schroeder 1997: 61).

value (1), or as absent, when they are given the value (0).<sup>17</sup> The nominal-scale measures are merely symbols of the presence or absence of the attributes attached to the outcome. An upper-case letter indicates that the attribute is present (e.g. A) and a lower-case letter that it is absent (e.g. a). The second features of Boolean algebra that are utilised in QCA are addition and multiplication. Boolean addition is equivalent to the logical operator OR and Boolean multiplication indicates logical AND. Boolean addition (+) indicates that the attributes are alternative, and Boolean multiplication (\*) that the attributes intersect, i.e. that the attributes are necessary. The sign for multiplication is not shown in the QCA equation; rather the attributes are written together without any signs between them. (Ragin 1987: 85–93.)

According to the Boolean minimization rule, which is applied in Mill's method of agreement, if two Boolean expressions differ in only one term, then that term is considered irrelevant for the outcome and can be removed. For example, an equation ' $X=AbC+ABC+AB+Bc$ ' indicates that the outcome X is produced by attribute combination 'AbC', 'ABC', 'AB' or by attribute combination 'Bc'. This equation can be minimized by combining terms 'AbC' and 'ABC', which differ only with regard to term 'B'. The attribute combination 'AC' produces the outcome 'X' regardless of whether 'B' is present or absent (b). The value of 'B' is irrelevant in these two terms and can be omitted, while term AC represents both terms 'AbC' and 'ABC'.

Now we have the equation ' $X=AC+AB+Bc$ '. These attribute combinations, which are also called prime implicants, can be minimized further through a second phase of Boolean minimization. The goal is to cover as many logical Boolean expressions as possible with a minimal number of prime implicants. We can see that 'AB' is covered by prime implicants 'AC' and 'Bc' together and can thus be reduced. This is understandable if we realize that 'Bc' means all B's ('B') except the intersection with 'C' ('c'). In other words, the presence of attribute 'B' is necessary (and sufficient in this case because it is the only attribute in the combination) to produce outcome 'X' provided that the attribute 'C' is absent ('c'). This

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<sup>17</sup> Ashley (1990) uses the same binary coding when he analyses the use of the HYPO program. When using the HYPO program a person decides in each case using a list of factors relevant to the cases whether the factor is present in a particular case. The use of Mill's method of agreement, Mill's indirect method of difference and De Morgan's Law differs QCA from HYPO.

reasoning also applies when 'B' intersects with 'A' ('AB'), except when 'A' intersects with 'C'.

The final phase of minimization is the equation ' $X=AC+Bc$ '. This equation shows us that it is important to pay attention to attribute 'C' because when it is absent attribute 'B' is regarded necessary and sufficient to produce outcome 'X' ('Bc'). By contrast, when attribute 'C' is present, attribute 'A' must also be present in order to produce outcome 'X' ('AC'). These techniques, however, should not be used mechanically, as otherwise we might lose information when the equation is minimized still further. The final phase should be used only if it is informative as concerns the research topic. (Ragin 1987: 93, 97–98.)

De Morgan's Law<sup>18</sup> is used in Mill's indirect method of difference. According to De Morgan's Law, the solution for negative outcomes can be derived from the solution for positive outcomes, and vice versa. Technically this means that elements present in the equation for positive outcome are coded as being absent, and that elements absent are coded as being present. Then logical AND (+) is recorded to logical OR (\*) and logical OR is recorded logical AND. (Ragin 1987: 98–99.) The equation attained by using De Morgan's Law is combined with the attribute combinations accomplished in the Boolean minimization. In this way we may extend the information from positive cases, which is often restricted, by adding the information from negative cases. Applied to the topic of this study – using de Morgan's Law means that – if sustainable development requires that at the same time nature is conserved and the environment is adequate for the health of human beings ( $X=AB$ ), then we can conclude that the development is not sustainable if either the nature is not conserved or if the environment is not adequate for the health of human beings ( $x=a+b$ ).

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<sup>18</sup> Augustus De Morgan presented his formal logic in 1847 in *Formal Logic; or, the Calculus of Inference, Necessary and Probable* (Schroeder 1997: 49). De Morgan's Law is represented mathematically as follows:  $\neg(AB) = \neg A + \neg B$  and  $\neg(A+B) = \neg A \neg B$ , while e.g. not A ( $\neg A$ ) is marked 'a' in this study.

### 1.3 Structure of the analysis

The structure of this book mainly follows the research process. This is because the book strives to illustrate how Qualitative Comparative Analysis (QCA) applies to legal thinking and to assess whether this approach is useful in legal dogmatics and further in comparative law. The main assumptions underlying the use of QCA were explained in the first chapter.

The approach to the use of QCA applied in this research is both deductive and inductive. The research process starts in Chapter 2 with a theoretical analysis aiming to define criteria that will be used to analyse cases. Sustainable development is a broad, undefined concept that is examined from a more narrow perspective in the context of land use planning. The definition of sustainability in land use planning is used to analyse how sustainable development has been regulated by law. The criteria defined on these grounds are the attributes used to interpret the cases that are research objects. The method is inductive in that analysis of the cases brings up more attributes and leads to redefinition of the attributes in consequence of the resulting inconsistencies.

The third chapter deals with the selection of cases. The cases in this research have been selected by using the attributes defined for sustainable land use and, as concerns Finland, by choosing the land use planning decisions<sup>19</sup> made by the Supreme Administrative Court (KHO) that have dealt with the selected attributes. In Finland, the legislation on land use planning was thoroughly revised at the beginning of the year 2000<sup>20</sup>. Because only a very few Supreme Administrative Court cases have applied the new Land Use and Building Act and Land Use and Building Decree, the study is based on the previous legislation, i.e. the Building Act and the Building Decree. The analysis includes the respective provisions of the current legislation. In Denmark, which has been chosen as the other object of study in order to be able to illustrate the comparison of the two countries, the Planning Act<sup>21</sup> regulates the interests defined as being part of sustainable land use. Decisions of the Nature

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<sup>19</sup> In Finland the judiciary is divided into general courts and administrative courts. For more detailed information in English see Aarnio 2002: 13–15.

<sup>20</sup> The foundations of this legislation are presented in English by Anne Kumpula 2002: 510–516.

<sup>21</sup> See outline of Danish Environmental Legislation in English and specially on physical planning by Ellen Margrethe Basse 1996:375–392.

Protection Board of Appeal<sup>22</sup> illustrate the weighing of interests regulated by this law. To highlight the difference between more general plans and concrete action plans, the regional and master plans are often referred in this study as 'overall plans', while local plans that regulate detailed land use planning are handled separately.

Chapters 4, 5 and 6 consist of the QCA analysis. The comparison pays attention to both the similarities and differences in the two countries being compared. First the countries are analysed separate in Chapter 4.2 in order to highlight the differences between the two countries. Then the similarities are examined in Chapter 4.3. The analysis is developed further by highlighting the different aspects of sustainable land use in Chapters 5 and 6. Finally, the results are interpreted in Chapter 7, where conclusions are drawn concerning the use of QCA in legal dogmatics and in comparative law in particular, and concerning sustainable land use in Finland and Denmark.

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<sup>22</sup> In addition to the ordinary courts in Denmark there are boards, which on a permanent basis deal with special areas of administrative disputes. In English see Melchior 1996:103.

## 2 CRITERIA FOR THE COMPARISON: TERTIUM COMPARATIONIS

### 2.1 Legal regulation of sustainable land use

To avoid problems caused by analysing foreign legal systems through one's own doctrinal concepts, a neutral position for comparative research is to be developed.<sup>23</sup> Once the research topic – in this case “Sustainable land use” – has been decided, the first step is to define the interests involved in (interest balancing to attain) sustainable land use planning. How have different aspects of sustainable development in physical planning been regulated? The definition of different attributes is based both on factors having an effect on legal regulation and on the factors of physical planning involved in sustainable development in land use planning. This book concentrates on the substantive elements of sustainable development in physical planning. How has sustainable development been legally regulated in physical planning legislation?

The first step is to try to define what sustainability in land use planning involves. The concept of sustainable land use<sup>24</sup> stresses the effects that land use have on the environment. Sustainable land use is part of the concept of sustainable development, which combines the aim of sustainability and the right to development, and the concept of land use. Sustainable land use is not an established legal concept, but evolving through the processes of international agreements<sup>25</sup>, EC legislation and national policy and regulations. What kinds of rules have been stipulated to co-ordinate and weigh against each other when deciding on different interests that are directed on land use? In order to determine what sustainable development is according to legislation on planning, I will focus on the material provisions regulating land use.

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<sup>23</sup> Zweigert and Kötz (1994: 30) introduced the concept *tertium comparationis* to advocate a neutral means as a point of comparison.

<sup>24</sup> Sustainable development, which is about how to politically organise development with respect to sustainability, should be distinguished from the concept of sustainability, which is a quantifiable concept on ecological and biological integrity (Porritt 2000: 103–104, Stallworthy 2002: 1).

<sup>25</sup> Both Finland and Denmark are party to the following international environmental agreements: Air Pollution, Air Pollution-Nitrogen Oxides, Air Pollution-Sulphur 85, Air Pollution-Sulphur 94, Air Pollution-Volatile Organic Compounds, Antarctic Treaty, Biodiversity, Climate Change, Desertification, Endangered Species, Environmental Modification, Hazardous Wastes, Marine Dumping, Marine Life Conservation, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, Wetlands, Whaling and Climate Change-Kyoto Protocol (<http://www.cia.gov/publications/factbook/>, <http://untreaty.un.org/English/TreatyEvent2002/index.htm>).



The main issues in legal regulation of sustainable land use consist of rules, aims and principles. Since decision-making in the field of administrative law is often based on interest balancing<sup>26</sup>, the *legislation should define which interests* can and ought to be taken into consideration as requirements for the content of plans. If sustainable development also is an aspect of the legislation in force as a *legal principle*, it would be directly applicable as, for example, is the case with the principle of equality<sup>27</sup>. The *aims of legislation* – e.g. sustainable land use – merely indicate the direction of the interest balancing. Different aspects of sustainable land use; namely ecological, economical, social and cultural feature indicate that these are the sides of the aim that have to be taken into consideration.

Land use is regulated through town and country planning, which is designed to balance economic, political, social and environmental factors. Physical planning includes both legal and appropriateness discretion. Appropriateness discretion gives the authorities the opportunity to apply the aims and flexible rules of planning legislation to contemporary social values within the framework of their competence, legal regulations and prevailing plans. The primary rules to be taken into account in the interest balancing are the regulations governing the contents of the spatial plans, and the secondary rules are the institutional regulations defining the authorities competence and the legal status of the plans. As an aim in the planning legislation sustainable development should have an impact on the weight the different interests are getting in proportion to each other in every decision. If sustainable development is considered to be in force as a legal principle, even other criteria than those mentioned in the legislation should be taken into consideration if being part of sustainable development.

Characteristic of physical planning is that it concentrates on fitting together different requirements concerning land use. In Denmark, the whole country is divided into urban and rural zones and summer cottage areas, while in Finland there has been different required content on plans for urban, rural and coastal areas. Both in Finland and in Denmark, land use planning consists of three types of plans. Regional plans (PA, §6; BA,

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<sup>26</sup> Even the concept of sustainable development comprises the element of interest weighing.

<sup>27</sup> When talking about sustainability, the competence of the authorities is restricted by the principles restricting administrative decision-making (legal equality, objectivity, the prohibition of unlawful purposes and the principle of proportionality).

§22.2) concern interests wider than just one municipality. Master plans (PA, §11; BA, §22.2, §29.1) encompass all of a municipality's land use interests while local plans (PA, §15; BA, §34, §95, §123a; BD, §32, §114, §145a) regulate detailed land use planning within a municipality. Plans at any level shall be in accordance with the framework established at the level above. According to the Building Act (§26, §30) and Land Use and Building Act (§25.2, §32, §42.3, §48, §54.1) the regional plan shall be used as a guideline in drawing up and amending master plans; and the regional plan and the master plan that is legally binding must be taken into account when a local plan is drafted or amended. This principle called framework management and control, applies in Denmark as well (PA, §6.3, §11.2, §13.1).

In Denmark only local plans are legally binding; the other plans may in fact become binding if they restrict the competence of authorities making land use decisions (Basse 1999: 56). In Finland, regional plans and local plans are legally binding, whereas municipalities have the competence to decide whether a master plan is legally binding or only a guideline (HE 101/1998, Chapter 3.2; LUBA, §32, §33, §42, §43, §58). Even though also the overall land use plans are legally binding in Finland, the interest weighing issued in Land Use and Building Act states (§33.2, §43.1) that a building permit shall be granted if its denial would cause substantial harm to the applicant and the authority does not expropriate the area or does not provide reasonable compensation for the said harm.

## **2.2 Sustainable development as a legal principle**

Sustainable development principles were defined in the Rio Declaration on Environment and Development including 27 principles of which six are essential for sustainable land use. The first principle states that human beings are at the centre of concerns for sustainable development. This principle indicates that the concept of sustainable development is anthropocentric, i.e. that the factors of sustainable development, such as environmental protection, are evaluated from the point of view of the effects on human environment. Sustainable development principles also include States sovereign right to exploit their own resources, but also the responsibility not to cause damage to the environment of other States or areas (Principle 2). The States have given up this

sovereignty by joining international agreements on the protection of the environment. The right to development has been proclaimed as one of the principles of sustainable development required that present and future developmental needs are equitably met, and that environmental protection is constituted as an integral part of development (Principle 3). Health and integrity of the Earth's ecosystem is part of sustainable development. This is the principle that expresses the aspect of environmental protection in the concept of sustainable development (Principles 4 and 7). Biological diversity is not mentioned as such, but could be interpreted to be conserved as part of the healthy ecosystem. In order to protect environment, the precautionary approach shall be applied (Principle 15) and the polluter should bear the cost of pollution (Principle 16). (Rio Declaration on Environment and Development)

In Decleris opinion (2000: 42–43) the law will in move away from rules towards decisions made with the aid of fixed general principles in communication with the society. He (2000: 65) has lined out *the law of sustainable development* as a collection of general principles consisting of the principles of Public Environmental Order, Sustainability, Carrying Capacity, Obligatory Restoration of Disturbed Ecosystems, Biodiversity, Common Natural Heritage, Restrained Development of Fragile Ecosystems, Spatial Planning, Cultural Heritage, Sustainable Urban Environment, Aesthetic Value of Nature and Environmental Awareness. His view of sustainable development stresses more diverse aspects of environmental protection than the principles of the Rio Declaration. He also sees the law of sustainable development as a dynamic new law in opposite to interpretation of static rules. Some of the aspects that Decleris characterizes as principles could be defined as legal rules, while other aspects could be defined as legal principles guiding the interest balancing of the criteria defined as legal rules.

Whether sustainable development is a principle has been discussed in the International Court of Justice in connection with the Gabcikovo-Nagymaros case (Bell & McGillivray 2000: 40). In this ICJ Case (Judgment of 25 September 1997) concerning Gabcikovo-Nagymaros power plant project (Hungary/Slovakia) sustainable development was addressed merely as a concept. The Court (paragraph 140) acknowledges that the "need to reconcile economic development with protection of the environment is aptly expressed in

the *concept* of sustainable development” and that it should be applied when “[i]t is clear that the Project’s impact upon, and its implications for, the environment are of necessity a key issue”. In a separate opinion the Court’s vice-president Weeramantry provides motivations on why the concept of sustainable development should be considered a *principle* that rests on a basis of worldwide acceptance in international law. In his opinion the principle of sustainable development would enable the Court to hold the balance even between the environmental considerations and the development considerations.

### 2.3 United Nations promotion of Sustainable Development

#### 2.3.1 Promotion of environmental aspects by the United Nations

Environmental protection was brought up globally in 1972 in Stockholm at the United Nations Conference on the Human Environment,<sup>28</sup> which agreed on the urgent need to respond to the problem of environmental deterioration. The question of environmental protection was further developed in 1992 in Rio de Janeiro by integrating environment and development at the United Nations Conference<sup>29</sup>.

Ten years later, year 2002 in Johannesburg, the commitment to uphold Rio principles was reaffirmed. The World Summit on Sustainable Development (WSSD) in Johannesburg also reaffirmed the commitment to fully implement Agenda 21. The Johannesburg Summit, however, concentrated on the gap between the developed and developing worlds rather than directly on the environmental protection. The Summit recognized poverty, eradication, changing consumption and production patterns, and protecting and managing the natural resource base for economic and social development as overarching objectives of sustainable development. The environmental problems, that are comprehended to rob millions of a decent life, were recognized to be: loss of biodiversity, depleted fish stocks, desertification, climate change and pollution. (Johannesburg Declaration on Sustainable Development). Other, than depleted fish stocks, are problems that also land use planning can deal with.

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<sup>28</sup> Report of the United Nations Conference on the Human Environment, Stockholm, 5–16 June 1972.

<sup>29</sup> Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3–14 June 1992.

Within the United Nations system, the Commission on Sustainable Development is the high-level commission responsible for sustainable development. The Commission on Sustainable Development concluded its first meeting, since the Johannesburg Summit, on 9 May 2003 with an agreement on its future programme and organization of work for the next 15 years. The Commission on Sustainable Development has identified priorities for its work, which include prevention of land degradation, biodiversity, drylands, wetlands and coastal zones, natural disasters, and rural-urban and land management interactions. Governments were urged to support the implementation of important international agreements, including the UN Convention on Biological Diversity, the UN Framework Convention on Climate Change and its Kyoto Protocol, and the Habitat Agenda adopted by the UN Conference on Human Settlements in 1996<sup>30</sup>. (Commission on Sustainable Development 2000.) Among other issues, the Commission has brought up one question that directly affects land use planning, namely the overarching theme of water. This theme included the water resource management and the water and land issue. (Commission on Sustainable Development 2003: 21.)

The first principle of the Rio Declaration on Environment and Development, which states that human beings are entitled to a healthy and productive life in harmony with nature, includes the factors of sustainable land use. The part that states that human beings are entitled to a healthy life comprise respect for the carrying capacity of ecosystems, combating climate change, and the water resource management. Sustainable land use patterns consist of minimizing transport demands and conserving nature, open spaces, landscapes, buildings, monuments and settlement patterns (The Habitat Agenda). Minimizing transport demands is incorporated in United Nations Framework Convention on Climate Change<sup>31</sup>, which establishes as the ultimate objective to stabilize greenhouse gases (Article 2). In pursuit of this ultimate objective the Kyoto Protocol of the Convention on Climate Change<sup>32</sup> includes commitments concerning transport and improving spatial

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<sup>30</sup> Also the UN Convention to Combat Desertification was mentioned among the important international agreements promoting sustainable land use.

<sup>31</sup> The Convention entered into force on 21 March 1994.

<sup>32</sup> The Kyoto Protocol shall enter into force on the ninetieth day after the date on which not less than 55 Parties to the Convention, which accounted in total for at least 55 % of the total carbon dioxide emissions for 1990 from that group, have deposited their instruments of ratification, acceptance, approval or accession. At the 5th September 2003 117 Parties have deposited their instruments of ratification, acceptance, approval or accession, which cover 44,2 % of total carbon dioxide emissions for 1990. The European Community has,

planning in order to achieve sustainable development (Kyoto Protocol Article 10 (b) (i)). The Convention on Biological Diversity and the Convention on Wetlands concern nature conservation. Biological diversity is valued because of ecological, genetic, social, economic, scientific, educational, cultural, recreational and aesthetic grounds (Preamble). Wetlands are appraised to constitute a resource of great economic, cultural, scientific and recreational value (Preamble). The protection of cultural and historical values is not mentioned in the Rio Declaration<sup>33</sup>.

The second part of the first principle of the Rio Declaration on Environment and Development, which states that human beings are entitled to a productive life in harmony with nature, comprises the right to development. The right to development is controversial. The Declaration on the Right to Development<sup>34</sup> recognises that development aims at the improvement of the well-being of the entire population and of all individuals (Preamble) and that all human beings have a responsibility for development (Article 2(2)). As to the social aspects on the right to development refers the obligation of States to ensure equal opportunity to basic resources, education, health services, food, housing, employment and the fair distribution of income (Article 8(1)). As to the economic aspects of the right to development the declaration (Article 1(1)) states that every human person and all peoples are entitled to participate in, contribute to, and enjoy economic development. The essential point in land use planning, namely property ownership, is insured as a human right<sup>35</sup>, the content of which is regulated by national regulations.

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however, declared that its commitments under the Protocol will be fulfilled by the Community and its Member States (<http://unfecc.int/resource/kpstats.pdf>).

<sup>33</sup> UNESCO Convention concerning the Protection of the World Cultural and Natural Heritage (Paris, 16 November 1972) concerns protection of cultural and natural heritage that are of outstanding universal value from the point of view of history, art or science (Articles 1–2). The protection of cultural and natural heritage belongs primarily to the State where it is situated on (Article 4). Whilst fully respecting the sovereignty of the States on whose territory the cultural and natural heritage is situated, and without prejudice to property right provided by national legislation, the States Parties to this Convention recognize that such heritage constitutes a world heritage for whose protection it is the duty of the international community as a whole to co-operate (Article 6).

<sup>34</sup> The declaration is adopted by the United Nations General Assembly resolution 41/128 of 4 December 1986 and reiterated in the Vienna Declaration on Human Rights (Vienna Declaration and Programme of Action, as adopted by the World Conference on Human Rights on 25 June 1993, Section I(11)). The right to development is sometimes referred to as a third generation human right; others argue that it is not a right at all because of its uncertain character (Birnie & Boyle 2002: 87).

<sup>35</sup> Universal Declaration of Human Rights (Articles 12 and 17) and the European Convention on Human Rights (Article 8).

Integrated planning and management of land resources is one subject of Agenda 21, which deals with the cross-sectoral aspects of decision-making for the sustainable use and development on global, national, regional and local levels.

### 2.3.2 World Commission's Definition on Sustainable Development

At present, different kinds of development are argued to be sustainable. According to the World Commission on Environment and Development (the so-called Brundtland Commission), the main issues of sustainable development that may be said to concern land use planning are:

- The fundamental right of all human beings to an environment adequate for their health and well-being.
- The conservation and use of the environment and natural resources for the benefit of present and future generations.
- The maintenance of ecosystems and ecological processes essential for the functioning of the biosphere.
- The protecting of biological diversity.
- The optimum sustainable yield in the use of living natural resources and ecosystems.
- To ensure that conservation is treated as an integral part of planning. (Our Common Future 1987, 348–349)<sup>36</sup>

These main issues can also be seen as different points of view on sustainable development. The first issue can be called the human rights perspective. Human rights have traditionally

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<sup>36</sup> The elements of the concept of sustainable development are mainly based on the Declaration of the United Nations Conference on the Human Environment held in Stockholm in 1972 and the Rio Declaration on Environment and Development of 1992, which reaffirmed the declaration adopted at Stockholm. On the different emphasis of these two declarations see Birnie and Boyle 2002: 82–84.

concentrated on ownership, but the sustainable development perspective also brings up health and well-being as fundamental human rights. The second consideration, the perspective of future generations, is also concerned with human rights, but from with different time frame. The third point can be called the perspective of ecological balance and the fourth the perspective of biological diversity; both of them deal with the sustainability of the environment. The fifth issue, the economic perspective, pays attention to the economical use of natural resources and ecosystems. The final point can be called the procedural<sup>37</sup> perspective on sustainable development.

## 2.4 Promoting sustainable land use on European Union level

### 2.4.1 Sustainable development and environment

The concept of sustainable development, without definition, was introduced in Community law in the Amsterdam Treaty in 1997<sup>38</sup>. The Treaty on the European Union states that one of its objectives is 'to promote economic and social progress and to achieve balanced and sustainable development' (§2). In secondary Community legislation, sustainable development was defined to mean 'the improvement of the standard of living and welfare of the relevant populations within the limits of the capacity of the ecosystems, by maintaining natural assets and their biological diversity for the benefit of present and future generations' (Regulation 3062/95 §2.4), Krämer 2000:7).

At Community level sustainable development and environmental protection are also connected. According to the Treaty establishing the European Community, which is fully integrated into the Treaty on European Union (§8), "[e]nvironmental protection must be integrated into the definition and implementation of Community policies and activities...in particular with a view to promoting sustainable development" (§6). Provisions on sustainable development in the Treaty are, however, considered to give more of a guideline

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<sup>37</sup> The procedural elements of sustainable development deal with public participation in decision-making and environmental impact assessment, including access to information (Principles 10 and 17 of Rio Declaration). Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters (Aarhus, Denmark, 25 June 1998) entered into force on 30 October 2001.

<sup>38</sup> Environmental action by the Community began in 1972 with action programmes, based on a vertical and sectoral approach to ecological problems.



to policy action than an actual legal concept (Krämer 2000:7). The objectives of Community policy on the environment are defined in the EC Treaty. The objectives concern the quality of the environment, human health, natural resources and promoting measures to deal with environmental problems (EC Treaty §174). These aims are not directly applicable, but need to be formalised and made precise by secondary legislation (Krämer 2000: 4). The Council shall decide on actions to be taken in order to achieve these objectives and shall set priority objectives in other areas through general action programmes (EC Treaty §175), which since the end of 1993, have to be adopted as legally binding decisions (Krämer 2000: 5). This means that the first legally binding environmental action programme is the sixth action programme.

The Fifth Environmental Action Programme ("Towards Sustainability") set the environmental priority objectives for the period 1992 to 1999. While the Action Programme set as aim to address the root causes of environmental problems rather than treat the symptoms, it placed considerable emphasis on the role of land use and strategic planning to achieve many of the Programme objectives. (The Fifth EC Environmental Action Programme.)

The decision for the sixth environment action programme of the European Community, which reached a political agreement in Gothenburg in June 2001 ('Environment 2010: Our future, Our choice') acknowledges that unsustainable use of the land and the sea and risks to biodiversity, need to be redressed (COM (2001) 31 final). The overall aim and objectives of the sixth environmental action programme (§2) are greenhouse gases, the functioning of natural systems and biodiversity (including protection of landscape values across the rural areas), human health and resource efficiency. The sixth environmental action programme does not mention any specific policy sector but concentrates on environmental problems arising from human actions.

The main lines of the strategy for sustainable development were set out in the conclusions of the Gothenburg European Council. The strategy is designed to be a catalyst for policy makers and public opinion, to change society's behaviour. This strategy also formed part of the European Union's preparatory work for the 2002 world summit on sustainable

development (Rio + 10), which was held in Johannesburg. Before the summit the Commission decided to present another communication on how the Union should contribute towards sustainable development in the world. One of the measures to attain long-term objectives set in the strategy for sustainable development is limiting the adverse effects of transport. The share represented by road transport in 2010 should not be higher than in 1998.<sup>39</sup>

#### 2.4.2 Land use

Measures concerning town and country planning and land use require unanimous adoption by Council, and thus each Member State has the right of veto against Community planning decisions which affect its territory (Krämer 2000: 64, 109). There is only one measure concerning land use that has been adopted at Community level; namely, the location of industrial establishments to prevent accidents (Directive 96/82/EC). There are, however Directives on nature conservation that the Member States have to take into consideration in their town and country planning. Directives 79/409 and 92/43 require Member States to designate the most suitable territories as special protection areas for particularly threatened bird, fauna and flora species. Any land use significantly affecting birds should be avoided (Directive 79/409, §4.4), while negative effects on fauna and flora can be carried out 'for imperative reasons of overriding public interest' (Directive 92/43, §6.4).

Furthermore some policy guidelines have been set for spatial development in the Member States and at Community level. European Spatial Development Perspectives (ESDP)<sup>40</sup> laid down policy guidelines for all Member States, regions and local authorities as well as for the Commission, but this is not a legally binding document (COM (2001) 24). According to the ESDP, spatial planning should aim to promote sustainable land use while ensuring a

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<sup>39</sup> Communication from the Commission of 15 May 2001 – A sustainable Europe for a better world: a European Union strategy for sustainable development (Commission's proposal to the Gothenburg European Council). This communication was not an issue at the European Council meeting in Barcelona 15–16 March 2002 (Presidency Conclusions), which merely stated that Sustainable Development Strategy means that economic, social and environmental considerations must receive equal attention in policymaking and decision taking processes. The European Council decided to determine the overall position of the European Union for the Johannesburg Summit at its meeting in June 2002 in Seville.

<sup>40</sup> European Spatial Development Perspectives (ESDP) have been drawn up by a consultative body appointed by the European Commission and consisting of EU Ministers responsible for spatial planning and regional policy (97/150/EC).

more balanced geographical distribution of economic activities. Land use planning should take account of ecological requirements and should help avoid disproportionate pressure on certain parts of the country.

General principles of spatial development defined in the ESDP are: respect for sustainability goals by economic decisions with spatial implications; the need for strategic impact assessment; and conservation of the rich territorial variety of Europe. As positive aspects of spatial development, the ESDP acknowledged an integrated view of the whole European continent, the use of a spatial framework for co-ordinating a wide spectrum of policies, and a novel trans-sector and proactive approach to planning. One of the environmental concerns was the threat of fragmentation of the European territory by transport networks. (ESDP 1999.)

Under the Sustainable Cities Project, the EU considered 'how future town and land use planning strategies can incorporate environmental objectives'. The project encouraged ecologically based approaches and a move away from a narrow land use focus. According to the Sustainable Cities Project, key sustainability issues in spatial planning are: land use changes, especially those which involve loss of biodiversity; loss of private and public green space; the outward spread of cities due to business parks and out of town retail centres; separation between activities, which has caused a rise in car-borne traffic; possibilities to compensate those experiencing negative impacts of land use changes; the aim of staying within environmental load-bearing capacities; the aim of passing on to future generations the stock of both natural capital and the built heritage; and, furthermore, political choices as to what assets to value and prioritise. There is general agreement that embracing sustainable development means both increasing the priority given to environmental concerns in proportion to economic and social dimensions, which also have to be taken into consideration, and adopting a longer time frame in drawing up plans. (European Sustainable Cities 1996: 156–158.)

The Commission has issued some legally non-binding communications that deal with: town and country planning (COM(90)544 and COM(91)452); the urban environment (COM(90)218, Council Resolution of January 28, 1991, Court of Auditors, Special Report

on urban environment [1994] O.J. C383/1 and COM (97)197), integrated coastal zone management (COM(95)511); and wetlands (COM(95)189). The integrated coastal zone management demonstration programme explores effective management, but does not directly affect decisions on land use, which are taken at Member State level.

## **2.5 Sustainable development as an objective in legislation on land use planning**

Bearing in mind the main issues of sustainable land use defined by the World Commission and the European Community, the next step is to study how these aims are promoted by land use and planning legislation in the countries being compared. Sustainable development has been the basic goal of physical planning and land use planning in Finland since 1990 (Finnish Building Act 16 August 1958/370, §1.2, revised in Act 17 August 1990/696). The goal encompasses the planned use of natural resources as well as the environment. In Finland's new Land Use and Building Act (5 February 1999/132, §1.1) sustainable development in land use planning is defined as the promotion of ecologically, economically, socially and culturally sustainable development. The Land Use and Building Act has been in force in its entirety since 1 January 2000. The Government has decided that in order to promote ecological sustainability in land use planning, the density of built-up areas and of the supporting commercial services should be increased. Physical planning strives to plan settings that are functional, diverse and adequate for good health. Traffic growth should be restrained by means of physical planning.<sup>41</sup> The criteria regulating legal discretion promoting sustainable development in land use planning are found in stipulations on the content of different plans.

In Denmark, the aim of sustainable development is defined in the Planning Act (6 June 1991/38) more precisely as the promotion of sustainable development both for the environment of people and for that of animals and vegetation. The law states that (Planning Act §1) attention should be paid to economical planning, the conservation of valuable buildings, landscapes and open shores and to the prevention of pollution. According to the National Plan Account, the political priorities of land use planning are to conserve nature

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<sup>41</sup> The Finnish Government's Programme on Sustainable Development.

and promote designation of continuous nature areas in order to protect biological diversity, to protect open shores and cultural strata and to stop cities from spreading.<sup>42</sup>

In both countries, national planning does not involve plans in the way that physical plans are understood; rather it is complementary to regulations on planning legislation. The Ministry of the Environment may hand down regulations to ensure that national planning interests are protected.

In Finland, national land use planning consists of national land use objectives and land use planning objectives determined in Land Use and Building Act (§5, §22). The human rights perspective is promoted by planning "a safe, healthy, pleasant, socially functional living and working environment which provides for the needs of various population groups, such as children, the elderly and the handicapped" (LUBA, §5.1 item 1). Also the availability of services (LUBA, §5.1 item 10) as well as an appropriate traffic system and, especially, public transport and non-motorized traffic (LUBA, §5.1 item 11) can be interpreted as being part of the human rights perspective of sustainable land use. From the perspective of the whole community, land use planning should help protect the beauty of the built environment, cultural values (LUBA, §5.1 item 3), the functionality of communities and good building (LUBA, §5.1 item 7). The perspective of ecological balance consists of promoting environmental protection and prevention of environmental hazards (LUBA, §5.1 item 5). According to the perspective of biological diversity, biological diversity and other natural values should be promoted (LUBA, §5.1 item 4). The economic perspective of sustainable development is considered to include paying attention to the economical community structure and land use (LUBA, §5.1 item 2), economical community building (LUBA, §5.1 item 8), provident use of resources (LUBA, §5.1 item 6) and favourable business conditions (LUBA, §5.1 item 9). The legislation does not mention the perspective of future generations.

In Denmark national planning has been stipulated in §2–5 of the Danish Planning Act. National planning guidelines have been given, from the perspective of promoting

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<sup>42</sup> Landsplanredegørelse fra miljø- og energiministeriet (National Plan Account of the Ministry of the Environment) 1997: 64–67.

biological diversity, to restrict and administrate the EU bird conservation areas and Ramsar areas (BKG 1994 408). From the economic perspective of sustainable development national planning guidelines have been given on the planning of windmills (cirk 1994 21) and extension of the infrastructure, e.g. expansion of Copenhagen Airport (cirk 1997 56). As concerns biological diversity, national planning in Danish planning legislation consists of protecting coastal areas (Chapter 2 a). As to the social and economic aspects, it consists of regulating the location and size of retail stores (Chapter 2 b).

## 2.6 Division of legal competence in land use planning

Which authority has legal competence and thus also the obligation to promote different aspects of sustainability, and which authority should ensure that land use is sustainable in its entirety? In the countries being compared, this legal competence is divided between state authorities, joint municipal boards (regional councils) and local municipal authorities.

In Denmark, the *Ministry of the Environment* is responsible for the overall national physical planning (§2.1). The Ministry has the competence to interpose a veto in order to prevent the passing of a master plan if it is against national land use objectives (§29.1). To ensure that national planning interests are protected, the Ministry of the Environment may hand down regulations governing the use of authority granted by the Planning Act and the content of planning in accordance with the Planning Act (§3.1). These guidelines, which are called National Plan Guidelines (landsplandirektiver), are binding (footnote 12 of the LBKG 1997/563).

According to the Danish Planning Act, the Ministry shall monitor development in order to ensure that national planning interests are followed in shore-areas (§5a.2). The Ministry shall be informed of the joint municipal boards' vetoes regarding conflicts with the regulations the Ministry has given in accordance with §3.1 the of Planning Act or conflicts with the regional plans (§29.3). The Ministry shall be provided an opportunity to give a statement on changes to proposals for regional plans (§27.3). If a competent authority has opposed a plan, the planning decisions cannot be approved before the dispute has been settled (§28.1).

The Ministry may also regulate the competence of municipalities. The Ministry may hand down regulations that allow local plans to contain provisions on matters other than those mentioned in §15.2 of the planning legislation (§15.6). In compliance with other legislation, the Ministry may hand down regulations stipulating that permits and exemptions that are necessary in order to realize a local plan, are considered to be granted by the implementation of the local plan. The Ministry may also hand down regulations on the ability of a municipal council to dispense with such local plans and on the right of other authorities to submit objections to proposals for such local plans (§15.7).

In Finland, until the beginning of the year 2000, the Ministry of the Environment was empowered with the highest authority and supervision in land use planning (BA, §8.1). According to the new Land Use and Building Act, the Ministry's steering competence is restricted to regional planning (LUBA, §17.1) and to the national objectives of land use (LUBA, §4.4). According to the Land Use and Building Act, unlike its Danish counterpart, the Finnish Ministry of the Environment has the competence to ratify regional plans (LUBA, §31; BA, §25.1). Earlier, when the Building Act was in force, the Finnish Ministry could even ratify some other plans (BA, §29.3, §38a, §97a, §123d.1). When it had been decided to draw up a plan or to revise a plan, or when a plan had not been ratified, the Ministry had the competence to order a ban against construction in the area where it had authority to ratify the plans (BA, §32, §42). The Ministry had competence to order that a plan be drawn up or revised whenever this was considered necessary (BA, §143). This competence is now restricted to concern only matters regarding the attainment of goals laid out in legislation or in national land use objectives (LUBA, §177.1, §178.1).

When the old Building Act was in force, the Ministry of the Environment had the same competence concerning master plans and local plans in the largest cities as the regional state authorities had in the other municipalities. The authority to deviate was decentralized from the Ministry and regional state authorities to municipalities even under the Building Act exceptions being shore areas, deviation from the gross floor area permitted in the local detailed plan and deviation from a plan regulation on the conservation of a building (BA, §132.2, §5.2; LUBA, §171). Deviation from these regulations was divided between the

Ministry of the Environment and regional state authorities when the Building Act was in force (BA, §132.2, §5.2). Under the Building Act, competence in deciding whether a shore plan was necessary for land use was divided between the Ministry of the Environment and the regional state authorities (§123b.3). In the Land Use and Building Act, the need for planning of shore areas is determined in legislation (LUBA, §72).

Denmark has no *regional state authorities*. In Finland, the regional state authorities were to monitor physical planning in their region (BA, §8.2). According to the new legislation, the Regional Environment Centres should promote and steer the organization of land use planning within the areas covered by a local authority, in order to ensure the realization of national land use objectives and other land use goals (LUBA, §18). Under the Building Act, competence in planning decisions was often divided between the Ministry of the Environment and the regional state authorities in accordance with the size of the municipality: that the largest cities fell under the Ministry's competence and the other municipalities under the competence of the regional state authorities.

Under the Building Act, the regional environmental state agencies had the competence to ratify some master plans, local detailed plans and shore plans (BA, §38a, §97a, §123d.1). When the decision had been made to draw up a plan or revise a plan or if a plan had not been ratified, the regional environmental state agencies had authority to set a ban against construction (BA, §32, §42). Under the Building Act, for some defined municipalities, deviation from planning regulations was stipulated as being within the competence of regional state authorities in the case of shore areas; this also applied to deviation from the gross floor area permitted in the local detailed plan and deviation from a regulation on the conservation of a building (BA, §132.2, §5.2). According to the Land Use and Building Act, the right to deviate in cases referred above falls under the competence of the Regional Environment Centres (LUBA, §171.3).

*Joint municipal boards* are regional councils in Finland and county councils in Denmark. They are responsible for regional planning and in Denmark also for the other land use decisions in rural areas. Furthermore county councils in Denmark take care of much the same things as the regional state authorities in Finland. They have competence to solicit



ideas, proposals, etc. in preparation for the planning of a regional or master plan or revisions thereto. The joint municipal boards shall adopt the final regional plans (PA, §27.1). They shall also submit objections to proposals for local plans and master plans, and for revisions to master plans, if the proposal is in contradiction with regulations the Ministry has given according with §3.1 of the Planning Act or in conflict with regional plans (PA, §29.2).

According to the Finnish Building Act (BA, §25) and the Land Use and Building Act (§19), the joint municipal boards' function is to carry out regional planning, which includes the drawing up and approval of regional plans and submitting them to the Ministry of the Environment for ratification (LUBA, §27, §31). Regional councils also have the authority to prohibit land use until the regional plan has been ratified (LUBA, §33.3).

*Municipalities* are the main decision-making authorities in matters concerning physical planning and construction in both countries. In Denmark, municipalities are responsible for urban zones and summer cottage areas. In Finland, municipalities are also responsible for rural areas. Municipal councils decide on master and locals plan on their own initiative (BA, §29.2, §38, §97, §123d; PA, §13, §22.2, §27). In Finland, under the Building Act, some plans had to be submitted to state authorities for ratification (BA, §38a, §97a, §123d.1). A master plan could include an ordinance stating that local plans in the area covered by the master plan need not to be submitted for ratification (BA, §29.4).

In Finland, the municipal authority may impose a ban on building when a master plan or local plan is being drafted or revised (LUBA, §38.1, §53.1). In Denmark, if use of the land can be prevented by a local plan, the municipal council can prohibit the building being planned (PA, §14). A Danish municipal council can permit a property included in a plan proposal to be developed or used in accordance with the proposal (PA, §17.2). In Finland the authority to grant exceptional permits was decentralized from the Ministry and the regional state authorities to municipalities even under the Building Act except in some cases where the competence of the state authorities was maintained (BA, §132.2, §5.2;

LUBA, §171). In Denmark municipal councils can grant exemptions from the provisions of a local plan so long as they do not contradict with the principles of the plan (PA, §19).

## 2.7 Property rights

According to the European Convention on Human Rights and Fundamental Freedoms (Protocol No. 1, Article 1) “[e]very natural or legal person is entitled to the peaceful enjoyment of his possessions. No one shall be deprived of his possessions except in the public interest and subject to the conditions provided for by law and by the general principles of international law. The preceding provisions shall not, however, in any way impair the right of a State to enforce such laws as it deems necessary to control the use of property in accordance with the general interest ...”.

Both in Finland and in Denmark landowners’ rights have been protected by constitution (PL, §15<sup>43</sup>; GL, §73), but can be restricted by law. As stated by the constitutional committee in Finland, minor interference may be enacted by an ordinary law, while more profound intrusion requires constitutional enactment. According to the Constitution of Finland (§ 15) “[t]he property of everyone is protected. Provisions on the expropriation of property, for public needs and against full compensation, are laid down by an Act”. The more important the public interest is, which requires interference with the property right, the more profound intrusion is possible to enact by ordinary law (e.g. PeVL 14/1982 vp, PeVL 2/1986 vp). (HE 1/1998: 79–80, HE 309/1993: 62–63.) According to the Constitution of Denmark (§73 (1)) “[t]he right of property shall be inviolable. No person shall be ordered to cede his property except where required by the public weal. It can be done only as provided by Statute and against full compensation”.

The concept of sustainable development includes as being part of the right of property also the right to develop. The Rio Declaration on Environment and Development (Principle 3) states that “[t]he right to development must be fulfilled so as to *equitably* meet developmental and environmental needs of present and future generations”. The land use

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<sup>43</sup> Until 1.3.2000 in HM §6.

planning legislation comprises restrictions in the landowners right to use their property. In Finland, the most comprehensive tool is detailed planning but even it “may not impose restrictions on or cause harm to landowners or other titleholders that could be avoided without disregarding the objectives or requirements of the plan” (LUBA, §54.3). In Denmark, there is no such restriction in the provisions on land use planning, but landowners are entitled to compensations when a local plan or a town planning by-law reserves a property or a part of a property for public use (PA, §48) or prohibits a building from being demolished or renovated (PA, §49).

The restrictions that may be imposed by land use planning comprise the objectives of land use planning (LUBA, §5; PA, §1) and the balancing of private and public interests in the plan. The fair balance that has to be struck between the general interest of the community and the interests of the individual may be e.g. protecting a limited natural resource, which is in the general interest, against landowners’ interests to exploit these natural resources. According to the European court of human rights, protecting the fish stocks was considered to be the legitimate general interest, even though it interfered with the applicants’ property rights. The restriction was regarded as justified, being lawful and pursuing, by means proportionate to the aim. (ECHR Case *Posti and Rahko v. Finland*, § 77.)

Respect for private life is a further aspect of human rights that has to be taken into consideration in balancing interests in land use planning. According to the European Convention on Human Rights and Fundamental Freedoms (Article 8)

“[e]veryone has the right to respect for his private and family life, his home and his correspondence.

There shall be no interference by a public authority with the exercise of this right except such as is in accordance with the law and is necessary in a democratic society in the interests of national security, public safety or the economic well-being of the country, for the prevention of disorder or crime, for the protection of health or morals, or for the protection of the rights and freedoms of others.”<sup>44</sup>

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<sup>44</sup> Decisions from the Court of Appeal (*Østre Landsrets dom 743/2000*) and Supreme Court (*Højesterets dom 1057/2001*) illustrate, that the Danish courts decide on, whether a restriction in the owner’s right to use their property is in conflict with the European Convention on Human Rights §8. (Betænkning nr. 1407: 52.)

Although the object of Article 8 is essentially that of protecting the individual against arbitrary interference by the public authorities, it does not merely compel the State to abstain from such interference: in addition to this primarily negative undertaking, there may be positive obligations inherent in effective respect for private or family life (see ECHR Case *Airey v. Ireland*, p. 17, § 32). Severe environmental pollution might affect individuals' well-being and prevent them from enjoying their homes in such a way as to affect their private and family life (ECHR Case *Guerra and others v. Italy*, § 58).

## 2.8 Sustainable land use in the content of plans

Sustainable land use comprises the *protection of different areas* and the location of activities. Conservation of nature shall be taken into consideration in the regional plans of both countries and also in the local plans of Finland (PA, §6.3 item 8; BA, §22.2, §32.2 item 18; LUBA, §28.3 item 6, §54.2). The new Land Use and Building Act contains provisions on protection of natural values also in master plans (LUBA, §39.2 item 8). Both countries have special regulations to protect shorelines (PA, §5b; Shore nature conservation programme).

Recreation areas are not mentioned on the contents of plans in the Building Act in Finland, while in Denmark recreation areas are to be protected by both regional and master plans (PA, §6.3 item 9, §11.4, §11.5 item 6). The new provisions in Finland contain, however, protection of sufficient areas suitable for recreation in all plans (LUBA, §28.3 item 7, §39.2 item 9, §54.2). Buildings and cultural-historic surroundings may be protected by local plans in both countries and in Denmark even by master plans (PA, §11.5 item 2, §15.2 item 14; BA, §135, §34.3, §95.3; LUBA, §54.2). According to provisions in the new Land Use and Building Act, even regional plans should contain provisions on protection of cultural heritage (LUBA §28.3 item 6) and master plans should contain provisions on protection of the built environment (LUBA §39.2 item 8) in Finland.

In both countries the regulations on local plans contain provisions on the health of the building site (PA, §15.2 item 15; BA, §34; LUBA §54.2). In Finland also new master plans should contain provisions on creating opportunities for a safe and healthy living

environment (LUBA, §39.2 item 5). As an aspect of the protection of human health water supplies are protected in Denmark by regional planning (PA, §6.3 item 11) and in Finland by local planning until the year 2000 (BD, §32.2 item 3) and since the year 2000, by regional and master plans (LUBA, §28.3 item 4, §39.2 item 4). As an aspect of the amenity of the human environment landscapes and the urban environment are regulated in Finland by local plans (BA, §34.1), since the year 2000, protection of landscape is regulated by regional plans and master plans (LUBA, §28.3 item 6, §39.2 item 8) and as pleasant living environments in local plans (LUBA, §54.2); and in Denmark by master plans (PA, §11.5 item 2).

Another factor in sustainable land use is regulating the *location of activities*. This includes the effective use of land and reducing the need for traffic. These factors could be interpreted as weighing rules together with the inconvenience for landowners. One could add to these weighing rules even the current Finnish regulation on not to “substantially weaken the quality of anyone’s living environment in a manner that is not justified by the local plan’s purpose” (LUBA, §54.3). The minimization of traffic is not mentioned in either Danish or Finnish planning regulations. Only in relationship to the location of commercial services is it necessary to take the impact on traffic into consideration. Thus in Finland, the aim of physical plans is that they should promote the accessibility of services (LUBA, §5.1 item 10). This aim can be interpreted as restricting traffic by means of local planning, which wasn’t possible before the new provisions came into force on 1 March 1999. In Denmark, the distance of retail shops and consumers should be restricted in all plans (PA, §5c.3).

Effective use of land is regulated in Finland in regional plans and in Denmark in local plans (BA, §22.2; PA, §15.2 item 7). Since the year 2000, economical community structure is mentioned both an objective in land use planning and as required content on regional plans and master plans (LUBA, §5.1 item 2, §28.3 item 1, §39.2 item 1). These aspects of sustainable land use will be analysed further in the following chapters.

### 3 SUSTAINABLE LAND USE: LAW IN ACTION

#### 3.1 Selecting Cases

Legal discretion with regard to interest balancing in land use planning can be interpreted on the basis of decisions made by the highest institutions of appeal<sup>45</sup>. In Finland, the Supreme Administrative Court (*korkein hallinto-oikeus*, KHO) is the highest court of appeal concerning land use planning decisions. The Supreme Administrative Court can rule only on the legal discretion of the decision. If the decision is mainly about the expediency of the case, it must be referred to the State Council. (Act on Supreme Administrative Court 22.7.1918/74, ASAC §5.1)<sup>46</sup> A complaint may be directed to the Parliamentary Ombudsman or to the Chancellor of Justice, who have, however, no jurisdiction to change the decision, but to issue a reprimand to the subject for future guidance or to consider criminal charge or disciplinary proceedings against the decision maker. He or she may also issue a recommendation to the competent authority that an error be redressed or a shortcoming rectified (Parliamentary Ombudsman Act 14.3.2002/197, §10.1 and §11.1; Chancellor of Justice Act 25.2.2000/193, §6).

In Denmark, the Nature Protection Board of Appeal, the Supreme Court, and the Parliamentary Ombudsman (*Folketings ombudsmand*) all have different roles in decisions concerning appeals pertaining to land use planning. The Nature Protection Board of Appeal (*Naturklagenævnet*, NKN) is a board of appeal on land use planning decisions. It consists of a lawyer as the chairman, two judges from the Supreme Court and a member from each political party represented in the economic committee of the Danish Parliament (*Lov om naturbeskyttelse* §80). Decisions made by the *Naturklagenævnet* can be appealed to the Supreme Court (*Danmarks Riges Grundlov* 5 June 1953/169, §63) or to the Parliamentary ombudsman. The Supreme Court may decide on whether the criteria for interest balancing are legal and whether the rules for prioritisation of the interests have

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<sup>45</sup> In Finland, precedents have *de facto* a significant argumentative value in the interpretation of statutes even if they are not *de jure* binding (Aarnio 1997: 82).

<sup>46</sup> Political-administrative discretion in Finland can be interpreted on the basis of the decisions made by the Ministry of the Environment to ratify regional plans as well as some municipal and local plans (BA, §25.1, §29.3, §38a, §97a, §123d.1). Under the new Land Use and Building Act, only regional plans are submitted to the Ministry of the Environment (LUBA, §31). Decisions of confirmation from the regional State authorities on the environment can be appealed to the Ministry of the Environment.

been followed (Christensen 1994: 92–103). Appeal to all these instances may concern only legal discretion<sup>47</sup>. The parliamentary ombudsman's decisions are not legally binding; however, if the Ombudsman calls upon the authorities to make a fresh decision, they usually do (Ombudsmandsloven 12 June 1996/473, §22–23).

Hardly any land use cases have mentioned sustainable development so far<sup>48</sup>. To be able to study sustainable land use in spite of this, we can utilize the various criteria we have considered here to promote sustainable land use. One of the few cases where sustainable development was mentioned occurred in 1993, when the Supreme Administrative Court of Finland ruled that excessively efficient land use in an area planned for tourism and recreational did not promote sustainable development (KHO 1993 A 40). The importance of the criteria of sustainable development to be mentioned in the legislation is reflected in a decision of the Supreme Administrative Court of Finland. It was ruled that the placing of a large shopping mall outside the city centre could not be prohibited on the grounds that it would jeopardize services in nearby areas or that it would splinter the community structure and add traffic, because these criteria were not mentioned in legislation when the construction was being planned (KHO 1997 145). The reason that sustainable development was mentioned as an aim in the Building Act since 1993 was not enough. On the other hand landscape, vegetation (KHO 1995 A 38) and important nesting site of ringed seals nearby (KHO 1993 A 37) were accepted as reasons to prevent construction. These criteria were mentioned either as criteria on plans or in the Government's Decision in Principle, both of which are legally binding.

In Denmark, there is so far only one decision concerning sustainable development in land use planning mentioned in the publication on questions of principal matter of the Nature Protection Board of Appeal (Naturklagenævnet orienterer, NKNO). Even this case doesn't

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<sup>47</sup> In Denmark political-administrative discretion can be interpreted on the basis of vetoes by the Ministry of the Environment (PA, §29.1). Vetoes made by joint municipal boards can be appealed.

<sup>48</sup> By 26 September 2003 there are ten land use planning cases that refer to the aim of sustainable development. Two of them are already mentioned above. There is one additional case on the placement of a shopping centre which rules that a shopping centre can't be placed outside the city centre by using a regional plan (KHO 2003 60), one case protecting the coastal area (KHO 2003 30), one case considering the conservation of wetland (Vuotoksen allas, KHO 2002 86), one protecting endangered species (KHO 2002 78), one about legal conditions on sewerage in scattered settlements (KHO 2002 15), one on applying the aim of sustainable development on national land use objectives (KHO 2001 59) and one not allowing to favour centralized heating solutions based on the aim of sustainable development (KHO 1669/1999).

bring any light on how to interpret what sustainable development in land use planning is. This case merely states that the goal of the planning legislation is to ensure that sustainable development of society is secured. The issue in this case was whether to permit the construction of new buildings to enlarge a piggery on a farm. (NKNO 30/1994.)

The legally regulated criteria are weighed against other legally accepted reasons. The principles of equity, proportionality and objectivity as well as the prohibition on the abuse of power and the right to promote the purpose of law are considered to be part of the legal framework of administrative decision-making in Finland and in Denmark (Herala 1997: 89–93). In Denmark, the Parliamentary Ombudsman weighed landscape interests against economic reasons and the principle of equity on one occasion (FOB 15 February 1993). Some criteria can be given special importance, as in Denmark where legislation has set the goal of keeping shores vacant (PA, §5a.1). A master plan was rejected in order to protect access to a recreation area near the shore (NKNO 13/1993). One other master plan was rejected because of construction was planned on a green belt at the shore (NKNO 82/1995).

The criteria for promoting sustainable development may also be the reason why land use requires regulations issued in a plan. In Finland, the Supreme Administrative Court refused to allow the establishment of a dump and a motor sport area because land use of these types was assessed as requiring plan regulations owing to their effects on the well-being of the environment (KHO 1992 A 81). Some regulations protect only the size not the site. For instance, under the old Finnish Building Act, the total size of park areas could be protected in a local plan, but not the park sites as such (KHO 1993 A 48).

### **3.2 Creating the Data File**

The next phase, when using Qualitative Comparative Analysis to examine legal regulation, is to code the selected cases (taking into account legal sources) according to the defined criteria. As explained in the earlier chapters, I have decided to use sustainable land use as the outcome. The outcome has been coded 1, if the plan was ratified and 0 if the plan was overturned. The outcome has been interpreted to indicate that ratified plans are in



accordance with sustainable development while overturned plans are counter to sustainable development. This has been taken into consideration when coding and selecting cases. Only cases that have been overturned on the basis of any of the attributes defined as being connected with sustainable development have been included in the research. In this way, it has been possible to avoid interpreting irrelevant issues as falling within the concept of sustainable development.

As attributes I shall use background criteria and criteria pertaining to sustainable land use, which can be divided into attributes concerning conservation, the human environment or regional and community structure. I have defined three criteria as background attributes linked with the type of regulation, which are important to keep in mind when regulating sustainable land use. These *background attributes* are the following: the type of decision, which can be either a local plan (coded as 1) or an overall plan (coded as 0) and the type of overall plan, which can be either a regional plan (coded as 1) or a master plan (coded as 0). Local plans are coded as a dash in order to indicate that local plans have no value for this attribute. Because there are three plan types and only two values for the attributes, two attributes have been used to be able to distinguish between all types of plans. The use of only one attribute to distinguish between the three types of plans and code them as 1,0 and a dash would give a false result because of the minimization that was done when comparing the sets of attributes. In this process, when cases are compared in pairs, the result could be that the attribute "type of overall plan" turns out to be irrelevant for the outcome and is therefore excluded. These cases would be confused with cases coded as a dash indicating a link with one of the three types of plans. The third background attribute is related to whether the area is covered by some conservation decision. An area has been coded as 1 if it was included in a conservation programme (e.g. for the shore or birds, etc.) and as 0 if it was originally founded as a national park or strict nature reserve. Other decisions have been coded as not having an impact on this attribute (coded as -).

Next are the attributes pertaining to sustainable land use. Attributes that define *conservation values* are recreational, nature and cultural values. If the decision concerned recreational values, and the recreational values were upheld in the decision, the decision for this attribute has been coded as 1. If the recreational values were overturned, the

decision has been coded as 0. If the decision did not concern recreational values, the decision has been coded as -. The same coding has been done for natural values and cultural values. Attributes associated mainly with the *human environment* are health, amenity and protection of water supplies. The third group of attributes on sustainable land use consists of attributes linked with *regional and community structure*, such as traffic, effective land use and the inconvenience to landowners. Appendix 1 shows a table of the attributes and their codes.

### 3.3 Data Matrix: The values of the attributes in cases

The use of binary codes to indicate that attributes were either present or absent is well suited to legal thinking, which assumes that issues are either legal or illegal. In this study the attributes either were taken into consideration in the court decisions, or they were not, while the result of the interest weighing remains open and has to be interpreted on the basis of the decisions.

In the data matrix editor, which is used to create the data file, each row represents a case and each column is an attribute. The data matrix is an important table when tracing the original cases on the basis of which the different configurations are defined.<sup>49</sup> The maximum number of attributes is 12, plus the outcome. Cases can be given a case identification (CaseID), and then the values for attributes (1,0 or -) concerning each decision. The outcome is always the last column of the matrix. The CaseIDs can be used to trace the original cases linked to different combinations of attributes from the data matrix.

In this research the two first attributes are linked so that if the attribute 'decision' is coded as 1, the next attribute 'plan' is coded with a dash to show that local plans (coded as 1) have no value on the next attribute indicating the type of overall plans. Correspondingly, if the case concerns overall plans, the attribute 'decision' is coded as 0 and the next attribute

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<sup>49</sup> When starting to create a new data file, a new data file is selected from the File menu and the attributes (variables) that have been chosen are named. An earlier document saved in RTF format can also be used. To exit the editor and save the file created, select "Create a New File" from the File menu and then give the file a name (8 characters.QVN); e.g. Denmark1.QVN. To add results to the output file, to be printed later, use "save output" (File menu) and select the appending text.

must have the value of either 1 (regional plans) or 0 (master plans). Outcome is another value that must be coded. In this case, it would be confusing to code the outcome with a dash indicating that the plan was ratified in part and overturned in part, because in this study a dash was used to indicate a missing value. In QCA, a dash usually means that the value is so close to average that it is hard to tell whether it should be coded as 1 or 0. Because the program doesn't allow an attribute to be coded as blank, I had to use the dash to indicate that the attribute had no value; i.e. to show that the attribute was not an issue affecting the interest weighing in a particular case. The attribute WATER was coded as blank in all cases, because the Building Act in force at the time of the cases did not regulate water supplies.

The next two tables illustrate the original cases and the values given to the chosen attributes<sup>50</sup>. These are the tables that were used later in the study to find out, for example, how many overturned local plans there are in the research material for Finland (Table 1; attribute local = 1 and attribute outcome = 0).

I decided to create different files for the cases from Finland and Denmark, in order to reserve the attributes for other criteria. One possibility would have been to use one of the attributes to indicate the country, since only two countries were being compared. If the number of issues to be compared is more than two, this would not be possible if the idea is to know which combinations of attributes represent each item of comparison. Here I have already used all 12 attributes<sup>51</sup> allowed by the program and no attributes were left to indicate the country.

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<sup>50</sup> The attributes are illustrated in Appendix 1.

<sup>51</sup> The minimum number of attributes that must be used is three.

Table 1. Raw data matrix (Finland).

CaseID	L	O	C	R					W				
	A	V	O	S					A				
	L	E	N	R					T				
	C	R	E	C					E				
	A	L	R	R		C			S				
	L	L	V	E	N	U	H	A	U	T	R	F	
	P	P	A	A	A	L	E	P	P	A	F	E	
	L	L	I	I	U	U	L	P	L	F	T	N	
	A	A	O	O	R	R	E	A	I	I	V	E	
	N	N	N	N	E	E	H	L	S	C	E	S	
1977AII50,	0	1	-	1	0	-	-	-	-	-	-	0	1
1980AII59,	0	0	0	0	0	-	-	-	-	-	-	-	0
1993A37,	1	-	1	-	0	-	-	0	-	-	0	-	0
1997T2532,	0	0	1	-	0	-	-	-	-	-	-	1	0
1988A57,	0	0	1	-	0	-	-	-	-	-	-	1	0
1985AII132, <sup>52</sup>	1	-	-	-	-	-	-	-	-	1	1	-	0
1989T98, <sup>53</sup>	1	-	-	-	-	-	-	-	-	1	-	-	0
1997T3215,	1	-	-	-	-	-	-	-	-	1	-	-	1
1997 145,	1	-	-	-	-	-	-	-	-	1	1	-	1
1993A48,	1	-	-	1	-	-	-	0	-	-	0	0	1
1978T2417,	1	-	-	0	0	-	-	-	-	-	-	-	0
1991A81,	1	-	-	0	-	-	-	0	-	-	-	-	0
1977T2068, <sup>54</sup>	1	-	-	0	-	-	-	-	-	-	1	-	1
1976T2574, <sup>55</sup>	1	-	-	0	-	-	-	-	-	-	1	-	1
1986T2667,	1	-	-	-	-	1	-	1	-	-	0	-	1
1981AII48,	1	-	-	-	-	-	-	0	-	-	0	-	0
1983AII59,	1	-	-	-	-	-	-	1	-	-	0	0	1
1993A40,	0	0	-	1	0	-	-	0	-	1	1	1	0
1986A14,	1	-	-	-	-	-	1	-	-	-	-	-	1
1987A45,	1	-	-	-	-	-	0	0	-	-	1	-	0
1983AII64,	1	-	-	-	-	-	1	-	-	-	-	-	1
1987A47,	1	-	-	-	-	0	-	0	-	-	-	-	0
1994A26,	1	-	-	-	-	0	-	1	-	-	-	-	1
1983AII68,	1	-	-	-	-	-	-	0	-	-	-	-	0
1995A38,	1	-	-	-	0	-	-	0	-	-	0	-	0
1991T197,	0	1	-	1	-	-	-	0	-	-	-	-	0
1985AII74,	1	-	-	0	0	-	-	0	-	-	-	-	0

<sup>52</sup> Omitted, after deliberations, in connection with Table 9.<sup>53</sup> Omitted, after deliberations, in connection with Table 9.<sup>54</sup> Omitted, after deliberations, in Chapters 4.3.1.1. and 5.2.1.3.<sup>55</sup> Omitted, after deliberations, in Chapters 4.3.1.1. and 5.2.1.3.

The next table shows the Danish cases coded with the same attributes as the Finnish cases.

**Table 2.** Raw data matrix (Denmark).

CaseID	L	O	C	R	C	H	A	W	L	O	A	O	
	L	V	O	R	N	U	H	A	P	R	E	S	
	O	R	S	E	A	L	E	P	P	A	F	D	
	C	A	E	C	A	L	E	P	P	A	C	W	
	A	L	R	R	A	L	E	P	P	A	C	O	
	L	L	V	E	N	U	H	A	P	R	E	O	
	P	P	T	T	T	T	A	P	L	F	T	N	
	L	L	I	I	U	U	L	E	I	F	I	E	
	A	A	O	O	R	R	T	A	E	I	V	R	
	N	N	N	N	E	E	H	L	S	C	E	S	
1995/59	1	-	1	-	0	-	-	-	-	1	-	-	0
1995/82	0	0	-	-	0	-	-	0	-	-	1	-	0
1996/107	1	-	-	-	-	-	-	0	-	-	1	-	0
1997/131	1	-	-	-	-	-	-	0	-	-	1	-	0
1995/86 <sup>56</sup>	1	-	-	-	-	-	-	-	-	1	-	-	0
1997/130	0	1	-	-	-	1	-	1	-	-	-	-	1
1994/24	0	0	-	0	-	-	-	-	-	-	1	-	1
1994/23	1	-	0	0	0	-	-	-	-	-	1	-	0
1998/168	0	1	-	-	-	-	0	-	0	-	-	-	1
1993/14	1	-	1	-	-	-	-	0	-	-	-	-	0
1993/13	1	-	0	0	0	-	-	-	-	-	-	-	0
1993/13 <sup>57</sup>	0	0	0	0	0	-	-	-	-	-	-	-	0

The table shows that in Denmark most of the researched cases are local plans (the attribute on local plan has the value 1); three of the cases concern master plans (the attribute on overall plan has the value 0) while two of the cases concern regional plans (the attribute on overall plan has the value 1).

### 3.4 Truth table: Rearranging the raw data

In the truth table the raw data is organised by different attribute combinations and this way detached from the original cases. The truth table summary lists every unique configuration

<sup>56</sup> Omitted, after deliberations, in Chapter 4.2.1.2.

<sup>57</sup> The decision concerns master planning as well as local planning.

of independent attributes found in the data plus the number and percentage of cases associated with different outcomes. If there is a contradiction between cases, the outcome is assigned the value C. The 'old' and 'new' columns refer to changes made in the classification of raw data.

**Table 3.** Truth table summary (Finland).

	Old	New
0 Configurations	13	13
1 Configurations	7	7
- Configurations	0	0
Contradictory Configurations	2	2

This table indicates that in Finland, for 13 of the different attribute combinations the plan was overturned (0 configurations) and for 7 of the different attribute combinations the plan was ratified (1 configurations). Contradictory configurations are of special interest because they draw attention to the fact that for two of the attribute combinations the outcome differed even though the values of attributes remain the same. These cases might lead us to a new attribute that is significant in relation to the outcome. Contradictory cases are analysed in connection with Table 7, which provides CaseIDs for all of the cases. The sum of 0 configurations, 1 configurations, – configurations and contradictory configurations is not necessarily the number of cases in the raw data matrix (Table 1), because several cases might have the same values for the same attributes.

**Table 4.** Truth table summary (Denmark).

	Old	New
0 Configurations	8	8
1 Configurations	3	3
- Configurations	0	0
Contradictory Configurations	0	0

In Denmark, no contradictory configurations were detected. The previous table on Denmark, the raw data matrix (Table 2), shows that these data contain 12 cases from Denmark. This table points out that of the 12 cases 11 had different configurations. Only two cases have the same configurations.

This indicates that the cases were quite heterogeneous; in both countries, only a few cases have the same configurations. This means that the suggestions presented in this research are often based on configurations attained from only one case. This is acceptable in legal interpreting, where even a single case decided in the highest court of appeal shows how the legislation will be interpreted in the future by decision-makers (in the same circumstances) and also by authorities and lower court instances; otherwise the decisions will be reversed upon appealed.

**Table 5.** Number of raw data cases for each truth table configuration (Finland).

	0 Cases	1 Cases	- Cases
LOCRNCHAWTELO <sup>58</sup>	N	N	N
01-10-----01	0	1	0
00000-----0	1	0	0
1-1-0--0--0-0	1	0	0
001-0-----10	2	0	0
1-----11-C	1	1	0
1-----1—C	1	1	0
1--1--0—001	0	1	0
1--00-----0	1	0	0
1--00--0---0	1	0	0
1—0--0---0	1	0	0
1--0-----1-1	0	2	0
1----1-1--0-1	0	1	0
1-----0--0-0	1	0	0
1-----0—0-0	1	0	0
1-----1—001	0	1	0
00-10--0-1110	1	0	0
1----1----1	0	2	0
1-----00--1-0	1	0	0
1----0-0---0	1	0	0
1---0-1----1	0	1	0
1-----0---0	1	0	0
01-1--0---0	1	0	0

<sup>58</sup> The variables by column: LOCAL PLAN, OVERALL PLAN, CONSERVATION., RECREATIONAL, NATURE, CULTURE, HEALTH, AMENITY, WATER SUPPLIES, TRAFFIC, EFFECTIVE USE OF LAND, LANDOWNERS, OUTCOME.

This table<sup>39</sup> shows how many cases have had the same values for the particular attributes separated by the attribute on the outcome. In most of the cases included in this study, each case had a unique combination of values for the different attributes. This table also shows which combinations of attribute values have had contradictory outcomes (marked with C). Attribute combinations 1-----11- and 1-----1-- have had both values 0 and 1 for the outcome attribute in Finland.

In line with the table 4 the research material contains 8 various configurations for cases that were overturned and 3 various configurations for cases that were ratified in Denmark. This is illustrated in the next table.

**Table 6.** Number of raw data cases for each truth table configuration (Denmark).

LOCRNCHAWTELO	0 Cases	1 Cases	- Cases
	N	N	N
1-1-0----1--0	1	0	0
00--0--0--1-0	1	0	0
1-----0--1-0	2	0	0
1-----1--0	1	0	0
01---1-1----1	0	1	0
00-0-----1-1	0	1	0
1-000-----1-0	1	0	0
01----0-0---1	0	1	0
1-1---0----0	1	0	0
1-000-----0	1	0	0
00000-----0	1	0	0

As expected, only a few cases have the same combinations of attributes. This is because the cases included in the study were gathered from the highest instances of appeal, which are meant to steer the interpretation of legislation. It is not likely that these precedents would involve many similar cases. To get a larger number we would have to use cases from lower instances. This would involve uncertainty about the ultimate interpretation of

<sup>39</sup> It is useful to save the output selection ("save output" in the File menu) for printing at a later time. This is done by giving a file name consisting of eight characters and an ending with the extension OUT (e.g. Sustain2.OUT).



the issue if such were appealed to a higher instance. On the other hand, a qualitative analysis in general and in this research on court decisions in particular, even a single case is sufficient to reveal a certain pattern.

The next table reveals the caseIDs linked with different configurations. This table is useful if the research material contains cases that have the same attribute values or/and contradictory cases.

**Table 7.** CaseIDs for the truth table (Finland).

01-10-----01	=>	1977AII50	=1		
00000-----0	=>	1980AII59	=0		
1-1-0--0--0-0	=>	1993A37	=0		
001-0-----10	=>	1997T2532	=0	1988A57	=0
1-----11-C	=>	1985AII132	=0		
		1997 145	=1		
1-----1--C	=>	1989T98	=0		
		1997T3215	=1		
1--1--0--001	=>	1993A48	=1		
1--00-----0	=>	1978T2417	=0		
1--0--0---0	=>	1991A81	=0		
1--0-----1-1	=>	1977T2068	=1	1976T2574	=1
1---1-1--0-1	=>	1986T2667	=1		
1-----0--0-0	=>	1981AII48	=0		
1-----1--001	=>	1983AII59	=1		
00-10--0-1110	=>	1993A40	=0		
1----1----1	=>	1986AI4	=1	1983AII64	=1
1----00--1-0	=>	1987A45	=0		
1----0-0---0	=>	1987A47	=0		
1----0-1----1	=>	1994A26	=1		
1-----0---0	=>	1983AII68	=0		
1--0--0--0-0	=>	1995A38	=0		
01-1--0---0	=>	1991T197	=0		
1--00--0---0	=>	1985AII74	=0		

This table is helpful in tracking the cases underlying the attribute combinations. Here we can see that cases 1977T2068 and 1976T2574 in Finland have *the same values for both attributes and outcome*. Also cases 1986AI4 and 1983AII64 are the same in this respect. It might be useful to take a closer look at these cases in order to determine if they are similar in general. Cases 1985AII132 and 1997 145 are *contradictory cases* and are of special interest when analysing the cases underlying the attribute combinations. Cases 1989T98

and 1997T3215 are *also contradictory*. Moreover, it would be useful to examine cases 1997T2532 and 1988A57 in more detail because they have the same values for attributes and outcome.

When analysing the contradictory cases<sup>69</sup>, we can see that both cases 1985AII132 and 1997 145 are decisions about local plans. Both decisions deal with increasing the effective use of land and traffic in the area. In case 1985AII132 the decision of the lower court was overturned and in case 1997 145 it was upheld. In case 1985AII132, the town plan was revised to increase retail shops in the area, at the expense of housing. An earlier plan had restricted traffic in the area. In case 1997 145, a rural plan was drawn that would allow construction of a shopping centre in an area planned to be commercial centre. The plan was not considered to be against the interests of sustainable development even though it increased traffic in the area, because it didn't spread the community structure and was well situated with regard to existing traffic routs. In case 1985AII132, an area intended mainly for housing was protected against an increase in traffic, whereas in case 1997 145, the area was planned for offices and commercial use. Thus the contradiction between these two cases stems from the fact that according to the Finnish legislation on planning, increased traffic in general is not against the law, but housing areas can be protected against increases in traffic as an aspect of practicable and suitable use of land (BA, §34.1; BD, §32.2 item 19).

The second pair of contradictory cases, namely cases 1989T98 and 1997T3215 are both decisions concerning local plans and deal with increases in traffic, but in these cases the issue was not the effective use of land. The decision made in 1989 was overturned because public transport had not sufficiently been taken into consideration in the plan. The decision made in 1997 concerned a local plan that would allow the construction of a shopping centre outside city centre in an area marked for industrial use in the regional plan. This plan could not be overturned on the grounds that it wasn't in accordance with sustainable development or because it increased traffic. This pair of contradictory cases thus also brought out that increased traffic as such is insufficient grounds for rejecting a plan,

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<sup>69</sup> Case-oriented researchers usually deal with inconsistencies or paradoxes by examining the cases in greater detail. This might lead to the conclusion that some attribute was overlooked or that the values of the attributes would need to be re-evaluated (Ragin 1987:113–118).

whereas failure to make adequate public transport arrangements led to rejection of the plan because traffic requirements had not been met (BA, §34.1; BD, §32.2 items 13 and 14).

**Table 8.** CaseIDs for the truth table (Denmark).

1-1-0---1--0	=> 1995/59	=0
00--0--0--1-0	=> 1995/82	=0
1-----0--1-0	=> 1996/107	=0 1997/131 =0
1-----1--0	=> 1995/86	=0
01---1-1----1	=> 1997/130	=1
00-0-----1-1	=> 1994/24	=1
1-000-----1-0	=> 1994/23	=0
01----0-0---1	=> 1998/168	=1
1-1---0----0	=> 1993/14	=0
1-000-----0	=> 1993/13	=0
00000-----0	=> 1993/13	=0

As already stated, in Denmark there were no contradictory cases. Cases 1996/107 and 1997/131 have the same values for attributes and outcome. They both deal with the visual appearance and the effective use of land in local plan areas near the shore.

### 3.5 Truth table: Comparable equations

Before the research data can be minimized by the logic applied in QCA, the raw data matrix (Table 1) must be translated into comparable equations in order to track the changes. This is shown for the data on Finland in the following table. This table merely transforms the values presented in the raw data matrix into sentences using capital and small letters, distinguishing different types of plans and on the other hand overturned plans from ratified plans. There are as many sentences as there are cases in the research material, except that cases that have exactly the same values generate only one sentence in the truth table. The number of cases that have generated the same sentences can be seen in the end of the row in brackets. The truth table concerning Finland shows that three of the sentences represent two cases, while the other represent each only one case.

**Table 9.** Truth table (Finland).

File: SUSTAIN2.QVN

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS<sup>61</sup>

OUTCOME = Local OVERALL RECREAT nature owners

outcome = Local OVERALL RECREAT amenity

outcome = Local overall conserv Recreat nature +  
Local overall CONSERV Nature OWNERS (2) +  
Local overall RECREAT nature amenity TRAFFIC EFFECTIVE  
OWNERSOUTCOME = LOCAL TRAFFIC EFFECTIVE © +  
LOCAL RECREAT amenity effective owners +  
LOCAL recreat EFFECTIVE OUTCOME (2) +  
LOCAL CULTURE AMENITY effective +  
LOCAL AMENITY effective owners +  
LOCAL HEALTH (2) +  
LOCAL culture AMENITY +  
LOCAL TRAFFIC ©outcome = LOCAL CONSERV nature amenity effective +  
LOCAL TRAFFIC EFFECTIVE ©<sup>62</sup> +  
LOCAL TRAFFIC ©<sup>63</sup> +  
LOCAL recreat nature +  
LOCAL recreat amenity +  
LOCAL amenity effective +  
LOCAL health amenity EFFECTIVE +  
LOCAL culture amenity +  
LOCAL amenity +  
LOCAL nature amenity effective

The truth table also clearly points out the contradictory cases concerning local plans, which have been marked with ©. The cases are described in connection with Table 5. One way to resolve the contradiction between the cases is to add an attribute that would distinguish the two conflicting cases from each other. The other alternative is to take a closer look and to reevaluate the denomination of the attributes in the equations involved. Traffic seems to be

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<sup>61</sup> This expression shows the attributes used in this truth table – in this case I have used all the attributes selected for this research – and the attribute that has been chosen as the outcome – in this case the attribute illustrating whether the plan has been ratified or overturned.

<sup>62</sup> Omitted because the case KHO 1985 A II 132 was omitted.

<sup>63</sup> Omitted because the case KHO 1989 T 98 was omitted.

the common attribute in the conflicting cases. Inadequate public transport and the aim to cut down traffic in housing areas were sufficient reasons to overturn planning decisions, while increases in traffic stemming from the construction of shopping centres outside city centres did not cause plans to be overturned. After taking a closer look at the conflicting cases I decided to omit case 1985 A II 132 because it deals mainly with the suitability of the terrain, and case 1989 T 98 because it deals mainly with the requirements concerns on traffic. This decision to omit these two cases eliminates the conflicting attribute combinations from the data on overturned plans.

The next truth table concerns Denmark's overturned as well as ratified plans. It shows – using all the attributes selected for this research – the attribute combinations linked to different outcomes distributed by the type of plan.

**Table 10.** Truth table (Denmark).

File: SUSTAIN4.QVN

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS

OUTCOME = Local OVERALL health water +  
Local OVERALL CULTURE AMENITY

OUTCOME = Local overall nature EFFECTIVE

outcome = Local overall nature amenity EFFECTIVE +  
Local overall conserv recreat nature

outcome = LOCAL CONSERV nature TRAFFIC +  
LOCAL amenity EFFECTIVE (2) +  
LOCAL TRAFFIC +  
LOCAL conserv recreat nature EFFECTIVE +  
LOCAL CONSERV amenity +  
LOCAL prserv recreat nature

We can read from this truth table e.g. that in Denmark it has been considered to be sustainable land use (OUTCOME) in regional planning to ignore health values as well as ignore water supplies (Local OVERALL health water) and on the other hand to protect cultural values and amenity values (Local OVERALL CULTURE AMENITY). This table also shows again the different possible attribute values combined with the two outcomes (See Table 6). The Danish cases don't include any contradictory cases. On the other hand, there are two cases generating the same sentences on local plans. The Table also indicates that there are no overturned regional plans or ratified local plans in the research material. Proper succession of the attributes is important for the comparability of files.

The information we can get by using QCA before applying minimization concerns, as we have seen in this chapter, similarities and contradictions of the cases. To get further in analysing interest weighing involved in the cases, we have to apply Mill's methods and the principles of Boolean algebra as is done when using the minimization process of the QCA. This is illustrated in the next chapter.

## 4 ANALYSING CASES WITH QCA

### 4.1 Applying Mill's methods and the principles of Boolean algebra

The truth table, which consists of the attribute values associated with the outcome, is minimized by using the Quine-McCluskey or Akers algorithm. This involves dealing with the raw data by applying Mill's methods and the principles of Boolean algebra. The underlying logic behind Mill's methods used in QCA is on one hand that whatever *is not* connected with the phenomenon by any law *can be eliminated*. On the other hand whatever *is* connected with the phenomenon by a law *cannot be eliminated*. (Mill 1970: 256.) This leads to generate prime implicants of the truth table, which imply all configurations with as simple a combination of attribute values as possible. When generating prime implicants, QCA compares all configurations to one another, looking for opportunities to eliminate irrelevant attributes and combine configurations into simpler forms. For example, if regional plans in Finland are upheld both when cultural values have been protected and when they have not been protected in cases where all the other attributes have the same values, then protecting cultural values would be interpreted as being irrelevant to sustainable development in regional plans in Finland. The outcome, in this research sustainable land use planning, would be considered attained regardless of the value for the attribute cultural values.

The algorithm also includes applying De Morgan's Law if the research material contains cases where outcome is 0 and outcome is 1. If there are no cases for both outcomes (negative and positive outcomes) the algorithm only produces prime implicants, which may even be the same as the configurations of the original cases. This is the case if it has not been possible to produce prime implicants owing to a lack of variety in the configurations of the original cases or to a lack of original cases. E.g. if the research material concerning Finland does not contain any sustained master plans, it indicates that the results on the analysis concerning this part of the research will merely be based on elimination of irrelevant attributes, because De Morgan's Law can't be applied.

If the situation gets more complicated and there are too many possible cluster combinations for the program to analyse with the Quine-McCluskey method, or too many

to make a complement of the minimized truth table, then the Akers method which is faster but which might not produce as minimized a truth table as the Quine-McCluskey method does<sup>64</sup> – can be used. As a result a subset of prime implicants sufficient to imply all configurations inherent in the truth table is selected.

## **4.2 Minimizing truth table: eliminating irrelevant attributes**

### **4.2.1 Not sustainable land use (overturned plans)**

The truth table can be minimized by output value 0 (not sustainable land use) or 1 (sustainable land use) or by a combination of both of these output values in the same minimized truth table. Since I was particularly interested in sets of conditions associated with plans that either were considered to be in accordance with sustainable development or plans that were considered as not meeting the requirements of sustainable development, I decided to have separate truth tables for outcomes 0 and 1. In order to keep configurations separated by plan, I selected the cases by background attributes. For the purposes of this study, it is interesting to analyse how different attributes concerning sustainable development have been weighed against each other in different plans.

In the next two subchapters the previous truth tables (Tables 9 and 10) – in other words the attribute combinations attached to not sustainable land use – will be examined by minimizing them separately by the type of plan. Minimizing these two truth tables by type of plan leads to eliminate the attributes that are not necessary for the outcome. This results in the necessary combinations of criteria that cause a plan to be overturned because it would lead to land use that is not sustainable.

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<sup>64</sup> When the number of categories is large, the Akers method has not always provided the most minimal solution (Hellström 2001: 41). This did not occur during the present research and would not be considered to be a major problem, because the most minimal solution is not always the most informative solution. On the other hand, it is possible to continue the minimization by hand if this would be useful.



## 4.2.1.1 Finland

The research material contains decisions on overturned regional, master and local plans concerning Finland. The next table deals with attribute combinations leading to overturn regional plans.

**Table 11.** Minimized truth table in cases where *regional plans* were overturned (Finland).

File: SUSTAIN2.QVN

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS

Outputs Minimized: 0

Method: Quine-McCluskey

Select if: Overall=1<sup>65</sup>

local OVERALL RECREAT amenity OWNERS +  
local OVERALL RECREAT amenity NATURE

When these two sentences are factored<sup>66</sup> by common attribute values, we get the following equation for overturned regional plans: 'outcome = local OVERALL RECREAT Amenity (OWNERS + NATURE)'.

This equation states that regional planning decisions were overturned when amenity values were not protected even though recreational values were protected if either the decision caused inconvenience to landowners, or nature values were protected. Compared against the truth table that includes the raw data (Tables 1 and 9), the attribute combinations are the same as in the original case (KHO 1991 T 197) except that the sentence contains one additional attribute, namely 'OWNERS' or 'NATURE'. These two attributes are the same attributes included in the sentence for regional plans that were upheld based on the decision KHO 1977 A II 50. The difference is that the attributes have an opposite value in the minimized equation. In this case QCA utilized an additional means to widen the analysis so that it also includes the information on positive cases.

To gain information not only from the overturned regional plans but also from the ratified

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<sup>65</sup> The option Select if: Overall=1 was used to select only information on regional plans.

<sup>66</sup> Factoring means that the equation is rearranged by selecting one or more attributes that are common to the configurations. It is different from choosing one of the attributes as the outcome and then considering configurations from this point of view. This is dealt with in the next two chapters.

regional plans QCA uses De Morgan's Law. Using De Morgan's Law, we assume that when protection of recreational values despite ignoring nature values in cases where the decision causes landowners no inconvenience, has led to ratification of the plan, whereas the opposite values for these attributes – namely, protection of nature values or causing inconvenience to landowners – would led to rejection of the plan. According to the Building Act a regional plan should “not cause landowners unreasonable inconvenience” (22.2 §). While this condition alone would be sufficient reason to overturn a regional plan, we cannot draw any conclusions on what effect protection of nature values or recreational values would have on a regional planning decision. Therefore cases that include sufficient conditions should not be coded for any other attributes despite for background and outcome attributes.

The next question to settle is whether this is an acceptable deduction for this research. Can we state that if regional plans were upheld when the value of recreational attribute was the same in both upheld and overturned regional plans, then the three remaining attributes – namely, nature and inconvenience to landowners – are the decisive attributes for the acceptance of the plan? In other words can we assume that if:

OUTCOME= Local OVERALL RECREAT nature owners, and  
 Outcome= Local OVERALL RECREAT amenity<sup>67</sup>, it then follows that  
 Outcome= Local OVERALL RECREAT amenity (OWNERS + NATURE)<sup>68</sup>.

It is quite logical to assume that if regional plans in Finland have been overturned because amenity values have not been taken into consideration even though recreational values have been protected, then inconvenience to landowners is one more reason for overturning the plan. The second option, which adds protection of nature values to the sentence, is more complicated. It indicates that regional plans are overturned in Finland if amenity values are not taken into consideration even though recreational and nature values have

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<sup>67</sup> This equation is based directly on the attribute values of the sole case of overturned regional plans in the raw data (Table 1).

<sup>68</sup> This equation is attained by using De Morgan's Law which implies the following equation: Outcome= Decision OVERALL RECREAT amenity (recreat + NATURE + OWNERS) => Outcome = Decision OVERALL RECREAT amenity recreat + Decision OVERALL RECREAT amenity NATURE + Decision OVERALL RECREAT amenity OWNERS => Outcome = Decision OVERALL RECREAT amenity NATURE + Decision OVERALL RECREAT amenity OWNERS). The first configuration is excluded because it contains both present and absent values with regard to the attribute recreat

been protected. It stresses the importance of amenity values<sup>69</sup> in the interest weighing.

If we compare how amenity values and outcome attributes correlate in the raw data matrix (Table 1), we notice that when amenity values were not taken into consideration, the plans were overturned (except in one local plan case) and also, correspondingly, when amenity values were protected, plans were upheld. On the other hand nature values also seem to have had a similar connection with the outcome. In all cases but one, the attribute value for the attribute nature correlates with the value for the outcome. The exception is the single case of ratified regional plans. When this case (KHO 1977 A II 50) is inspected more closely, especially how nature values were taken into consideration, we find that even though the appellant based her complaint among other things, on the values of nature in the area, the Supreme Administrative Court balanced the inconvenience to landowners with the need for sufficient amounts of land for various purposes (in this case, for recreation) and did not motivate the ignoring of nature values.

This leaves us with three options. We can either decide to exclude the attribute of nature from the case, and thus end up with the attribute combination 'OUTCOME = Local OVERALL RECREAT owners' for ratified regional plans and, further, after applying De Morgan's Law with the configuration 'Outcome = Local OVERALL RECREAT amenity OWNERS' for overturned regional plans. Or then we may decide to exclude the whole case from the research material if we consider it to be entirely misleading. Then we would have no cases of ratified regional plans and the configuration of the original case would be as for overturned regional plans ('Outcome = Local OVERALL RECREAT amenity'). The third option would be to accept the information based on the case. I decide to include the case in the sample because even though the Supreme Administrative Court does not explicitly mention that nature values are not given weight in this decision, in fact the decision shows that the court has ignored nature values while weighing recreational needs and the inconvenience to landowners.

We can also accept that protected nature values (after the use of De Morgan's Law) can be associated with overturned plans. Actually, the use of De Morgan's Law to extend the

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<sup>69</sup> On protection of amenity values in regional plans in Finland, see chapter 5.6.1.1.

information on overturned plans adds attributes that are not necessary to overturn the plan because the original case indicates that regional plans were overturned when recreational values were protected but amenity values were ignored. The information obtained by using De Morgan's Law, is however, interesting because it illustrates that even the protection of nature values does not lead to the plans being upheld; nor were plans upheld because they did not cause inconvenience to landowners. This leads to the conclusion that inconvenience to the landowners is a sufficient but not necessary reason when the decision is made whether to overturn or uphold a regional plan.

The next table includes information on overturned master plans in Finland.

**Table 12.** Minimized truth table in cases where *master plans* were overturned (Finland).

File: SUSTAIN2.QVN

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS

Outputs Minimized: 0

Method: Quine-McCluskey

Select if: Overall=0

local overall conserv recreat nature +  
 local overall CONSERV OWNERS nature +  
 local overall amenity TRAFFIC EFFECTIVE OWNERS nature

Factoring by common attributes we have the equation:

outcome = local overall nature [(conserv Recreat) + (CONSERV OWNERS) + (amenity TRAFFIC EFFECTIVE OWNERS)]

The sentences are the same as for the raw data except that the third sentence does not include the attribute 'RECREAT', which is included in the original truth table (Table 9). The minimization process did not include the use of De Morgan's Law because the research material does not contain any cases on master plans that were upheld. The Boolean minimization has involved producing prime implicants according to Mill's method of agreement.

The important attribute in overturned master plans seems to be natural values that were not protected. We cannot, however, draw the conclusion that unprotected natural values would be necessary to overturn master plans, or that unprotected natural values would always lead to the overturning a master plan, because this has been the case only in connection with the presence or absence of the other attributes in the configurations. This does not overrule the possibility that there will be overturned master plans which do not deal with natural values, or that there are master plans that have been overturned solely because natural values were ignored. All three cases in the raw data have involved other attributes as well.

If we consider the prime implicants dealing with master planning decisions, we get the results that master plan decisions are overturned when natural values were not protected in an area that belongs to a strict nature reserve or a national park and recreational values, too were not protected ('outcome = local overall conserv recreat nature'). This configuration is based directly on the decision KHO 1980 A II 59. Master plans have also been overturned when natural values were not protected and the plan caused landowners inconvenience in an area covered by a nature conservation programme ('outcome = local overall CONSERV OWNERS nature'). This configuration is based directly on decisions KHO 1997 T 2532 and 1988 A 57. Master plans were also overturned when nature and amenity values were not protected in a decision which increased traffic and the effective use of land and the decision caused landowners inconvenience ('outcome = local overall amenity TRAFFIC EFFECTIVE OWNERS nature'). This configuration is based on the decision KHO 1993 A 40 except that this case includes one additional attribute, protection of recreational values, which is not included in the equation produced by QCA.

One interesting question rises from the comparison against the original cases: Why has the attribute protected recreational values ('RECREAT'), which included in the original case, been minimized away? Do we lose information if we accept that Boolean minimization has excluded the attribute 'recreational'? The case to which this combination of attributes implies, KHO 1993 A 40, deals with a master plan drawn up for areas for tourism, summer cottages and recreation. The main issue in this case was not protection of recreational values, but extension of a slalom slope and the related facilities for tourism. The master plan was overturned mainly because the plot ratio was too high for purposes of tourism and

recreation and because the plan caused inconvenience to some landowners in the area. In this case I will include the attribute 'recreational' in the equation on overturned master plans, because the attribute seems to be decisive in the original case. Thus the last configuration would be 'outcome = local overall amenity TRAFFIC EFFECTIVE OWNERS nature RECREATIONAL'.

The next table deals with overturned local plans in Finland.

**Table 13.** Minimized truth table in cases where *local plans* were overturned (Finland).

File: SUSTAIN2.QVN

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS

Outputs Minimized: 0

Method: Quine-McCluskey

Select if: Local=1

LOCAL recreat health amenity traffic effective +  
 LOCAL RECREAT health amenity traffic EFFECTIVE +  
 LOCAL RECREAT health amenity traffic OWNERS

Factoring by the common attribute values gives a clearer picture of the interest weighing involved in the decisions.

– LOCAL health amenity traffic [(recreat Effective) + (RECREAT EFFECTIVE) + (RECREAT OWNERS)]

Health values and amenity values that were ignored seem to be important attributes in overturned local plans even though the decisions did not increase traffic. Recreational values are the fourth common attribute in deliberation on overturned local plans. Local physical planning decisions were overturned when health and amenity values were not protected in decisions that did not increase traffic when: either recreational values were not protected even though the decision did not increase the effective use of land ('health amenity traffic recreat effective'); or, on the other hand, when recreational values were protected but the decision either increased the effective use of land ('health amenity traffic RECREAT EFFECTIVE'); or caused inconvenience to landowners ('health amenity traffic RECREAT OWNERS').

Compared against the raw data, we find that the configurations look quite different after the data are minimized by using QCA. According to Mill's method of agreement, the focus is on the configurations of all overturned plans and on finding the prime implicants implying these configurations. After that, overturned local plans were compared against local plans that had been upheld, in order to generate configurations which actually don't exist as such in the data but which are consequence of applying Mill's indirect method of difference. Overturned local plans did not include data on recreational values that were protected; these were deduced from data on ratified plans. There are several cases of both ratified and overturned local plans, which makes the minimization process more productive and different from the original data when compared against the regional and master plans. To stress the differences in alternative configurations, I have chosen to select all the common items as joint attributes.

When analysing the truth table (Table 9), ignored amenity values seem to be the common attribute in all analysed cases except one, which deals with ignored recreational and natural values (KHO 1978 T 2417). In one of the cases, ignored amenity values alone were sufficient to cause a local plan to be overturned (KHO 1983 A II 68). This was the case with regard to ratified local plans as well. Local plans that have protected amenity values were upheld in all but one case where a local plan was upheld even though amenity values were ignored (KHO 1993 A 48). In this case, recreational values were protected. This is an interesting exception that needs to be analysed more closely. This case, which concerns changing the location of a park, was not made unanimously; it was a divided judgment (3 votes to 2). The minority would have overturned the plan because of the amenity values and the location of the old park. In this case, the crucial point was whether the location of the park could be protected or whether only the sufficiency of the number of parks in a certain area could be protected. The majority ruled that only the sufficiency of the number of parks could be protected while the minority would have also taken the amenity of an old park into consideration.

The minimization of local plans will be examined more profound in the next four tables (Tables 14–17) to indicate the effect of the logical operations that QCA uses to minimize the results of the analysis. Overturned local plans are used as an example because the

research material is most comprehensive regarding local plans. The next tables illustrate the cases concerning overturned local plans in Finland and the three attribute combinations that are the result of the minimization process.

**Table 14.** Minimized function summary: number of truth table configurations and raw data cases implied by each term.

DPPRCHAWTELN <sup>70</sup>	0 Configs		Cases		1 Configs		Cases		- Configs		Cases	
	N	%	N	%	N	%	N	%	N	%	N	%
1--0-00-00--	8	89	8	89	0	0	0	0	0	0	0	0
1--1-00-01--	3	33	3	33	0	0	0	0	0	0	0	0
1--1-00-0-1-	6	67	6	67	0	0	0	0	0	0	0	0
Checked	9	100	9	100	0	0	0	0	0	0	0	0
Total	9	100	9	100	8	100	10	100	0	0	0	0

This table includes all local plan decisions where the local plan was overturned. The raw data contains nine decisions overturning local plans. The configuration 'outcome=LOCAL recreat Health amenity traffic effective' (1--0-00-00--) is generated based on eight of these local plan decisions. The next configuration on overturned local plans 'outcome=LOCAL RECREAT Health amenity traffic EFFECTIVE' (1--1-00-01-) includes three of the local plan decisions. The last configuration 'outcome=LOCAL RECREAT health amenity traffic OWNERS' (1--1-00-0-1-) is based on six of the local plan decisions. The respective caseIDs linked with each configuration can be seen in the next table.

<sup>70</sup> Variable Names by Column: DECISION, OVERALL, CONSERV, RECREAT, CULTURE, HEALTH, AMENITY, WATER, TRAFFIC, EFFECTIVE, OWNERS, NATURE.



**Table 15.** CaseIDs for the minimized function.

CaseIDs for: 1--0-00-00-- (N = 8)

Configuration: 1-1---0--0-00	Covered By: 2 Function Terms	1993A37	=0
Configuration: 1--0-----00	Covered By: 1 Function Term	1978T2417	=0
Configuration: 1--0--0----00	Covered By: 1 Function Term	1985AII74	=0
Configuration: 1--0--0----0	Covered By: 1 Function Term	1991A81	=0
Configuration: 1----0--0-00	Covered By: 2 Function Terms	1995A38	=0
Configuration: 1----0--0--0	Covered By: 2 Function Terms	1981AII48	=0
Configuration: 1---0-0-----0	Covered By: 3 Function Terms	1987A47	=0
Configuration: 1-----0-----0	Covered By: 3 Function Terms	1983AII68	=0

CaseIDs for: 1--1-00-01-- (N = 3)

Configuration: 1----00--1--0	Covered By: 2 Function Terms	1987A45	=0
Configuration: 1---0-0-----0	Covered By: 3 Function Terms	1987A47	=0
Configuration: 1-----0-----0	Covered By: 3 Function Terms	1983AII68	=0

CaseIDs for: 1--1-00-0-1- (N = 6)

Configuration: 1-1---0--0-00	Covered By: 2 Function Terms	1993A37	=0
Configuration: 1-----0--0-00	Covered By: 2 Function Terms	1995A38	=0
Configuration: 1-----0--0--0	Covered By: 2 Function Terms	1981AII48	=0
Configuration: 1----00--1--0	Covered By: 2 Function Terms	1987A45	=0
Configuration: 1---0-0-----0	Covered By: 3 Function Terms	1987A47	=0
Configuration: 1-----0-----0	Covered By: 3 Function Terms	1983AII68	=0

Two of the cases (KHO 1983 A II 68 and 1987 A 47) are covered by all three configurations. These are cases that include only amenity and cultural values that were ignored. Prime implicants<sup>71</sup> are produced as the first step of the Boolean analysis.

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<sup>71</sup> A small number of prime implicants indicates greater diversity within the prime implicants because more combinations of attributes are covered by one prime implicant (Ragin 1987:108).

**Table 16.** Prime implicant chart of local plans that were overturned in Finland.Prime implicants/configurations of original cases<sup>72</sup>

	DPaen	Daen	Dae	DhaE	Dca	Da	Drn	Dran	Dra
Da	x	x	x	x	x	x		x	x
Drn							x		

For the original combinations of attributes, the case KHO 1983 A II 68 covers all the other attribute combinations of the cases except the case KHO 1978 T 2417. The case KHO 1983 A II 68 has the attribute combination 'LOCAL amenity', which means that it covers all local plans except those where amenity values were not protected. This is the reduced expression covering all except one of the original combinations of attributes. We need to deduce one more combination of attributes to cover the case that doesn't include the attribute of amenity values. This would be the same as the original combination of attributes of the case in question, namely 'LOCAL recreat nature', which covers local plans in which recreational values and natural values were not protected.

These two reduced expressions are called prime implicants. According to Mill's method of agreement, together they form what is logically the most minimal equation, implying that local plans were always overturned in Finland when amenity values were not taken into consideration and also when both recreational and natural values were ignored. In other words we might draw the conclusion that ignored amenity values are sufficient, but not necessary to overturn a local plan decision in Finland.

According to Mill's indirect method of agreement we can extend this assumption by examining the decisions ratifying local plans in Finland (Table 1). The raw data contain ten such decisions, of which eight have different attribute configurations. One of them concerns amenity values that were not taken into consideration. This is the case KHO 1993 A 48, where local plans were ratified when recreational values were protected even though amenity values were ignored; in this case the decision did not increase the effective use of land or cause landowners inconvenience ('LOCAL RECREAT amenity effective owners').

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<sup>72</sup> The attributes are the same as those used for this research, but only the first letter of the attribute is shown in this table.

The prime implicants generated from the configurations of the original ratified local plans in Finland are 'LOCAL TRAFFIC', 'LOCAL HEALTH', 'LOCAL AMENITY', 'LOCAL recreat effective owners' and 'LOCAL effective recreat'. This is based on the following table:

**Table 17.** Prime implicant chart of ratified local plans in Finland.

Prime implicants/configurations of the original cases<sup>73</sup>

	DT	DTE	DRael	DrE	DCAe	Dael	DH	DcA
DT	x							
DH							x	
DAe			x		x	x		x
DcA					x			x
DRel <sup>74</sup>			x			x		
DrE				x				

A comparison of the prime implicants of overturned and ratified local plans implies that attribute A, which indicates amenity value, was the decisive factor determining whether the local plans were overturned or ratified. Other attributes did not have equally clear consequences on the outcome of the plan. The attributes of the prime implicants are, however, the attributes in the minimized equations of overturned local plans. When De Morgan's Law is applied to the equation based on the prime implicants for the ratified local plans, we get the final solution implied by the QCA minimization process as the equations for overturned local plans: 'outcome = LOCAL (TRAFFIC+HEALTH+AMENITY+RECREATIONAL effective owners + EFFECTIVE recreational)' => 'outcome = LOCAL [(traffic health amenity) (recreational + EFFECTIVE + OWNERS) (effective + RECREATIONAL)]' => 'outcome = LOCAL (traffic health amenity recreational + traffic health amenity EFFECTIVE +traffic health amenity OWNERS) (effective + RECREATIONAL)' => 'outcome = LOCAL traffic health amenity recreational effective + traffic health amenity EFFECTIVE effective + traffic health amenity OWNERS effective + traffic health amenity recreat RECREAT + traffic health

<sup>73</sup> The configurations of the original cases are generated on the basis of Table 1A.

<sup>74</sup> 'DECISION AMENITY effective' covers all the cases, including the intersection of attributes 'DECISION' and 'AMENITY'. Therefore the configuration 'DECISION RECREAT amenity effective owners' can be simplified as the prime implicant 'DECISION RECREAT effective owners'.

amenity EFFECTIVE RECREAT + traffic health amenity OWNERS RECREATIONAL'<sup>75</sup>  
 => 'outcome = LOCAL (traffic health amenity recreational effective + traffic health amenity OWNERS effective + traffic health amenity EFFECTIVE RECREATIONAL + traffic health amenity OWNERS RECREATIONAL)'. These are the attribute combination suggested by the QCA software as the solution when minimizing local plans that had been overturned. The final solution includes only three of the attribute combinations (Table 13) because 'traffic health amenity OWNERS RECREAT' and 'traffic health amenity OWNERS effective' cover the same attribute combinations; thus only 'traffic health amenity OWNERS RECREAT' is included in the solution.

The use of De Morgan's Law produces attribute combinations that do not exist in the truth table (Ragin 1987: 109). This is why we need to approve the logic behind this solution. The result presented is precisely a statement of unlikely (Ragin 1987: 159) combinations of attributes that would result in a decision ratifying a local plan. Is it acceptable to assume that if a certain combination of attributes results to a positive outcome, then the opposite value for this attribute combination would yield a negative outcome?

We can start by taking a closer look at the prime implicant 'LOCAL TRAFFIC', which is implied by the local plans that were ratified (and which was also one configuration of the original cases). This attribute combination states that local plans are ratified when the decision increases traffic in the area. Can we turn this around and state, on the basis of this knowledge, that local plans will be overturned when the decision does not increase traffic in the area? In this case the logic isn't sustainable. If the local plan does not increase traffic, this should be considered a positive outcome that is in accordance with sustainable development and thus would not be the reason for overturning a plan. This configuration is based on the case KHO 1997T3215, which concerns constructing large retail shops on the outskirts of an urban area. This shortcoming has been dealt with in the new Land Use and Building Act that has been in force since 1 March 1999. While the attribute combinations 'LOCAL HEALTH' and 'LOCAL AMENITY' are logically acceptable even when reversed, stating that local plans will be overturned when health values or amenity values

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<sup>75</sup> The attribute combinations 'traffic health amenity EFFECTIVE effective' and 'traffic health amenity recreat RECREAT' are excluded because one of the attributes is both present and absent at the same time.

are not protected. The last attribute combination dealing with amenity values is confirmed by the original attribute combinations on overturned plans.

The next prime implicant for configurations of original local plans that were ratified states that local plans are ratified when recreational values are protected if the decision does not increase the effective use of land and doesn't cause inconvenience to landowners ('LOCAL RECREAT effective owners'). Turned around to apply to overturned plans, we state that local plans are likely to be overturned if recreational values are not protected when the decision increases the effective use of land and causes inconvenience to landowners ('LOCAL recreat EFFECTIVE OWNERS'). This is quite likely according to the legislation.

The last prime implicant for local plans that were upheld indicates that local plans have been ratified even though recreational values were not protected and the decision has increased the effective use of land ('LOCAL recreat EFFECTIVE'). This seems strange and against the idea of sustainable development. According to the raw data matrix (Table 1) there are two cases implying this configuration, namely KHO 1977 T 2068 and 1976 T 2574. Both cases are quite old and require analysis in order to reveal whether the rule valid for these cases is still applied. When reversed, this configuration seems equally odd. The cases concern reducing park and recreation areas in cities. The Building Act that was in force at the time stated that care must be taken to endure that "space reserved for [sufficient parks and other recreation areas] is not reduced without special cause" (BA, §34.2). The special reason for reducing the size of recreation areas in the city seemed to be the need for housing sites when the recreation area was in close proximity to existing housing areas. The minority (6-2) in the decision KHO 1976 T 2574 were of the opinion that an alternative space for recreation should have been indicated in the plan. This regulation is not included in the new Land Use and Building Act.

These prime implicants lack the attribute combination 'LOCAL recreat nature', which is one of the prime implicants for the configurations of the original cases on overturned local plans. Put this together all the above remarks, we can adjust the equation for overturned local plans in Finland to be the following: 'outcome = LOCAL (health amenity recreat +

health amenity EFFECTIVE + health amenity OWNERS + recreat nature)'. This equation implies that local plans in Finland will be (and some have already been) overturned: 1) if values linked with health, amenity and recreation have been ignored; 2) if values linked with health and amenity have been ignored and the decision increases the effective use of land; 3) if values linked with health and amenity have been ignored and the decision causes landowners inconvenience; and, finally, 4) if values linked with both recreation and nature have been ignored.

#### 4.2.1.2 Denmark

The research material did not contain any cases of overturned regional plans in Denmark, but we have cases where master and local plans were overturned. The following table deals with master plans that were overturned in Denmark.

**Table 18.** Minimized truth table in cases where *master plans* were overturned (Denmark).

File: SUSTAIN4.QVN

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS

Outputs Minimized: 0

Method: Quine-McCluskey

Select if: Overall=0

Local overall conserv recreat nature effective +  
Local overall RECREAT nature amenity EFFECTIVE

– local overall [(conserv recreat nature effective) + (RECREAT nature amenity EFFECTIVE)]

The research material contains two cases where master plans were overturned and one case where master plans were ratified. These cases were subjected to QCA in order to minimize the data. The two attribute value combinations associated with the raw data are not quite the same as the sentences on the minimized truth tables. The attributes on the effective use of land and protection of recreational values are the distinctive features. Master plans were overturned when recreational and natural values were not taken into consideration with regard to strict nature reserves or national parks, even though the decision did not increase

the effective use of land ('Local overall conserv recreat nature effective'). This was also the case if the plan increased the effective use of land and nature and amenity values weren't taken into consideration even though recreational values were protected ('Local overall RECREAT nature amenity EFFECTIVE').

As concerns Denmark, the QCA analysis is based on two overturned master plans and one ratified master plan. The two overturned master plans (NKNO 82/1995 and 13/1993) yield the configurations 'outcome = local overall (nature amenity EFFECTIVE + conserv recreat nature)' and the ratified master plan (NKNO 24/1994) gives the configuration 'OUTCOME = local overall (recreat EFFECTIVE)'. Applying De Morgan's Law to the configuration based on the master plans ratified in Denmark, we get the equation 'RECREATIONAL + effective'. Combined with the configurations on the overturned master plans we get the equation 'outcome = local overall (nature amenity EFFECTIVE + conserv recreat nature)(RECREAT + effective)' => 'outcome = local overall (RECREAT nature amenity EFFECTIVE + conserv recreat nature effective)' which is the equation obtained from the QCA minimization process presented in Table 18.

As we take a closer look at the logic drawn from the cases we find that we need to analyse the case NKNO 24/1994 in order to determine why the master plan was ratified even though recreational values were not protected and the decision increased the effective use of land. This was a divided judgment (5-5) where the majority (included the vote of the chairman) was of the opinion that the reasons for protecting a city park were not strong enough<sup>76</sup>. This leads to an absurd outcome when revised according to De Morgan's Law, implying that master plans will be overturned if recreational values are protected or the plan does not increase the effective use of land.

It is therefore sensible to exclude the attribute combinations added to the equation on the basis of the ratified plan obtained by using De Morgan's Law ('RECREAT + effective') and to include the outcome based on overturned master plans 'outcome = local overall (nature amenity EFFECTIVE + conserv recreat nature)' based directly on the researched cases, which state that master plans were overturned in Denmark: 1) when nature and

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<sup>76</sup> Chapter 5.2.2.2. includes a description of the case.

amenity values were not protected and the decision has increased the effective use of land; and also 2) in an area established as a national park or strict nature reserve in situations when recreational and natural values were ignored.

**Table 19.** Minimized truth table in cases where *local plans* were overturned (Denmark).

File: SUSTAIN4.QVN

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS

Outputs Minimized: 0

Method: Quine-McCluskey

Select if: Local=1

LOCAL CONSERV amenity +  
 LOCAL conserv recreat nature +  
 LOCAL TRAFFIC +  
 LOCAL amenity EFFECTIVE

Factoring by background attributes, the sentences are:

- LOCAL [(CONSERV amenity) + (conserv recreat nature) + TRAFFIC + (amenity EFFECTIVE)]

The research material on Denmark lacks ratified local plans, which makes the minimization process simpler because De Morgan's Law can't be used. The sentences are identical with four of the six different sentences (two of the cases have the same attribute combination) based on the original cases. The original cases include two additional sentences, which were omitted in the minimization process. One of the cases is a case on areas covered by a nature conservation programme, which states that local plans have been overturned when natural values were not taken into consideration and the decision increased traffic ('CONSERV nature TRAFFIC'). This configuration was covered by the configuration which states that local plans have been overturned when they increased traffic in the area ('TRAFFIC'). This again is not very likely, and we find that the case (NKNO 86/1995), on which this configuration is based, ruled that a ring road should be based on a master plan and detailed local plan, but did not ban the increase of traffic as such. This decision clearly leads to a misleading outcome with regard to traffic and was



thus excluded. This brings us to include the attribute combination 'CONSERV nature traffic', which had previously been excluded from the solution.

After these remarks, we find that local plans were overturned in Denmark 1) when amenity values haven't been taken into consideration in areas covered by nature conservation programmes. Local plans were also overturned 2) concerning strict nature reserves or national parks, when recreational and natural values were not taken into consideration. This was also the case 3) when the plan increased traffic in areas included in nature conservation programmes while natural values were not protected, and 4) when the effective use of land was increased but amenity values were not taken into consideration.

#### 4.2.1.3 Summary of results on not sustainable land use

##### **Finland**

The provisions on regional plans during the time that the analysed cases were decided were more flexible than they are currently in Finland. The equation obtained as a result of the qualitative comparative analyse stresses the meaning of amenity values in regional plans. Interesting is that the provisions did not include amenity as a criteria on regional plans. The new Land Use and Building Act includes a provision on protection of landscape (LUBA, §28.3 item 6), which gives rise to the question on amenity of the surroundings. The information obtained by using De Morgan's Law illustrates that even the protection of nature values does not lead to the plans being upheld; not protecting amenity values is given more weight in balancing of interests. Regional plans were also overturned when they caused inconvenience to landowners, which indicate that inconvenience to landowners have significant weight in interest balancing.

Based on this analysis we can draw conclusions only on interest balancing on the aspects occurring in the cases, namely recreational values, amenity values, nature values and inconvenience to landowners. Other aspects, like cultural values, health values water supplies and effective use of land were not dealt with in the researched cases. The provisions on regional plans mainly deal with reserving sufficient amounts of land for

various purposes (BA, §22.2); qualitative aspects like cultural values, health values, effective use of land and impact on traffic are not dealt with. Nor did the cases deal with areas including in nature conservation programmes or national parks. Provisions on taking into account decisions on nature conservation programmes and nature parks were added in 1996 (1097/1996).

Provisions on regional plans were applied correspondingly to the drafting and development of a master plan (BA, §29.1). Concerning master plans, the various purposes for which land needed to be reserved were defined such as housing; business operations, such as industry, commerce and services, and farming and forestry; recreation; and traffic, water supply and other public necessities (BA, §28.1). However in the equation derived from the analysis we have even some aspects on quality of land use concerning master plans in Finland. One of the attribute combinations concern areas that are included in nature conservation programmes and one concerns areas that are established as national parks. Only the third and last combination of attributes deal with plans outside nature conservation areas.

It is in line with the provisions – that master plans, which cover some kind of area reserved for nature conservation – give high priority to natural values. The reason that recreation values also are ignored in the plan or that the decision has caused unreasonable inconvenience for landowners as well, gives even stronger motive to overturn the plan. On the other hand, we can't – based on this analysis – draw the conclusion that ignored natural values alone would be sufficient reason to overturn a master plan drawn up for areas that are reserved for nature conservation.

The third combination of attributes draws attention again to amenity values. All other attributes but preserved recreational values give weight to overturn the plan. The master plan was overturned mainly because the plot ratio was too high for purposes of tourism and recreation and because the plan caused unreasonable inconvenience to some landowners in the area. The decision was not motivated solely on the grounds of unreasonable inconvenience to landowners, but too effective use of land for the reserved purpose and the consequences of it have given weight in the decision as well. There are no provisions

backing up the latter motivation but that attention must be paid to any special needs arising from conditions in the region (BA, §22.2).

The equation on overturned local plans in Finland reflects the provisions on local plans. A local plan should meet the demands of health, fire safety, traffic, amenity and beauty (BA, §34.1). In particular, there were provisions on reserving sufficient areas for recreation (BA, §34.2). None of these conditions seem to be sufficient to alone cause the local plans to be overturned. On the other hand, ignored health values and amenity values seem to be involved in all but the last combination of attributes. The last combination of attribute values links both ignored recreation and nature values. Provisions on nature conservation were added in 1996 (BA, §34.4, 1097/1996). The condition that the decision increases the effective use of land is not directly based on any provisions, but can be derived from the provision regulating that space reserved earlier for recreation may not be reduced without special cause (BA, §34.2). Inconvenience to landowners is not so strictly regulated concerning local plans as it is regarding regional plans and master plans. The provisions state that no unreasonable restrictions should be placed on private landowners that can be avoided without essentially overriding the demands made of the plan (BA, §34.1). However this equation shows that inconvenience to landowners may be a reason to overturn a local plan as well.

## Denmark

We can't draw any conclusions on sustainable land use in regional planning in Denmark, because there was no Danish regional plans in the research material.

The equation based on QCA illustrates that master plans were overturned in Denmark when natural values were not protected. In all the cases ignored natural values alone didn't cause the plan to be overturned but the decision also ignored amenity values and increased effective use of land were involved in interest weighing. In areas established as national parks or strict nature reserves it is expected that natural values will be given weight in interest balancing. Conservation of natural values in master plans is not mentioned in the

Planning Act of Denmark<sup>77</sup> otherwise than concerning costal areas, which shall be kept as free as possible of development and installations (PA, §5a). Amenity values are neither mentioned in provisions on master plans. Inconvenience to landowners doesn't appear in these attribute combinations, which is a result of the fact that regional and master plans are not directly binding for the actions of property owners in Denmark (PA, §9, §12).

Three of four attribute combinations on local plans in Denmark in the QCA equation relate to special nature conservation areas. The interest weighing concerning this part can't be applied on other local plans. On nature conservation areas local plans were overturned in Denmark when amenity values haven't been taken into consideration or when recreational and nature values were not taken into consideration. It is interesting that ignoring amenity values in areas covered by nature conservation programmes was sufficient to cause the local plan to be overturned. According to Planning Act in Denmark, local plans may contain provisions on reserving landscape features in connection with development of an area allocated to urban or summer cottage development (PA, §15.2 item 10), which may be applied as preserving amenity values. Areas for recreational use should be established by municipal planning (PA, §11.5 item 6), which constitutes the framework for local plans. A plan should also be overturned when it increases traffic in areas included in nature conservation programmes; but in this case natural values were also at risk. A local plan in Denmark may contain provisions on matters related to traffic (PA, §15.2 item 4). Local plans were also overturned when effective use of land was increased in a way that jeopardized amenity values. Effective use of land is not explicitly mentioned in the provisions concerning local plans.

#### 4.2.2 Sustainable land use (ratified plans)

If the first option was to determine factored configurations for unsustainable development, the function complement may be used to determine factored configurations for sustainable development. This means a minimized function of all configurations that are not implied

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<sup>77</sup> Regional plans shall include guidelines for administering areas that are worthy of preservation and natural qualities, worthy of conservation in the open country (PA, §6.3 item 8).

by the original function. Or we can minimize the attribute combinations concerning ratified plans, the way we did with overturned plans.

#### 4.2.2.1. Finland

The data consists of cases where regional and local plans, but no master plans, were ratified in Finland. The next table indicates the attribute combinations in ratified regional plans.

**Table 20.** Minimized truth table in cases where *regional plans* were ratified (Finland).

File: SUSTAIN2.QVN

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS

Outputs Minimized: 1

Method: Quine-McCluskey

local OVERALL RECREAT AMENITY owners nature

The data consists of one combination of attributes where regional plans were ratified. If we take a closer look at the minimized attribute combination for regional plan decisions ('OUTCOME = local OVERALL RECREAT AMENITY owners nature'), we can see that recreational values together with amenity values were given more weight than natural values when the decisions has not caused the landowners inconvenience. This sentence differs from the one sentence presented in the data on ratified regional plans (KHO 1977 A II 50) with regard to the attribute amenity. This assumption is made on the basis of overturned regional plans and is derived by applying De Morgan's Law to this configuration.<sup>78</sup> The use of De Morgan's Law extends the configuration by adding the protected amenity value to the sentence. This is surplus information when the original case states that regional plans have been upheld when recreational values were protected even though natural values have not been protected, provided that the decision did not cause

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<sup>78</sup> 'OUTCOME = RECREAT nature owners (recreat + AMENITY)' => 'OUTCOME = RECREAT recreat nature owners + RECREAT nature owners AMENITY' => 'OUTCOME = RECREAT nature owners AMENITY'. ('RECREAT recreat nature owners' contains attribute 'RECREAT' as being both present and absent, and is therefore excluded).

inconvenience to landowners. It is quite logical that when the protection of amenity value is added, the regional plan is still ratified, but based on the original case we can argue that even without the attribute 'amenity value', the plan would still be ratified. The more important information gained from this equation is that recreational values have been given more weight than natural values, provided that the decision did not cause unreasonable inconvenience to landowners.

There are no attribute combinations concerning decisions ratifying master plans because the research material contained no decisions in which master plans were upheld (Table 1).

**Table 21.** Minimized truth table in cases where *local plans* were ratified (Finland).

File: SUSTAIN2.QVN

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS

Outputs Minimized: 1

Method: Quine-McCluskey

Select if: local=1

LOCAL RECREAT AMENITY effective +  
 LOCAL RECREAT culture AMENITY +  
 LOCAL RECREAT HEALTH AMENITY +  
 LOCAL RECREAT AMENITY TRAFFIC +  
 LOCAL recreat AMENITY NATURE

QCA produces eight different combinations of attributes in cases where local plans were ratified. The four latter combinations are included in the solution, while the first combination is produced to also cover the following combinations of attribute combinations:

LOCAL HEALTH AMENITY NATURE+  
 LOCAL AMENITY NATURE TRAFFIC+  
 LOCAL culture AMENITY NATURE +  
 LOCAL effective AMENITY NATURE

When minimizing the truth table containing data on cases where a local plan was ratified, we obtain the following attribute combinations:

LOCAL [(RECREAT AMENITY(effective + culture + HEALTH + TRAFFIC) + (recreat AMENITY NATURE))]

A closer examination of this sentence reveals that local plans were upheld when recreational and amenity values were protected if the decision did not increase the effective use of land or even though cultural values were not protected or if health values were also protected or even though the decision increased traffic in the area ['OUTCOME = LOCAL (RECREAT AMENITY(effective + culture + HEALTH + TRAFFIC))']. Local plans were also ratified even though recreational values were not protected if amenity and natural values were protected ['OTCOME = LOCAL (recreat AMENITY NATURE)']. The interest weighing in these equations include all the criteria mentioned in the Building Act (§34) on demands on the content of local plans, except unreasonable restrictions placed on private landowners. The reason that the provision does not include any instructions on the weighing of these criteria makes the equation very interesting. It does not give us any information on how restrictions placed on landowners would be assessed compared to the other criteria, but otherwise it gives a good picture on how different demands on the content of local plans are weighed against each other. Protected recreational values together with protected amenity values seem to be important while cultural values seem to be given less weigh in the decision-making. The equation also shows that natural values are given more weigh than recreational values provided that amenity values are still protected.

These minimized sentences thoroughly differ from the sentences in the truth table because of the use of De Morgan's Law. The data include ten ratified local plan decisions, of which two were excluded on the basis of the analysis of local plans that had been overturned in Finland.

#### 4.2.2.2. Denmark

The Danish attribute combinations concerning ratified plans all pertain to regional and master plans. The truth table contains no sentences about ratified local plans.

**Table 22.** Minimized truth table in cases where *regional plans* were ratified (Denmark).

File: SUSTAIN4.QVN

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS

Outputs Minimized: 1

Method: Quine-McCluskey

Select if: Overall=1

local OVERALL health water +  
 local OVERALL CULTURE AMENITY

- local OVERALL [(health water) + (CULTURE AMENITY)]

Regional plans have been upheld even though health values and water supplies were not taken into consideration ('OUTCOME = local OVERALL health water'). On the other hand, both cultural and amenity values have been given weight in ratified regional plans ('OUTCOME = local OVERALL CULTURE AMENITY'). The sentences are identical with the truth table; in other words, QCA was not successful in minimizing the data because there are no negative cases (overturned regional plans) in the data which could have been use in comparison according to Mill's indirect method of difference. There was not possible to produce any prime implicants according to Mill's method of agreement neither, because the cases cover different attributes.

**Table 23.** Minimized truth table in cases where *master plans* were ratified (Denmark).

File: SUSTAIN4.QVN

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS

Outputs Minimized: 1

Method: Quine-McCluskey

Select if: Overall=0

local overall recreat EFFECTIVE NATURE  
 local overall CONSERV Recreat AMENITY EFFECTIVE

- Master plans: local overall (recreat EFFECTIVE NATURE) + (CONSERV Recreat AMENITY EFFECTIVE)



When interpreted this means that when master plans were upheld, protection of natural values was given more weight than recreational values even though the plan increased effective use of land ('OUTCOME = local overall recreat EFFECTIVE NATURE'). In areas covered by a nature conservation programme, protection of amenity values was given more weight than recreational values even though the plan increased effective use of land ('OUTCOME = local overall CONSERV Recreat AMENITY EFFECTIVE'). The truth table contained only one sentence on ratified master plans ('recreat EFFECTIVE'), and thus Mill's method of agreement and prime implicants cannot be used. The solution is, however, quite different from the sentence on the ratified plan. The research material contained two cases of overturned master plans ('nature amenity EFFECTIVE and conserv recreat nature'), which were used in applying Mill's indirect method of difference. Utilization of De Morgan's Law yields four attribute combinations, the two attribute combinations presented above and two additional attribute combinations ('NATURE CONSERV Recreational EFFECTIVE and AMENITY NATURE recreational EFFECTIVE'), which are covered by the two sentences QCA software chose in the solution.

#### 4.2.2.3. Summary of results on sustainable land use

##### **Finland**

Concerning regional plans in Finland the result implies that recreational values together with amenity values were given more weight than natural values when the decisions has not caused inconvenience to landowners. In this case the regulations on regional planning imply that the inconvenience to landowners might have been the decisive indicator, because amenity values are not specifically mentioned in the regulations on the content of regional plans (BA, §22). At the time that the regional plans included in the research material were decided, there was neither any provision on natural values in the content of the regional plans. Natural values should, however, be given more weight in the regional plan decisions since 1996 because this indicator was at that time added to the provisions (1097/1996). The research material didn't contain any upheld master plans of Finland, and therefore there are no results concerning sustainable land use in areas covered by master plans in Finland. Since provisions on the content of regional and master plans are related,

the results on sustainable land use in regional plans may analogically be implemented on sustainable land use in master plans.

Recreation and amenity values seem to be decisive on sustainable land use in local plans. Natural values were not included in the provisions on local plans before 1996 (1097/1996), and thus should not be included in the interest weighing as an indicator on local plan decisions in this research because only two of the local plan decisions included in the research material are made after 1996 and they don't include deliberations on natural values<sup>79</sup>. The other preserved values here; namely reserving sufficient areas for recreation, and meeting the demands of amenity, health and traffic; are mentioned in the provisions on the content of local plans (BA, §34). On the other hand effective use of land and cultural values are not mentioned in the provision on the content of local plans. Preserved recreation values and amenity values seem to be important in the interest weighing on local plans. The reason that the plan is considered to increase traffic in the area, which is currently regard as a not sustainable feature in land use, didn't have the same impact on balancing of interest in 1980s and 1990s. The last attribute combination is interesting because it indicates that natural values are given more weight in connection with preserved amenity values regarding to reserving sufficient areas for recreation. This is particularly interesting because preserving natural values were not included in the provisions on the content of the plan at that time.

### **Denmark**

In Denmark, regional plans have been upheld even though health values and water supplies were not taken into consideration. A regional plan shall include guidelines for the use and protection of water resources (PA, §6.3,12), but there are no provisions on health values. Because regional planning includes to a great extent administrative discretion, the provisions on the content of the plan are interpreted in a way that stresses the deliberation on different aspects of the plan, but does not regulate the outcome. In this case the water supplies were considered to deteriorate, but within acceptable limits. On the other hand, both cultural and amenity values have been given weight in ratified regional plans. The

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<sup>79</sup> These two decision are KHO 1997T3215 and KHO 1997 145 (Table 1).

provisions on cultural preservation are very vague comprising only guidelines to administer areas, buildings, etc. that are worthy of preservation (PA, §6.3,8).

When master plans were upheld, effective use of land together with the protection of natural values was given more weight than recreational values. This is in accordance with the general aim of sustainable development but not with the provisions on the criteria on master plans in Denmark. Master plans shall include provisions on recreational areas (PA, §11.5,6), but protection of nature is regulated only concerning coastal parts of urban zones (PA, §11a.4,2). In areas covered by a nature conservation programme, effective use of land together with the protection of amenity values was given more weight than recreational values. Both of these combinations of attributes indicate that recreational values have to be part of the deliberation on master plans, but that there are other indicators, like natural values of amenity values that can be given more weight in decision making, even though the decision would increase effective use of land in the area.

We can draw no conclusions on sustainable land use in local plans in Denmark because the research material didn't contain any ratified local plans.

### 4.3 Intersection: The comparison of the two countries

Because the cases collected from the two different countries are contained in separate raw data matrixes, an intersection of the minimized truth tables was made in order to compare the sets of attribute combinations in the two countries. To compare data saved in two different files, the files are marked for intersection. So long as the files (or functions) are compatible, the result will be a set of configurations implied by both files (or all functions) in the intersection.<sup>80</sup> In the logical sense, the intersection is a Boolean multiplication of the sentences for the two countries being compared that indicates their similarities. The intersection is done so that minimized truth tables of the different countries concerning overturned plans (having an output value of 0) and those regarding upheld plans (having an output value of 1) are intersected separately.

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<sup>80</sup> This requires that their truth tables have the same attributes in the same order.

#### 4.3.1 Comparison of the aspects regulated in same plans

Intersection of Denmark and Finland's minimized truth tables for plans that have been *overturned* shows the subset of causal combinations that were found in both countries. In this case there can't be any combinations of conditions equal in concerning overturned regional plan decisions that would be equal in Finland and Denmark, because the research material contains no overturned regional plans from Denmark.

Next table shows the similar aspects of overturned master plans of Denmark and Finland.

**Table 24.** Intersection of Denmark and Finland's minimized truth tables for *master plans* that were overturned.

Files: SUSTAIN2.QVN and SUSTAIN4.QVN

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS

Outputs minimized: 0

Intersection of truth tables 12 and 18

local overall conserv recreat nature effective +  
 local overall RECREAT nature amenity TRAFFIC EFFECTIVE OWNERS +  
 local overall CONSERV RECREAT nature amenity EFFECTIVE OWNERS

- Master plans: outcome = local overall [(conserv recreat nature effective) + (RECREAT nature amenity TRAFFIC EFFECTIVE OWNERS) + (CONSERV RECREAT nature amenity EFFECTIVE OWNERS)]

There are no provisions in Denmark with regard to landowners' inconvenience in the content of master plans, and therefore the data contain no values for this attribute. Inconvenience to landowners is an attribute that was coded in this study in order to illustrate whether landowners' rights have been taken into consideration in the interest weighing. In this case, the value dash (-) was used to indicate that landowners' rights were not an issue figuring in the decision. This result shows, however, that this coding was interpreted by QCA to mean that the decision might have caused inconvenience, or then again it might not. Two separate attributes to code the inconvenience to landowners, one for cases where the decision has caused inconvenience to landowners and one to indicate

that it hasn't, would have been needed to avoid this misunderstanding. To correct this misinterpretation, the attribute for inconvenience to landowners was removed from the result.

All configurations concerning similarities in overturned master plans include interest weighing between recreational values, natural values and effective use of land. Master plans pertaining to national park or strict nature reserve areas have been overturned in Finland and in Denmark when recreational and natural values were not taken into consideration even though the decision did not increase the effective use of land ('outcome = local overall conserv recreat nature effective'). Master plans were also overturned in areas covered by a nature conservation programme when the decision has increased the effective use of land if nature and amenity values were not taken into consideration even though recreational values were taken into consideration ('outcome = local overall CONSERV RECREAT nature amenity EFFECTIVE'). Master plans were overturned as well when the decision increased traffic and the effective use of land if nature and amenity values were not taken into consideration even though recreational values were taken into consideration ('outcome = local overall RECREAT nature amenity TRAFFIC EFFECTIVE'). In areas designated for nature conservation, the special emphasis in the interest weighing is on nature, while in other areas recreational values might be given more weight than natural values to ensure sufficient amount of recreational areas near population centres.

Comparison on similarities of not sustainable development in local plans of Denmark and Finland's is shown in the next table.

**Table 25.** Intersection of Denmark and Finland's minimized truth tables for *local plans* that were overturned.

Files: SUSTAIN2.QVN and SUSTAIN4.QVN

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS

Outputs minimized: 0

Intersection of truth tables 13 and 19

LOCAL RECREAT health amenity traffic EFFECTIVE +  
 LOCAL CONSERV RECREAT health amenity traffic OWNERS +  
 LOCAL CONSERV health amenity traffic effective OWNERS +  
 LOCAL CONSERV recreat health amenity traffic effective +  
 LOCAL recreat nature health amenity traffic effective

Factoring gives the following sentences for overturned local planning decisions in Denmark and Finland:

- Local plans: outcome = LOCAL health amenity traffic [(RECREAT EFFECTIVE) + (CONSERV RECREAT OWNERS) + (CONSERV effective OWNERS) + (CONSERV effective) + (recreat nature effective)]

With one exception, the criteria in the interest weighing were all regulated as part of the content of local plans in both countries. The exception was the inconvenience to landowners, which was not mentioned in the content of local plans in Denmark. The Danish research material does not contain any cases including values dealing with this attribute. For this reason and owing to the misinterpretation caused by coding this attribute – as explained above concerning master plans – the attribute of inconvenience to landowners was removed from this equation as well.

When interpreted, these sentences reveal the common features of overturned local plans in Finland and Denmark. The interest weighing has included either recreational values or effective use of land in an area covered by a nature conservation programme. The common features of overturned local plans in Finland and Denmark all deal with health and amenity values and with the increase of traffic. Local plans have been overturned in both countries when health and amenity values were not taken into consideration even though the decision did not increase traffic in cases where recreational values were protected but the

decision increased the effective use of land ('outcome = LOCAL health amenity traffic RECREAT EFFECTIVE'). This has also occurred in areas covered by a nature conservation programme even though recreational values were protected ('outcome = LOCAL health amenity traffic CONSERV RECREAT') or in areas covered by a nature conservation programme when the decision has not increased the effective use of land ('outcome = LOCAL health amenity traffic CONSERV effective'). Local plans have also been overturned in both countries even though the decision did not increase the effective use of land in national or strict nature reserve areas when both recreational and natural values were not taken into consideration even though the decision did not increase the effective use of land ('outcome = LOCAL health amenity traffic recreat nature effective').

*Ratified* local or master plan decisions from Finland and Denmark have no attribute combinations that are equal. This is because the research material contains no ratified master plans from Finland and no ratified local plans from Denmark. The only plans that can be compared regarding to what is common in sustainable land use in Denmark and Finland, are regional plans.

**Table 26.** Intersection of Denmark's and Finland's minimized truth tables for *regional plans* that were ratified.

Files: SUSTAIN2.QVN and SUSTAIN4.QVN

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS  
Outputs minimized: 1

Intersection of truth tables 20 and 22

local OVERALL RECREAT nature CULTURE AMENITY owners +  
local OVERALL RECREAT nature health AMENITY water owners

Both sentences concern regional plans. Factoring gives the sentence: OUTCOME = local OVERALL RECREAT nature AMENITY owners (CULTURE + health water)

The attribute for inconvenience to landowners was removed, as in the previous comparisons, owing to misinterpretation of coding. On the same grounds, the attribute for the protection of water supplies was removed, as it was not regulated in rules concerning

the content of Finnish plans and therefore it was not taken into account in the decisions contained in the research material.

Confirmed regional plans have similarities in the interest weighing with regard to recreational and natural values as well as amenity values. Regional plans are considered to further sustainable development both in Finland and in Denmark when recreational and amenity values were protected even though nature and health values were not taken into consideration ('OUTCOME = local OVERALL RECREAT nature AMENITY health'). Regional plans have also been ratified in both countries when recreational, cultural and amenity values were taken into consideration but not natural values ('OUTCOME = local OVERALL RECREAT nature AMENITY CULTURE').

#### 4.3.2 Comparison of aspects regulated in different plans

From the original sentences we may also choose the ones that are in conflict only because of the attributes describing the plan used. These sentences illustrate the sets of attribute combinations found in both countries and producing ratified or overturned plans, when the only difference was the plan used in each country. This is done to find out whether differences regarding to what is sustainable land use and what is not sustainable land use in the compared countries are due to the plan that is used to regulate different aspects of sustainable development or whether there are differences in the overall content of what is regulated as part of sustainable land use.

The sentences for attribute combinations where the interest weighing in Finland concerned regional plans that were *ratified* (Table 20: 'RECREAT nature AMENITY owners') and in Denmark master plans that were ratified (Table 23: 'recreat NATURE EFFECTIVE + CONSERV recreat AMENITY EFFECTIVE') reveal that there were no equal attribute combinations for plans that have been ratified. The intersection of these two tables is a null set, which implies that there are no similarities between the sets of attribute combinations regarding ratified regional plans in Finland and ratified master plans in Denmark. The result of this analyse is that there is no interest weighing regarding the aspects of sustainable development that is done concerning Finland in regional plans and concerning



Denmark in master plans. The next table reveals whether the same plans when they are overturned bring more information on this question.

**Table 27.** Intersection of overturned *regional plans* in Finland and *master plans* in Denmark (minimized truth tables 11 and 18).

File: SUSTAIN4.QDM

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS

RECREAT nature amenity EFFECTIVE OWNERS<sup>81</sup>

The intersection of these two tables implies that there are similarities between sets of attribute combinations regarding overturned regional plans in Finland (Table 11: 'RECREAT NATURE amenity + RECREAT amenity OWNERS') and master plans in Denmark (Table 18: 'conserv recreat nature effective + RECREAT nature amenity EFFECTIVE'). Regional plans have been overturned in Finland and master plans in Denmark if nature and amenity values were not taken into consideration in plans that increased the effective use of land even though recreational values were protected ('outcome = RECREAT nature amenity EFFECTIVE'). Here, too, the similarities are based on interest weighing that included recreational and natural values. This is quite obvious, because the cases that concern recreational values usually involve construction or some other kind of interference with the nature.

When the question is turned around in order to determine whether there were any similarities between Finnish master plans and Danish regional plans, we find that the intersection between these minimized truth tables is an empty set for both overturned plans and ratified plans, because the data contained no ratified Finnish master plans while the Danish data had no overturned regional plans.

The following tables pertain to attribute combinations where the interest weighing concerned overall plans in Finland and local plans in Denmark. The first step is to minimize at the same time Finnish regional and master plans that were overturned:

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<sup>81</sup> Even in this comparison, the attribute for inconvenience to landowners was removed owing to misinterpretation.

**Table 28.** Minimized truth table when the plan is a Finnish *overall plan* that was overturned.

File: SUSTAIN3.QDM

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS

Outputs Minimized: 0

Method: Quine-McCluskey

Select If: LOCAL=0

RECREAT NATURE amenity +  
 conserv recreat nature +  
 CONSERV nature OWNERS +  
 nature amenity OWNERS

This table shows the minimization of the truth table for Finnish regional and master plans that were overturned. The next step in comparing Finnish and Danish plans is to make an intersection of the previous table and the table on Danish local plans that were overturned:

**Table 29.** Intersection of Finnish *overall plans* and Danish *local plans* that were overturned (truth tables 28 and 19).

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS

conserv recreat nature +  
 CONSERV nature TRAFFIC OWNERS<sup>82</sup> +  
 RECREAT NATURE amenity EFFECTIVE +  
 RECREAT NATURE amenity TRAFFIC +  
 CONSERV RECREAT NATURE amenity +  
 nature amenity EFFECTIVE OWNERS +  
 CONSERV nature amenity OWNERS +

One From the Following Group:

RECREAT amenity TRAFFIC OWNERS +  
 nature amenity TRAFFIC OWNERS

Finnish overall plans and Danish local plans have been overturned in areas covered by nature conservation programmes, when natural values were not protected and either the decision increased traffic or amenity values were not protected, either ['outcome = CONSERV nature (TRAFFIC + amenity)']. The similarities between Finnish regional and

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<sup>82</sup> As explained in the previous chapter, the attribute for inconvenience to landowners will be removed due to misinterpretation.

master plans and Danish local plans also include interest weighing of either recreational or natural values, as was the case when other plans were compared.

Finnish overall plans and Danish local plans have also been overturned when amenity values were not protected even though recreational and natural values were in cases where either the decision increased traffic or the effective use of land, or the area was covered by a nature conservation programme ['outcome = RECREAT NATURE amenity (EFFECTIVE + TRAFFIC + CONSERV)'].

Furthermore, Finnish overall plans and Danish local plans have been overturned when recreational and natural values were not protected in areas set aside as national parks or strict nature reserves ('outcome = conserv recreat nature'), and when nature and amenity values were not protected and the decision increased the effective use of land ('outcome = nature amenity EFFECTIVE').

Moreover, there are two sentences which are presented as optional (one of the following group), both of which deal with decisions that do not protect amenity values but increase traffic. The distinctive attribute is the protection of recreational values in the first sentence and lack of protection for natural values in the second one. ['outcome = amenity TRAFFIC (RECREAT + nature)'].

We can't compare the same plans when they are ratified to gain more information, because there are no sentences for ratified local plans in Denmark.

The next table shows the attribute combinations for overturned overall plans in Denmark. Regional plans and master plans are combined in the same truth table:

**Table 30.** Minimized truth table when the plan is a Danish *overall plan* that was overturned.

File: SUSTAIN4.QDM

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS

Outputs Minimized: 0

Method: Quine-McCluskey

Select If: LOCAL=0

conserv recreat nature HEALTH amenity effective +  
 conserv recreat nature culture HEALTH effective +  
 conserv recreat nature amenity WATER effective +  
 conserv recreat nature culture WATER effective +  
 RECREAT nature HEALTH amenity EFFECTIVE +  
 RECREAT nature amenity WATER EFFECTIVE

The intersection between these two tables shows that in a good many situations, the interest weighing done in Finland in the case of a local plan (Table 13) shares similarities with the interest weighing done in Denmark in the case of either a regional or a master plan (Table 30). Here again, recreational and natural values were part of the interest weighing. Comparison to Table 13 reveals that the minimization result differs with regard to the minimization done separately for truth tables concerning ratified master and regional plans (the latter not included in the research material). This is due to the fact that taking both master and regional plans into consideration, and not only one type of plan, provides more possibilities for comparisons in the minimization process. Minimization of the truth table on overturned master plans only, gives two sentences as result [Table 18: 'outcome = local overall (conserv recreat nature effective + RECREAT nature amenity EFFECTIVE) '].

**Table 31.** Intersection of overturned Finnish *local plans* and Danish *overall plans* (truth tables 13 and 30).

File: SUSTAIN3.QDM

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS

RECREAT nature health amenity WATER<sup>53</sup> traffic EFFECTIVE +  
 conserv recreat nature health amenity WATER traffic effective

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<sup>53</sup> Here again the attribute for water supplies was removed.

Finnish local plans and Danish overall plans have been overturned when nature values, health values or amenity values have were not protected in decisions when recreational values were protected but the decision has increased effective land use or when the area is set aside as a national park or strict nature reserve but recreational values were not protected and the decision did not increase the effective use of land. Once again, recreational values and natural values were taken into account in the interest weighing.

The last comparison deals with Finnish local plans and Danish overall plans that were ratified. The first step in this comparison is to minimize Danish regional and master plans at the same time:

**Table 32.** Minimized truth table on Danish *overall plans* that were ratified.

File: SUSTAIN4.QDM

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS

Outputs Minimized: 1

Method: Quine-McCluskey

Select If: LOCAL=0

CONSERV health water effective +  
 RECREAT health water effective +  
 NATURE health water +  
 CONSERV CULTURE AMENITY +  
 RECREAT CULTURE AMENITY +  
 NATURE CULTURE AMENITY +  
 RECREAT health AMENITY water +  
 recreat NATURE EFFECTIVE +  
 CONSERV recreat AMENITY EFFECTIVE

Comparison of this table against the Tables 22 and 23, which presented the minimized truth tables for ratified Danish plans separately, illustrates the differences between minimizing ratified plans separately and minimizing overall plans at once. Minimizing ratified Danish regional plans yields two configurations (Table 22: 'health water + CULTURE AMENITY'), and minimizing ratified Danish master plans also yields two configurations (Table 23: 'recreat EFFECTIVE NATURE + CONSERV recreat AMENITY EFFECTIVE'), while minimization of overall plans at the same time results in nine configurations. The final step in comparing the interest weighing of Finnish local plans and Danish overall plans is to make an intersection of the minimized truth tables:

**Table 33.** Intersection of Finnish *local plans* and Danish *overall plans* that were ratified (truth tables 21 and 32).

File: SUSTAIN3.QDM

Model: OUTCOME = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS

RECREAT CULTURE AMENITY TRAFFIC +  
 RECREAT CULTURE HEALTH AMENITY +  
 recreat NATURE AMENITY EFFECTIVE +  
 recreat NATURE CULTURE AMENITY +  
 NATURE CULTURE AMENITY effective +  
 RECREAT CULTURE AMENITY effective +  
 recreat NATURE health AMENITY water +  
 NATURE health AMENITY water effective +  
 RECREAT culture health AMENITY water

After removing the attribute 'water' and factoring the result, we get four main types of sentences:

RECREAT CULTURE AMENITY (TRAFFIC + HEALTH + effective) +  
 recreat NATURE AMENITY (EFFECTIVE + CULTURE + health) +  
 NATURE AMENITY effective (CULTURE + health) +  
 RECREAT culture health AMENITY

We find that there are similarities between the interest weighing done for Finnish local plans and that done for Danish overall plans. Finnish local plans and Danish overall plans have been ratified when recreational, cultural and amenity values were protected even though the decision increased traffic in the area while the effective use of land in the area were not increased or health values were protected ['OUTCOME = RECREAT CULTURE AMENITY (TRAFFIC + HEALTH + effective)'].

Finnish local plans and Danish overall plans have also been ratified when recreational values were not protected if nature and amenity values were protected even though the decision increased the effective use of land in the area or cultural values were also protected, and even though health values were not protected ['OUTCOME = recreat NATURE AMENITY (EFFECTIVE + CULTURE + health)'].

Finnish local plans and Danish overall plans have also been ratified when natural and amenity values were protected and the decision did not increase the effective use of land in the area if cultural values were also protected or even though health values were not protected [‘OUTCOME = NATURE AMENITY effective (CULTURE + health)’].

The last sentence illustrates that Finnish local plans and Danish overall plans have also been ratified when recreational and amenity values were protected even though cultural and health values were not protected (‘OUTCOME = RECREAT culture health AMENITY’). The similarities between the interest weighing done for Finnish local plans and that done for Danish overall plans involve either recreational or natural values, as has become apparent on the basis of all the comparisons between the two countries.

#### 4.3.3 Summary on the comparison of the two countries

The comparison using QCA brings up the similarities of the two countries. I will first deal with the similarities in plans that were considered to be in accordance with *sustainable land use*. In both countries the main interest weighing in regional plans was done between recreational values and natural values. Recreational values were given more weight in regional plans than natural values provided that amenity values were taken into consideration. If there were cultural values in the area, also these are to be protected, while health values and water supplies could be ignored. The similarities concerning sustainable land use in master plans and local plans could not be examined due to lack of researched material.

When we compare different plans, the result is that there are no similarities between the two countries concerning sustainable development in regional and master plans. The final comparison that brings information on similarities of interest weighing between the two countries has to do with Finnish local plans and Danish overall plans. All the four attribute combinations that yield from this comparison include protected amenity values. One of them gives an opposite result on interest weighing between recreational values and nature values than the comparison between regional plans. The interest weighing between Finnish local plans and Danish overall plans shows that natural values together with cultural values

and amenity values are given more weight than recreational values and health values, even though the decision increases effective use of land. Health values have been ignored in all of these interests weighing except when all the interests represented have been protected. Cultural values have been protected in all but one case, in which protected recreational values and protected amenity values were given more weight than cultural values and health values.

The second comparison concerns what is not considered to be in accordance with sustainable land use. The research material contains no overturned regional plans from Denmark therefore there could be no comparison of these plans. Also overturned master plans included interest weighing between recreational values and natural values. Master plans were considered to be against sustainable land use when neither natural values nor recreational values were protected in an area established as a national park or strict nature reserve even though the decision didn't increase effective use of land. The protection of recreational values was not enough to make the decision to be in accordance with sustainable land use while natural values as well as amenity values were ignored and the decision increased effective use of land in an area that is included in a conservation programme or the decision increased traffic in the area.

Interest weighing on local plans was regarded as not sustainable land use when health values and amenity values were ignored even though the decision did not increase traffic in the area, and even though recreational values were protected if the decision increased effective use of land or the area is included in a nature conservation programme or if also recreational values and nature values were ignored. Here the decisive criteria might be amenity values that were not protected because if we compare this result with the attribute combinations on sustainable land use we can see that ignored health values have not been an obstacle to uphold a local plan while amenity values have always been protected in ratified local plans.

The last two comparisons on interest weighing in plans that were considered not to be in accordance with sustainable land use concern the comparison between overall plans and local plans. The result on comparison of Finnish overall plans and Danish local plans



shows that there are similarities that include interest weighing of either recreational values, natural values or amenity values; and on the other hand increase of effective use of land, increase of traffic or that the area is included in a nature conservation programme. If natural values and/or amenity values have been ignored in areas included in nature conservation programmes, then the plan has been considered to be against sustainable land use. The plan has also been regard as against sustainable development if amenity values have been ignored even though recreational values and natural values have been protected if the plan has increased either effective use of land or traffic.

Furthermore, when we compared Finnish local plans and Danish overall plans we don't get any clear results on interest weighing on what is not considered to be sustainable land use because the attribute combinations include so many ignored attributes and only one protected attribute value. Natural values, health values and amenity values were ignored in all attribute combinations. The one attribute combination that didn't include any protected attributes didn't increase traffic or effective use of land, while in the other one recreational values were protected but the decision increased effective use of land but didn't increase traffic in the area. This comparison doesn't give us much information of the interest weighing leading to overturn a plan because it is against sustainable development.

## **5 REGULATING PROTECTION ASPECTS OF SUSTAINABLE LAND USE: RE-ARRANGING THE RECONSTRUCTION OF THE COMPARED LEGAL MATERIALS**

The previous chapter dealt with sustainable regulation considered by outcome of the planning decisions. This analysis provided information on the combinations of attributes associated with different types of plans that had been either overturned or ratified. In the next two chapters, the point of view is changed in order to determine how different aspects of sustainable land use are weighed in different plans. Analysis of the data using one of the attributes as the outcome gathers together in the same sentence all of the plans – both ratified and overturned – that include the selected attribute. Outputs are minimized in different tables according to whether the attribute selected as the outcome has been protected or not. The sentences are analysed on the bases of the regulations concerning different aspects of sustainable development in each country.

### **5.1 Nature conservation**

Conservation of nature is considered to be an international and national interest as well as a regional and local issue. It should be regarded as one aspect in the content of regional planning, which because of the principle of framework management regulates the protection of nature in other plans as well. According to planning legislation, conservation of nature shall be part of regional plans in both Denmark and Finland (PA, §6.3 item 8; BA, §22.2). The Finnish Building Decree (§32.2 item18) stipulates that nature shall be taken into consideration in local plans as well. There are no specific regulations either in Denmark or in Finland on taking nature into consideration in master plans, but because a plan may not be in conflict with a hierarchically higher plan, natural values protected in regional plans shall be taken into consideration in master and local plans.

Protection of shorelines in Denmark concerns land use planning in both joint municipal boards and municipalities. As a rule, construction is not allowed near the shoreline (PA, §5b, footnote 29 of LBKG 1997/563). In Finland, protection of shorelines is regulated by the Shore Nature Conservation Programme (Rantojensuojeluohjelma), which shall be taken

into account in land use planning (BA, §22.2, §29.1, §34.4; LUBA, §28.2; Nature Conservation Act, §7, §77).

### 5.1.1 Finland

The research material obtained from Finland involved cases where plans were overturned (outcome=0) or ratified (OUTCOME=1) in situations where natural values had not been protected (outputs minimized: 0). There are no cases where natural values had been protected. The next table shows the attribute combinations for cases where natural values have not been protected.

**Table 34.** Minimized truth table for the attribute *natural values* (Finland).

File: SUSTAIN2.QVN

Model: NATURE = LOCAL + OVERALL + CONSERV + RECREAT + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS + OUTCOME

Outputs Minimized: 0

Method: Quine-McCluskey

LOCAL amenity effective outcome +  
 Local overall conserv recreat outcome +  
 LOCAL recreat outcome +  
 local overall CONSERV OWNERS outcome +  
 local overall amenity TRAFFIC EFFECTIVE OWNERS outcome +  
 local OVERALL RECREAT owners OUTCOME

Factoring by the type of plan yields the following equation:

Nature=  
 LOCAL[(amenity effective outcome) + (recreat Outcome)] +  
 local overall[(conserv Recreat outcome) + (CONSERV OWNERS outcome) + (amenity  
 TRAFFIC EFFECTIVE OWNERS outcome)] +  
 local OVERALL(RECREAT Owners OUTCOME)

The research material did not contain any attribute combinations for Finnish plans that would have conserved natural values, but here we have attribute combinations for all types of plans in which nature was not conserved. These attribute combinations associated with different plans are dealt with separately for each type of plan.

#### 5.1.1.1. Nature conservation in regional plans

The Government of Finland has protected nationally important nature sites and landscape areas by law or by a decision in principle. Some swamps, different types of forests, some shorelines and archipelago areas as well as some nesting sites for water birds have been conserved by the Government's decisions in principle.<sup>54</sup> The Government's decisions in principle and the areas included in Natura 2000 (European ecological network) have to be taken into consideration in physical planning (BA, §22.2, §29.1, §34.4, §95.4, §123a.3)<sup>55</sup>. The Government's nature conservation plans should be implemented within regional plans, and other natural values and valuable areas should also be conserved in regional, master and local plans<sup>56</sup> (BA, § 22.2, §34, §95, §123a.3). According to the Land Use and Building Act, the content of both regional plans (LUBA, §28.3 item 6) and master plans (LUBA, §39.2 item 8) shall include provisions on the conservation of "natural values". Regional planning shall also pay attention to the ecological sustainability of land use (LUBA, §28.3 item 2).

The attribute combination for decisions pertaining to regional plans ['nature = local OVERALL (RECREAT Owners OUTCOME)'] is the only one that concerns plans which were ratified. Regional plans have been ratified even though natural values were not taken into consideration if recreational values were protected and the decision did not cause inconvenience to landowners. The attribute combination is based directly on the following Supreme Administrative Court decision.

**KHO 1977 A II 50:** Recreational use was not considered detrimental to nature in a ridge area that was not protected in the regional plan.

Marking a conservation area in a regional plan gives high priority to conservation in the area, but doesn't necessarily eliminate all use of land. On the other hand, nature conservation should also be considered in areas not marked for conservation on the regional plan. The decision didn't just weigh nature conservation interests against

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<sup>54</sup> Luonnonsuojelu laki (Nature Conservation Act 1096/1996, §7). The stipulations therein are also applied to decisions made before the Nature Conservation Act came into force in 1997 (§77).

<sup>55</sup> Also included in the new Finnish Land Use and Building Act (§24).

<sup>56</sup> The stipulations on nature conservation were added in the Building Act in 1997 (20 December 1996/1097).

recreational interests; instead, the interest weighing considered landowners rights to use the area for their own recreation against the interests of the municipality to extend areas for public recreation and tourism in the area. The area was part of the Rauma archipelago where both summer cottages and public recreation areas were already situated. The archipelago was not part of any nature conservation programme. Both the Ministry and the Supreme Administrative Court were of the opinion that more recreation areas were needed in the area and that public recreational use didn't cause the landowners unreasonable inconvenience (BA, §22.2). The decision of the Supreme Administrative Court was, however, a majority ruling (4–1); one judge was of the opinion that the City of Rauma already owned areas that could be used for public recreation instead of private property. Not even this judge paid attention to conservation of nature.

How the planned land use affects nature has to be taken into consideration when activities are placed in areas that have nature values. The plans may contain provisions regulating land use in order to protect nature.

**KHO<sup>57</sup> 1991 A 78:** A permit was granted allowing the construction of a sauna in an area that was in a regional plan containing a national park. The regional plan didn't include any provisions for nature conservation or restriction of construction. The sauna was located at the edge of the national park, in an area that was not especially important for the conservation values.

The reason that the area was part of a national park, not a strict nature reserve, had significance in the interest weighing concerning the landowner's rights and the aim of nature conservation in the area.

Conclusions as to how natural values have been taken into consideration in regional plans in Finland are based on only one decision. This is because the research material included only one decision concerning regional plans that had a statement on natural values. Therefore Mill's method of agreement could not be applied, nor could Mill's indirect

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<sup>57</sup> This Supreme Court decision is not included in the researched data because it deals with building permits, not with ratification or overturning of a plan. It is described here because it gives some idea of how, after land use planning, land use is further regulated by means of permits. Permits should also be used to promote sustainable development (LUBA, §1.1).

method of difference be applied because the data lacks overturned regional plans that would have dealt with natural values.

#### 5.1.1.2. Nature conservation in master plans

The provisions regulating the drafting of regional plans correspondingly apply to the drafting and development of master plans (BA, §29.1). Nature is not mentioned until 1997 (1097/1996) in the regulations of the Building Act concerning overall plans. Until then the stipulations on drafting overall plans, which enacted that, "attention must be paid to any special needs arising from conditions in the region" (BA, §22.2) could be interpreted to include also the conservation of nature.

All three attribute combinations yield for taking into consideration natural values in master plans concern plans that were overturned [nature = local overall (conserv Recreat outcome + CONSERV OWNERS outcome + amenity TRAFFIC EFFECTIVE OWNERS outcome)]. The first configuration implies that ignoring of both nature and recreational values has been sufficient to cause a master plan to be overturn in areas designated as national parks or strict nature reserves. This combination of attributes is based directly on the following Supreme Court decision according to which the environmental impacts of implementing the plan have to be assessed (BA, §3<sup>88</sup>; LUBA, §9), the content of which is not legally binding even though it is obligatory.

**KHO 1980 A II 59:** A master plan decision was overturned because it didn't include an assessment of the effects on natural livelihood, or assessment on how recreation and tourism would affect the natural conditions in a national park. The plan was considered to have paid insufficient attention to the special values of the area.

This decision does not include interest weighing that would imply what kind of weight natural values should be given when compared against demands for development in national parks. Instead, this decision indicates that ignoring natural values together with

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<sup>88</sup> The Building Act was amended to include stipulations on assessment of environmental impacts in 1994 (10 June 1994/469).

ignoring recreational values in areas designated as national parks or strict nature reserves will lead to the overturning of master plans. Natural values may often be in conflict with recreational values because areas having nature values are often considered to be suitable for recreational use as well.

Inconvenience to landowners seems to be an important attribute when considering the nature values contained in master plans. Master plans have been overturned in areas covered by a nature conservation programme if natural values have not been conserved and the decision would cause inconvenience to landowners. This attribute combination is based on the following two decisions that have equal values for the attributes concerned: Supreme Court decisions KHO 1997 T 2532 and KHO 1988 A 57, which deal with master plans drawn up for an area covered by a shore nature conservation programme or, respectively, a bird nature conservation programme.

**KHO 1997 T 2532:** In its decision, the Supreme Administrative Court reversed the Ministry of the Environment's decision to ratify a master plan. In the decision, the Ministry left out areas of the master plan that were protected and that required the payment of compensation to the landowners. The reason for the conservation of the areas was not just that some part of the land needed special protection, but also that the area was completely undeveloped and therefore of significance as a habitat for animals and vegetation.

**KHO 1988 A 57:** In its decision, the Supreme Administrative Court reversed the Ministry of the Environment's decision concerning a master plan that dealt with protected areas. According to the Supreme Administrative Court, there was not enough evidence of the need for protection, and the surrounding areas were not under conservation.

Both decisions deal with the equality of landowners in situations where the area to be under conservation has not been proven to have specific nature value. Nature itself can be protected, without having specific value only if landowners are treated equally. Otherwise such protection is considered to be an unreasonable inconvenience to landowners (BA, §22.2) unless they are paid compensation.

In addition, a plan was overturned when natural values and amenity values were ignored in a situation that would have increased traffic and the effective land use and would also have

caused inconvenience to landowners. The attribute combination is based on the following decision, except that recreational values are coded for conservation in this decision; but this attribute was left out when the combination of attributes was minimized.

**KHO 1993 A 40:** A master plan had not been drawn up according to sustainable use of natural resources and sustainable development of the environment because of overly efficient use of land in an area planned for tourism and recreation. The placing of business operations and traffic areas on a farm engaged in agriculture and forestry was considered to be unreasonable to the landowners. Therefore the plan was overturned.

This Supreme Administrative Court decision stresses that the form of activity must be taken into consideration when regulating the efficiency of the area. Sustainable development promotes the effective use of land in areas that use common municipal engineering while providing sufficient areas for recreation, whereas in other areas the effective use of land might put too much pressure on nature. Decisive in this case, as in two of the cases previously mentioned, seems to be the unreasonable inconvenience to nearby landowners, not the protection of nature or recreational values. Based on Mill's method of agreement, recreational values were considered not to have relevance in interest weighing in association with natural values in areas that were not part of nature conservation programmes or that were not set aside as national parks or strict nature reserves.

#### 5.1.1.3. Nature conservation in local plans

Nature conservation was not clearly mentioned in the Building Act regarding local plans either until 1997 (1097/1996). It only contained regulations that could be interpreted to concern nature in local plans stipulating that the "plan shall be drawn up to suit the terrain, soil quality and other local conditions to ensure that land is practicably utilized" (BA, §34.1), while recreational and amenity values are mentioned in the same stipulation. In the new Land Use and Building Act, one of the objectives of land use planning is to promote "biological diversity and other natural values" (LUBA, §5.1 item 4). According to the content requirements for local plans, "the natural environment must be protected and [its] special values must not be destroyed" (LUBA, §54.2).



Both attribute combinations for local plans concern cases in which plans were overturned, but ignoring of natural values alone has not been sufficient to cause local plans to be overturned [*nature = LOCAL[(amenity effective outcome) + (recreat Outcome)]*]. The first configuration implies that ignoring both natural values and amenity values has caused local plans to be overturned even though the plan would not have increased the effective use of land in the area. This seems to be the case in spite of whether or not the area was included in a nature conservation programme. This conclusion is based on the following two decisions.

**KHO 1993 A 37:** The decision regarding a shore plan that would have allowed the construction of 72 summer cottages was overturned because the ringed seal had an important nesting site nearby and because of natural values in the area.

**KHO 1995 A 38:** The decision concerning a local plan that would have allowed construction on a hilltop was reversed because the landscape and vegetation in the area were valuable. This was the case even though the local plan increased the total area set aside for parks in the region.

Local plans have also been overturned when both nature and recreational values were ignored in the planning decisions. This attribute combination is based on the following decisions.

**KHO 1978 T 2417:** A local plan decision was reversed because a forest suitable for recreational would be destroyed to a significant extent by construction of a commercial building, and the nearby shore would lose its value for recreation.

**KHO 1985 A II 74:** A local plan was not ratified because the shore of the river in the area was designated as part of a residential district. The Supreme Administrative Court ruled that – as had been done on the other side of the river – the riverbank should be designated for public recreational use because of its recreational and landscape values and because the river sometimes flooded.

That amenity values were not protected (KHO 1985 A II 74) was not considered relevant whereas ignoring nature and recreational values alone was sufficient to overturn a local plan.

#### 5.1.1.4. Protection of open shorelines

There are no special provisions concerning the protection of shorelines<sup>89</sup> in Finland's Building Act. Construction is however not allowed on shores unless the construction is based on a ratified master plan or a local plan that allows this (BA, §6a). Some shorelines are protected by an administrative decision made by the Government,<sup>90</sup> and which must be applied in physical planning (BA, §22, §34, §95, §123a). The QCA minimization process on protection of shorelines yields the result 'nature=local overall CONSERV OWNERS outcome + LOCAL CONSERV amenity effective outcome'. Both configurations are directly based on the respective cases.

**KHO 1988 A 57:** A master plan was drawn up for an area protected by the national conservation programme for bird wetlands. This was considered reason enough for the area to be marked as conservation area in the plan.

The protection is implemented through physical plans. Even on these protected shorelines, construction may be allowed if it doesn't endanger the protected interest.

**KHO 10 October 1997 T 2532:** A master plan was drawn up for an area protected by the shore nature conservation programme. Although the area was marked as a nature conservation area, the construction of summer cottages was allowed in some parts.

When the protected interest may be endangered in areas included in nature conservation programmes, the plan should not be ratified. This was the case in the decision made for a local plan, situated in shore area, that didn't contain a sufficiently large protection area the ringed seal to breed. Environmental and natural circumstances had not been taken into consideration. (KHO 1993 A 37.)

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<sup>89</sup> Even though protection of shorelines is not one of the attributes, cases concerning shores can be collected from the data manually and minimized by defining the respective caseIDs as selection objectives (select if:).

<sup>90</sup> Rantojensuojeluohjelma (National conservation programme for Shoreline protection areas) decided by the Council of State on 20 December 1990 and lintuvesien suojeluohjelma (National conservation programme for bird wetlands) decided by the Council of State on 3 June 1982.

All three decisions are decisions concerning areas protected by a nature conservation programme. The first two decisions concern master plans and the last one pertains to a local plan.

### 5.1.2 Denmark

In Denmark, nature protection should be included in regional plans (PA, §6.3 item 8) and, because of the binding effect on administration, nature protection should also be taken into consideration in compiling master and local plans (PA, §11.2, §13.1). Nature protection<sup>91</sup> is regulated by the Nature Protection Act (3 January 1992/9), which includes provisions concerning protected geographical areas (§7).

The next table shows how natural values have been weighed against other attributes pertaining to sustainable development in Denmark.

**Table 35.** Minimized truth table for the attribute *natural values* (Denmark).

File: SUSTAIN4.QVN

Model: NATURE = LOCAL + OVERALL + CONSERV + RECREAT + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS + OUTCOME

Outputs Minimized: 0

Method: Quine-McCluskey (Minimal)

LOCAL CONSERV TRAFFIC outcome +  
 LOCAL conserv recreat outcome +  
 local overall conserv recreat outcome +  
 local overall amenity EFFECTIVE outcome

All the attribute combinations that pertain to nature involve decisions that were overturned (outcome=0) and dealt with the conclusion that natural values had not been protected in the decision (outputs minimized: 0, output being nature). The cases researched did not contain any attribute combinations for plans that had been ratified or for plans in which natural values had been protected. Factoring by the type of plan gives the following sentence for overturned plans:

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<sup>91</sup> See Basse (1999) pp. 102–106.

Nature =

LOCAL[(CONSERV TRAFFIC) + (conserv Recreat)] +  
local overall[(conserv Recreat) + (amenity EFFECTIVE)]

These attribute combinations are handled separately for each type of plan.

#### 5.1.2.1. Nature conservation in regional plans

Regional plans shall include guidelines for "administering areas, buildings, etc. that are worthy of preservation and natural qualities, etc. worthy of conservation in the open country, including designating and protecting nature reserves with special natural qualities, etc." (PA, §6.3,8). The research material did not contain any decisions on natural values in regional plans, therefore we have no results on interest weighing of natural values in regional plans.<sup>92</sup>

#### 5.1.2.2. Nature conservation in master plans

Protection of natural values is included in the provisions on the content of master plans, which establish the framework for the content of local plans only as concerns shores. Natural values shall be taken into consideration when planning land use in master plans in coastal parts of urban zones (PA, §11a.4,2).

Master plans have been overturned in cases where natural values were not protected when the area has been designated as a national park or nature reserve and when recreational values were not protected. This is the same attribute combination as for local plans. Master plans have also been overturned when the plan has increased the effective use of land and neither natural values nor amenity values were protected. ['nature = local overall outcome (conserv Recreat) + (amenity EFFECTIVE)']

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<sup>92</sup> Nature conservation has also to be taken into consideration in road plans, which should have a close connection to land use planning. Nature Protection board of Appeal ruled that a motor way planned through a high priority biological preservation area could not be carried out (NKNO 9/1993).

The attribute combinations are based directly on the two following decisions:

**NKNO No. 13 1993:** A municipal council drew up a local plan and revised a master plan to allow the construction of a golf course in an area 300 m from the shoreline, some of which had been protected (Nature Protection Act §3). In the regional plan the area was marked as a nature area that can only be used for agriculture and nature conservation. The Nature Protection Board of Appeal's decision was that both the local plan and the master plan conflicted with the regional plan and therefore the decisions concerning the master plan and the local plan were overturned. A golf course would have significantly changed the area close to the coastline, which had great natural and recreational values. It would also have made public access to the area difficult.

In this case, the fact that both natural and recreational values were ignored in a protected area led to the decision overturning the plan. Natural values and public access to the recreation area was weighed against private interests for a recreation area.

**NKNO No. 82 1995:** When a master plan was revised, a residential area close to the coastline was planned. The plan involved the conversion of a rural zone to an urban zone. The regional plan gave high priority to visual and landscape values in undeveloped areas. The area was not marked as a residential area in the regional plan. The county council had presented objections to the plan (PA, §29.2) but later withdrawn them. According to the decision of the Nature Protection Board of Appeal's chairman, the master plan should not contradict with the regional plan (PA, §11.2) in matters referred to in §6.3-4 of the Planning Act. In this case, the master plan conflicted with the regional plan's guidelines for the location of residential areas and the protection of nature in an undeveloped area. Because of the high priority of protecting an open green area located close to the coastline, the conflict between the regional plan and the master plan was considered to be so significant that the master plan was not upheld.

In this case the area had not been designated as a conservation area, but nature and amenity values were given high priority in the regional plan and the master plan would have increased the effective use of the land in the area if the residential area had been constructed.

### 5.1.2.3. Nature conservation in local plans

According to the Planning Act, “[a] local plan may contain provisions on ... the design, use and maintenance of undeveloped areas, including provisions that regulate... conservation of plants and other matters pertaining to plants ... ” (PA, §15.2,9). “Outside villages, a local plan for areas in a rural zone that are designated for agricultural use may not contain provision in accordance with subsection §2, no. 9.” (PA, §15.5).

When interpreted, the configurations for local plans [*nature = LOCAL outcome (CONSERV TRAFFIC) + (conserv recreat)*] illustrate that local plans have been overturned when natural values were not taken into consideration in areas included in a nature conservation programme if the decision increased traffic in the area. This has also been the case when the area was founded as a national park or nature reserve and natural values together with recreational values have not been protected. In other words, the reason that natural values were not protected in itself was not sufficient to overturn the local plans, but has been linked with designation of the area for nature conservation (nature conservation programme or national park or nature reserve) as well as with increased traffic or unprotected recreational values. The attribute combinations are based on the following decisions and the decision NKNO 13/1993, which was already described in the previous chapter in connection with master plans.

**NKNO No. 23 1994:** A municipal council revised a local plan to allow the construction of a residential area in a forest that had been protected (Nature Protection Act, §50.2) since 1940. The reasons for this revision were the nearby location of the city centre and the fact that the old forest provided a natural background for the growing city. The county council did agree with the municipal council. The Nature Protection Board of Appeal decided that the revised local plan was not acceptable. The use of a protected forest area for housing motivated by the need to expand residential districts, was not considered to be based on reasons strong enough to allow the use of the area in a way that would be against the aims of conservation.

In Denmark, plans must also contain a report that includes an assessment of the impacts of the plan on nature (PA, §6.8, §11.7, §16.3).

**NKNO No. 59 1995:** A local plan that lacked an assessment of how a motor racing track would affect a nearby EC-bird protection and Ramsar area, was judged to be invalid.

In this case, the Nature Protection Board of Appeal did not issue a statement on any material aspects of the case, because the plan was judged to be invalid on the grounds of a procedural fail.

Of the attribute combinations, 'nature = LOCAL outcome (CONSERV TRAFFIC)' is based directly on the decision NKNO 59/1995. The configuration 'nature = LOCAL outcome (conserv recreat)' is obtained by applying Mill's method of agreement to decisions NKNO 23/1994 and 13/1993, which contain the same attributes; in addition, the former decision even has an additional attribute ('EFFECTIVE'). As ignoring nature and recreational values in an area designated as a national park or nature reserve is sufficient to cause a local plan to be overturned (NKNO 13/1993), then the fact that the local plan would also increase effective use of the land (NKNO 23/1994) is not necessary, because the plan would be overturned regardless of this attribute.

#### 5.1.2.4. Protection of open shorelines

In Denmark, protection of coasts is considered to be of national interest. In coastal areas, high priority should be given to nature and landscape values as well as to use for recreation. Protection of open coasts has higher priority than other land use interests of municipals or counties. (FT 1993–94, pp. 6494–6495)

One aim of the in Danish Planning Act is that the coasts shall be a significant nature and landscape resource for people and for fauna and flora (PA, §1.2 item 3). The open shores shall remain undeveloped, while the plants and facilities that require coastal location can still be located by the coast. Also urban areas that are located by the coast, shall be able to develop. (Footnote 4 of LBKG 1997/563)

The provisions on physical planning in coastal areas in Denmark are applied in rural zones and summer cottage areas (PA, §5a.3). With regard to shore areas, there are provisions about the part of the shoreline that should be left untouched (PA, §5b). The area close to

the coastline is defined mainly as being 300 metres from the coast in rural zones and 100 metres in summer cottage areas (Nature Protection Act 9/1992, §8). The coastal administrative area where planning provisions are applied covers 3 km from the coast. (FT 1993–94, p. 6495) Some parts of the coast are protected by other provisions, e.g. Nature Protection Act (9/1992, §3), which protects different types of nature, or the EU bird protection area. Because the law has the character of weighing rules, even these provisions delegate a wide scope of the power of decision to the authorities. Both of the cases related to nature conservation in Danish master plans (NKNO 13/1993 and 82/1995) concern development of coastal areas in rural zones. The sentence based on these cases [‘nature = local overall outcome (conserv Recreat) + (amenity EFFECTIVE)’] also shows the interest weighing with regard to development in coastal areas. The interests weighed are natural, recreational and amenity values and the effective use of land. The fact that coasts should be given higher priority in conservation than other areas is likely to have had an impact on the interest weighing but is not shown in this analysis, because all of the cases pertained to coastal development.

Land use in coastal areas is also restricted in urban zones (PA, §5a.4). One aim of physical plans in coastal areas is for the plan to insure that the public has access to coasts (PA, §5b.1.5). In municipal plans, development in coastal areas and especially the height of buildings, shall be regulated closely so that buildings will fit in to the landscape, will take into consideration preservation of the city structure and nature conservation, will take into consideration the necessary infrastructure and will make sure that the public has access to the coast (PA, §11a.4). The case NKNO 82/1995, which deals with the change of an area from a rural zone to an urban zone, refers to the public’s access to the coast. According to the provisions, new areas can become an urban zone, and rural zone areas can be used for construction, only if there are special planning or functional reasons for this (PA, §5b.1.1). The provisions of paragraph 5b are applied to both county council and municipal council decisions concerning rural zones and summer cottage areas. The provisions specify the criteria pertaining to the content of plans in coastal areas<sup>93</sup>. These provisions are meant not

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<sup>93</sup> According to the Nature Protection Board of Appeal (NKNO 44/1994), the shore protection area should be interpreted in a very restricted way, and exemptions should acquire strong justification. Parcelling out was not allowed even though the local plan would have allowed it (Nature Protection Act §15). The Nature Protection Board of Appeal (NKNO 178A/1999) ruled for granting the permit to construct a building for



to ban construction situated in urban and rural zones in the coastal area, but to ensure that land use is planned as far as possible from the coast; if possible behind existing buildings. (FT 1993–94, pp. 6512–6513)

With the exception of structures for traffic or infrastructure virtually no structures can be planned within the coast or the coastal protection area (PA, §5b.1,2). The intention is to protect vulnerable flora and fauna and to allow dynamic processes, such as coastal erosion and floodwaters (FT 1993–94, p. 6514).

New summer cottage areas can't be planned and the existing ones must be kept only for holiday use (PA, §5b.1,3). Construction for tourism shall be allowed only close to existing settlements or existing holiday constructions (PA, §5b.1,4).

## 5.2 Protection of recreational values

In Denmark recreation areas are protected by regulations concerning both regional plans and master plans (PA, §6.3,10; §11.4) and the framework regulations for the content of local plans (PA, §11.5, 6). In Finland, recreation areas can be considered included in regional plans under the category "enough areas for various use defined in law" (BA, §22.2), but they are specifically mentioned only in regulations defining the content of local plans (BA, §34.2). According to the new Land Use and Building Act suitable areas for recreation are mentioned in required content of all plans (LUBA, §28.3,7; §39.2,9; §54.2).

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social use, because it serves public interest and because it was in connection with existing buildings, even though it was against coastal protection. Also construction of a shopping centre was allowed in a coastal area, because the sea was considered to be drained and had therefore a restricted value, and because of the expectations of the landowners based on the local plan (from 1987) that allowed construction (NKNO 178B/1999). The Nature Protection Board of Appeal (NKNO 179/1999) has also ruled that economical reasons are not enough to grant permits on conserved areas. Only if the site is of no significant meaning for nature conservation or if the operation doesn't lead to any meaningful damage of the conserved values, the permit can be granted. These three decisions from the year 1999 are based on the Nature Protection Act §3 and §16.

## 5.2.1 Finland

As concerns Finland, the research material consists of cases where recreational values were protected and other cases where they were not; this allows the use of Mill's indirect method of difference. The first table shows attribute combinations for cases in which recreational values have not been protected.

**Table 36.** Minimized truth table for the attribute *not protected recreational values* (Finland).

File: SUSTAIN2.QVN

Model: RECREAT = LOCAL + OVERALL + CONSERV + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS + OUTCOME

Outputs Minimized: 0

Method: Quine-McCluskey

Local overall conserv nature owners outcome +  
 Local overall conserv nature effective outcome +  
 LOCAL amenity outcome +  
 LOCAL nature outcome +  
 Local overall conserv nature traffic outcome +  
 Local overall conserv nature AMENITY outcome +  
 LOCAL EFFECTIVE OUTCOME

Attribute combinations for situations where recreational values were not protected have led to the decision being overturned in the case of all but one attribute combination. There are attribute combinations for local plans and for master plans in areas designated as national parks or strict nature reserves. Factoring by the type of plan gives the following sentence for planning decisions in which recreational values have been ignored:

Recreational=

LOCAL[(amenity outcome) + (nature outcome) + (EFFECTIVE OUTCOME)] +  
 (local overall conserv Nature outcome)(owners + effective + traffic + AMENITY)

The next table gives attribute combinations for Finnish plans where recreational values were protected.

**Table 37.** Minimized truth table for the attribute *protected recreational values* (Finland).

File: SUSTAIN2.QVN

Model: RECREAT = LOCAL + OVERALL + CONSERV + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS + OUTCOME

Outputs Minimized: 1

Method: Quine-McCluskey

local OVERALL amenity outcome +  
 local overall CONSERV nature amenity TRAFFIC EFFECTIVE OWNERS  
 outcome +  
 LOCAL amenity effective owners OUTCOME +  
 local OVERALL nature owners OUTCOME

There are attribute combinations for local plans and regional plans and one combination for overall plans that does not specify whether it pertains to master plans or regional plans and is therefore interpreted to cover both. Factoring gives the sentence for plans where recreational values have been protected:

RECREATIONAL=

LOCAL (amenity effective owners OUTCOME) +

local OVERALL (amenity outcome + nature owners OUTCOME) +

local overall CONSERV (nature amenity TRAFFIC EFFECTIVE OWNERS outcome)

#### 5.2.1.1. Protection of recreational values in regional plans

Neither the Building Act nor the Building Decree included any provisions as to how recreational values should be taken into consideration in overall plans. The Building Act states (BA, §22.2), that "...sufficient amounts of land needed for various future purposes shall be reserved".... According to the Land Use and Building Act, regional planning shall pay attention to the "sufficient availability of areas suitable for recreation" (LUBA, §28.3,7). There are no attribute combinations for cases in which recreational values were not protected, but there are two attribute combinations where recreational values were protected in regional plans ['RECREATIONAL=local OVERALL (amenity outcome + nature owners OUTCOME)']. One relates to plans that were overturned even though recreational values were protected and, the other pertains to plans that were ratified and in which recreational values were protected. The conclusion that regional plans have been

overturned even though recreational values were protected while amenity values were ignored ('RECREATIONAL=local OVERALL amenity outcome') derives from the following decision:

**KHO 1991 T 197:** In a regional plan, a recreation area for construction of a slalom slope was designated on a hill descending into a lake, constituting a valuable landscape. The Supreme Administrative Court reversed the plan because, in view of the number of existing slalom slopes and the expect trend of future development, the reservation of land for this purpose was not considered to be required.

The attribute combination is based directly on this decision, in which recreational values and amenity values were weighed against each other. It sounds at first a bit strange that recreational values and amenity values would be weighed against each other, but this was also the case when recreational values were compared against natural values; the decision was that use of land for recreation requires development of the nature. In this case the decision was based on the assessment that the future development wasn't considered to require further reservations for slalom slopes. The regulations nor the case don't give any indications on how to balance recreational and amenity values.

Regional plans have been ratified when recreational values were protected even though natural values were not, provided that the decision did not cause inconvenience to landowners ('RECREATIONAL=local OVERALL nature owners OUTCOME'). This interest weighing is based directly on the following decision:

**KHO 1977 A II 50:** Recreational use was not considered to harm nature in a ridge area that was not protected in regional plan.

In this case natural values in the archipelago were considered less important than recreational use even though recreational use caused inconvenience to landowners. This case was discussed earlier when natural values in regional plans were analysed. Mill's indirect method of difference didn't produce any additional information for the cases even though we had one positive and one negative case because the two cases had different attributes.

### 5.2.1.2. Protection of recreational values in master plans

The same provision of the Building Act on reserving sufficient amounts of land needed for various future purposes (BA, §22.2) as regards regional plans applies also to master plans (BA, §29.1). According to the current provisions when a master plan is drafted it must be ensured that there are "sufficient number of areas suitable for recreation" (LUBA, §39.2,9).

The attribute combinations covering master plans in areas included in a nature conservation programme state that plans have been overturned even though recreational values were protected if nature and amenity values were not protected and the decision has increased traffic and the effective use of land while also causing inconvenience to landowners ['RECREATIONAL = local overall CONSERV (nature amenity TRAFFIC EFFECTIVE OWNERS outcome)']. The attribute combination is based mainly on the Supreme Administrative Court Decision 1993 A 40, which was dealt with in connection with nature conservation in master plans. The attribute combination is identical with this decision, except that this decision is not about an area covered by a nature conservation programme.

In this case, the logic underlying the QCA analysis doesn't work as concerns addition of the attribute 'CONSERV' to the sentence. This is because this attribute hasn't been coded as absent and present in the same way as the other attributes have, but the presence of the attribute implies that the area is covered by a nature conservation programme and the absence of the attribute means that the area has been set aside as a national park or strict nature reserve. When this attribute is left out to indicate that the area doesn't belong to either of these two areas, the QCA software interprets this as a sign that the area can belong to either one of these conservation areas. When the software has applied De Morgan's Law to the negative cases (now being the cases where recreational=0), the result is the equation 'RECREAT=nature amenity TRAFFIC EFFECTIVE. OWNERS (CONSERV+ NATURE+OUTCOME)' => 'RECREAT = CONSERV nature amenity TRAFFIC EFFECTIVE. OWNERS outcome'<sup>94</sup>. We must now disregard the attribute

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<sup>94</sup> The two other configurations have been disregarded because they include attributes that are both present and absent.

'CONSERV' because we don't want to state that this configuration implies only areas included in nature conservation programmes.

There are four attribute combinations for master plans where recreational values were not taken into consideration. The attribute combinations are based on two decisions: the Supreme Administrative Court decision 1980 A II 59, which was discussed in the chapter on natural values in master plans; and the previously mentioned decision 1993 A 40. ['recreational = local overall (conserv Nature outcome)(owners + effective + traffic + AMENITY)']. The shared part of the attribute combination ('recreational = local overall conserv Nature outcome') is directly based on the 1980 A II 59 decision, and the alternative attribute values attached to this shared attribute combination ('owners + effective + traffic + AMENITY') are the opposite attribute values based on the decision 1993 A 40. This is again the result of applying De Morgan's Law,<sup>95</sup> and the analysis is now acceptable, even though we may wish to exclude the attribute 'conserv=0', because it is not present in the negative sentence (in this case 'recreational=1') to which this De Morgan's Law is applied.

With regard to master plans, unreasonable inconvenience was again one of the interests weighed against natural and recreational values. Finally, the consequences of the possible development – namely, the effect of increased efficiency or increased traffic in the area – were taken into account, as was also the case with regard to regional plans.

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<sup>95</sup> 'RECREATIONAL = conserv nature outcome (NATURE + AMENITY + traffic + effective. + owners + OUTCOME)' => 'RECREATIONAL = AMENITY conserv nature outcome + conserv nature traffic outcome + conserv nature effective. outcome + conserv nature owners outcome)'.

### 5.2.1.3. Protection of recreational values in local plans

According to the provisions regulating the local plan, "care must be taken that sufficient parks and other recreation areas are provided in various parts of the city and that space reserved for these purposes earlier is not reduced without special cause" (BA, §34.2). The protection of areas earlier reserved for parks and recreation areas was abolished by the new Land Use and Building Act, which states that (LUBA, §54.2) "[t]here must be sufficient parks or other areas suitable for local recreational in the area covered by the plan or in its vicinity."

There are three attribute combinations which include recreational values that have not been protected ['Recreational = LOCAL (amenity outcome) + (nature outcome) + (EFFECTIVE OUTCOME)']. Local plans have been overturned when recreational values were ignored together with amenity values or natural values. These attribute combinations are based on the Supreme Administrative Court decisions KHO 1978 T 2417 and 1985 A II 74, which were dealt with in the chapter on nature in local plans, and on the decision 1991 A 81. In the decision KHO 1978 T 2417, the ignoring of recreational and natural values led to overturning the plan. In the following decision, recreational and amenity values are ignored:

**KHO 1991 A 81:** A decision concerning a local plan didn't give special reasons for reducing a park because of three factors: the limited size of the planning area; the extensiveness of the park area (the intention was to restrict the area); and the planned land use would cut off a park area at a riverbank. The height of the buildings and the efficiency of the land use were not in accordance with the requirements for the harmony and amenity of the environment.

Based on this decision we may conclude that also ignoring recreational and amenity values leads to local plans being overturned. In the decision KHO 1985 A II 74, the local plan was overturned because all three attributes – namely, recreational values, natural values and amenity values – were ignored. According to Mill's method of agreement, ignoring recreational values in connection with either ignoring natural values or amenity values is sufficient to overturn a local plan.

The third attribute combination pertains to local plans that were ratified even though recreational values were ignored and the decision increased the effective use of land. This seems to be against the principle of sustainable development. Could this attribute combination relate to planning areas for tourism? The attribute combination is based on the Supreme Administrative Court decisions 1977 T 2068 and 1976 T 2574, both of which have the same attribute values. These two decisions were considered unsuitable for the outcome even in the previous chapter and it was decided to remove them. Thus the configuration ('EFFECTIVE OUTCOME') is eliminated from the result.

**KHO 1977 T 2068:** When a local plan was revised, a recreation area was marked to allow the construction of public buildings in an area near other public buildings. An area previously reserved for public buildings was marked as park area, to compensate for this alteration to the recreation area. Another park area was marked for teaching and social functions. The Supreme Administrative Court upheld the decision, but the decision was not unanimous (6–2). The minority was of the opinion that marking what had previously been reserved as a park for teaching and social functions without compensating for the lost park area did not constitute the special reason needed to allow the size of the park area to be decreased, taking into account the total amount of recreation areas in the region.

**KHO 1976 T 2574:** A decision on a local plan was upheld even though what had previously been a recreation area was marked for housing. The recreation area had not been utilized and there was another recreation area nearby.

There is one attribute combination on protected recreational values in local plans. Local plans have been ratified when recreational values were protected even though amenity values were not if the decision has not increased the effective use of land or has not caused inconvenience to landowners ['RECREATIONAL = LOCAL (amenity effective owners OUTCOME)']. This attribute combination is based directly on the Supreme Administrative Court Decision 1993 A 48.

**KHO 1993 A 48:** A local plan was amended to point out part of an existing park for dwelling. At the same time a vacant plot in the area was turned into a park. The Supreme Administrative Court ruled that if there is a special reason, the total amount of park area could be protected in a local plan, but not the site of the park. In this case, the special reason was the location of the new park bordering on the current park area. The permissible building volume was reduced and the park area was enlarged. The minority would have protected the 30-year-old park, which had been taken care of well (3–2).



In this case, a park was not considered to be part of nature and thus could not be protected. Nor was the park considered by the majority to be part of the landscape, and thus could not be protected for amenity values.

Applying de Morgan's Law,<sup>96</sup> we get the equation that local plans are overturned if recreational and natural values have not been protected even if amenity values have been protected or if the decision increases the effective use of land or causes inconvenience to landowners. Local plans will also be overturned if recreational and amenity values have been ignored if the decision would increase the effective use of land or cause inconvenience to landowners. ['recreat = LOCAL outcome (nature AMENITY) + (nature EFFECTIVE.) + (nature OWNERS.) + (nature) + (amenity EFFECTIVE.) + (amenity OWNERS) + (amenity)']. The application of De Morgan's law doesn't increase the information in this case because we can see that ignored nature or amenity values alone in connection with ignored recreational values is sufficient to overturn a local plan.

### 5.2.2 Denmark

The research material for Denmark contains only cases where recreational values have not been protected:

**Table 38.** Minimized truth table for the attribute *not protected recreational values* (Denmark).

File: SUSTAIN4.QVN

Model: RECREAT = LOCAL + OVERALL + CONSERV + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS + OUTCOME

Outputs Minimized: 0

Method: Quine-McCluskey (Minimal)

local overall EFFECTIVE OUTCOME +  
LOCAL conserv nature outcome +  
Local overall conserv nature outcome

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<sup>96</sup> Recreational = (nature outcome + amenity outcome) (AMENITY + EFFECTIVE + OWNERS + outcome)

There are attribute combinations for local plans and master plans. Factoring by the type of plan, the sentence for plans in which recreational values were not protected is:

Recreational=LOCAL(conserv nature outcome) + local overall(EFFECTIVE OUTCOME + conserv nature outcome)

#### 5.2.2.1. Protection of recreational values in regional plans

Regional plans shall include guidelines for the location of areas to be used for recreation (PA, §6.3 item10). The research material contained no regional plans for the protection of recreational values, and therefore no attribute combinations.

#### 5.2.2.2. Protection of recreational values in master plans

Master plans shall also include guidelines (PA, §11.4) and a framework for the content of local plans (PA, §11.5 item 6) for the location of areas to be used for recreation. Master plans have been ratified even though recreational values were not protected when the decision increased the effective use of land ('recreational = local overall (EFFECTIVE OUTCOME)'). This configuration is based on the following decision:

**NKNO No. 24 1994:** A municipal council revised a master plan in order to allow the construction of a concert hall and the extension of a museum in a former park area. The city park was located between the harbour and the city centre. According to the Nature Protection Act (§1.3), the location of the park and its importance to the public were essential for its protection. According to the practice of the earlier appeal board the "overfredningsnævnet", protection in urban areas was possible only if the area in question had effects significantly wider than effects concerning the local surroundings. The Nature Protection Board of Appeal decided not to follow this practice, but to allow protection in urban areas also when the area under protection has only local importance. In this case, the majority of the Nature Protection Board of Appeal (5–5) decided that the grounds for protecting the park were not strong enough.

In this case the interest weighing was done between the constructions demands in the city centre and the recreational needs of the citizens. The Nature Protection Board confirmed that recreational areas might be protected by the Nature Protection Act although they are

located in cities and the areas have only local relevance. The decision was therefore based on the Nature Protection Act, but the interest weighing was equivalent to the interest weighing based on the Planning Act. As a result of the interest weighing it was decided that in a city centre constructions demands, that lead to more effective use of land were given more weight than recreational demands although there were only a few green areas in the area.

The second configuration ['recreational = local overall (conserv nature outcome)'] is based on decision NKNO 13/1993, which was described in connection with natural values in master plans. Here again, ignoring natural and recreational values in an area set up as a national park or strict nature reserve has led the master plan decision to be overturned. To make the interest weighing clearer and to separate recreational use that requires construction and recreational use that is based on nature values, the attribute on protection of recreational values should have been divided into two separate attributes. In this case construction of a golf course was not allowed because of nature values and recreational values based on nature values.

#### 5.2.2.3. Protection of recreational values in local plans

Recreational values are not mentioned in the provisions on what a local plan may contain, but master plans shall establish a framework for the content of local plans including recreational areas (PA, §11.5 item 6). According to the Planning Act, "[a] local plan may contain provisions on ... the use of the area" (PA, §15.2 item 2). Local plans have been overturned in Denmark when recreational values have not been protected in association with natural values in areas designated as national parks or strict nature reserves ['recreational=LOCAL(conserv nature outcome)']. This attribute combination is based on the decisions NKNO 23/1994 and 13/1993, which are described in connection with natural values in local plans. Both decisions have the same attributes as in the sentence, except that the decision NKNO 23/1994 also includes the fact that the decision increases effective use of the land. According to Mill's method of agreement, the common attributes are sufficient to overturn local plans regardless of whether or not the decision increases effective land use.

### 5.3 Conservation of buildings

In Denmark, buildings and cultural-historical surroundings are protected in master plans and in local plans (PA, §11.5 item 2 and §15.2 item 14); in Finland, they are protected in local plans (BA, §135, §34.3, §95.3).

#### 5.3.1 Finland

There are neither attribute combinations nor provisions in the Building Act regulating cultural values in master or regional plans. According to the Land Use and Building Act, "protection of the built environment [and] landscape" must be taken into account in master plans (§39.2 item 8) and when drawing up regional plans special attention shall be paid to "protection of landscape...and cultural heritage" (§28.3 item 6).

The attribute combinations for Finland contained local plans in which cultural values had not been protected and local plans in which cultural values had been protected.

**Table 39.** Minimized truth table for the attribute *not protected cultural values* (Finland).

File: SUSTAIN2.QVN

Model: CULTURE = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS + OUTCOME

Outputs Minimized: 0

Method: Quine-McCluskey

LOCAL amenity outcome +  
LOCAL AMENITY EFFECTIVE OUTCOME

The next table pertains to cultural values that had been protected.

**Table 40.** Minimized truth table for the attribute *protected cultural values* (Finland).

File: SUSTAIN2.QVN

Model: CULTURE = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS + OUTCOME

Outputs Minimized: 1

Method: Quine-McCluskey

LOCAL AMENITY effective OUTCOME

According to the Building Act, "particular efforts must be made to promote the practicable utilization of the built environment and to ensure that traditional, aesthetic and other values in the built environment are not destroyed" when a local plan is drawn up (BA, §34.3). The Land Use and Building Act (§54.2) stipulates that in a local plan "[t]he built...environment must be protected and [its] special values must not be destroyed."<sup>97</sup>

There are two attribute combinations in which cultural values were ignored. The sentence for planning decisions where cultural values were not protected is:

Culture= LOCAL [(amenity outcome) + (AMENITY EFFECTIVE OUTCOME)]

Local plan decisions have been overturned if cultural and amenity values were ignored. Local plans have been ratified even though cultural values were not protected while amenity values were protected even if the decision increased effective use of the land.

The attribute combinations are based on three cases, which include values on the attribute 'culture': one decision in which cultural values were protected (KHO 1986 T 2667) and two decisions in which cultural values were not protected (KHO 1987 A 47 and KHO 1994 A 26). All three decisions weighed cultural and amenity values. The first attribute combination on cultural values that were not protected ('Culture= LOCAL amenity outcome') is based directly on the next decision.

**KHO 1987 A 47:** The Supreme Administrative Court upheld a decision, made in the Ministry of the Environment, that had rejected a local plan in which a building valuable to the townscape and having cultural-historical and architectural values was not protected.

In this case, cultural values were not weighed against other features of sustainable development, but were together with ignored amenity values sufficient in themselves to cause the plan to be overturned. Actually the interest weighing has been done between the

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<sup>97</sup> In areas covered by a local plan valuable buildings ought to be protected in the plan. However even on these areas a building might be protected according to the Building Protection Act (Rakennussuojelulaki 18.1.1985/60, §3) if a nationally valuable building can't be sufficiently protected according to the Land Use and Building Act or if there is some other significant reason for the protection. On protection of cultural property see in English Hollo 1990.

interests to rebuild the site and to conserve the building. Because construction was not included in the attributes, this interest weighing doesn't show in the attribute combinations for Finland.

The second attribute combination on cultural values that were not protected ('Culture=LOCAL AMENITY EFFECTIVE OUTCOME') is a result of applying de Morgan's Law and the minimization. As outcome we get an equation that is slightly different from the following decision:

**KHO 1994 A 26:** A local plan was revised in a way that would allow the demolition of two old factories assessed as being valuable to the townscape and having cultural-historical and architectural values. One of the buildings was dilapidated and the other one was difficult to reconstruct to suit the requirements of housing. Considering the overall interest, the Supreme Administrative Court upheld the decision.

This decision implied that local plans are ratified even if cultural values aren't protected if amenity values are protected. This decision differs by the attribute 'EFFECTIVE' from the combination of attributes that QCA produces. De Morgan's Law gives the following equation for ignored cultural values ('culture = AMENITY EFFECTIVE OUTCOME')<sup>98</sup>. Now we get the additional information that the plans are ratified even if they increase the effective use of land.

The only attribute combination on protected cultural values ('CULTURE=LOCAL AMENITY effective OUTCOME') is based directly on the following decision:

**KHO 1986 T 2667:** The Supreme Administrative Court upheld the revision of a local plan which reduced the volume of permissible building in order to protect the townscape, cultural-historical and architectural values.

In the latter decision both cultural and amenity values were protected and the plan was ratified.

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<sup>98</sup> Applying de Morgan's Law on the three cases that include deliberations on cultural values gives also as result the attribute combination 'cultural=LOCAL amenity outcome EFFECTIVE' but this alternative was excluded from the outcome because the attribute combination 'cultural=LOCAL amenity outcome' includes this information in a more minimized combination: if local plans are overturned when cultural values and amenity values are not protected then they certainly will be overturned if the plan also increases effective use of land.

The decision KHO 1986 T 2667 states that local plans have been ratified when cultural and amenity values were protected and the decision did not increase effective use of the land ('CULTURE = AMENITY effective OUTCOME'). The sentence on protected cultural values is based directly on this decision. The application of De Morgan's Law on the negative cases (in this case ignored cultural values) doesn't produce any configurations.<sup>99</sup>

### 5.3.2 Denmark

For Denmark, the research material contains only plans in which cultural values have been protected.

**Table 41.** Minimized truth table for the attribute *cultural values* (Denmark).

File: SUSTAIN4.QVN

Model: CULTURE = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS + OUTCOME

Outputs Minimized: 1

Method: Quine-McCluskey (Minimal)

local OVERALL AMENITY OUTCOME

#### 5.3.2.1. Cultural values in regional plans

According to the Planning Act, regional plans shall include guidelines for the protection of areas and buildings in the open country that are worthy of conservation (PA, §6.3 item 8). If cultural values and amenity values were protected in regional plans, then the plans have been ratified ('CULTURE = local OVERALL AMENITY OUTCOME'). The attribute combination is based directly on the following decision:

**NKNO No. 130 1997:** The county council revised the regional plan in consequence of an environmental impact assessment (EIA) that had been done concerning the construction of two shopping centres in the area. After the revision, the regional plan contained guidelines on the building of shopping

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<sup>99</sup> CULTURE = AMENITY effective OUTCOME (AMENITY OUTCOME) (amenity outcome) => all the configurations are disqualified because they include both present and absent values for one of the attributes.

centres smaller than had been planned earlier, and guidelines on where to locate the buildings. According to the Nature Protection Board of Appeal's decision, the revision of the regional plan was justified because the assessment showed that the construction of the shopping centres would cause several local shops to close. The revision was also justified in order to protect the landscape. Both a church and a protected building were situated nearby.

The interest weighing includes not only protection of cultural values and amenity values, but also the regulation of retail trade. Retail trade is analysed in chapter 6.1.2.

#### 5.3.2.2. Cultural values in master plans

Master plans may contain guidelines for designating preservation-worthy buildings (PA, §11.6). Master plans shall also establish a framework for the content of local plans with regard to preserving settlements or urban environments (PA, §11.5 item 2). There were no cases involving master plans in which cultural values would have been protected therefore we have no results of interest weighing on cultural values in master plans.

#### 5.3.2.3. Cultural values in local plans

Local plans may contain provisions on "preserving landscape features in connection with development of an area allocated to urban or summer cottage development" (PA, §15.2 item 10) and "preserving existing buildings, so that buildings may only be demolished, converted or otherwise altered with the permission of the municipal council" (PA, §15.2 item 14). There were no cases involving local plans in which cultural values would have been protected.

### 5.4 Protection of health values

Health is regulated in local plans in both Denmark (PA, §15.2 item 15, Bekgør 847/1994 §7 noise) and Finland (BA, §34). In Finland an urban development shall not be allowed in an area which is unsuitable for urban development for health reasons (BA, §6) The



location of polluting institutes is regulated as part of healthy surroundings in Denmark with regard to regional plans (PA, §6.3 items 2–4; Bekgør.nr. 847/1994).

#### 5.4.1 Finland

In Finland, the provisions containing the right to a clean and healthy environment are based on the Constitution (11 June 1999/731, §20)<sup>169</sup>. In accordance with the Building Act, no dense use of land should be allowed on ground that is not adequate for health (BA, §6) and local plans shall be drawn up in a way that is suitable for the health (BA, §34).

Having health attribute as outcome we have two attribute combinations in the researched cases for Finland: one where health values have not been taken into consideration and one where health values have been protected. Both attribute combinations are about local plans. The first table is about health values not taken into consideration.

**Table 42.** Minimized truth table for the attribute *not protected health values* (Finland).

File: SUSTAIN2.QVN

Model: HEALTH = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS + OUTCOME

Outputs Minimized: 0

Method: Quine-McCluskey

LOCAL amenity EFFECTIVE outcome

And the second table shows us when health values have been taken into consideration

**Table 43.** Minimized truth table for the attribute *protected health values* (Finland).

File: SUSTAIN2.QVN

Model: HEALTH = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS + OUTCOME

Outputs Minimized: 1

Method: Quine-McCluskey

LOCAL OUTCOME

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<sup>169</sup> The provisions were added to the former Constitution Act (17.7.1919/94) in 1995, as §14a (revision 17 July 1995/969).

#### 5.4.1.1. Protection of health values in overall plans

The Building Act did not have any provisions on health values in overall plans. The Land Use and Building Act (§39.2 item 5) stipulates that when a master plan is drafted “opportunities for a safe and healthy living environment which takes different population groups into equal consideration” must be taken into account. The current legislation still makes no mention of health values as a required component of regional plans.

There are no attribute combinations for regional or master plans in which health values would have been protected or in which health values would not have been protected. The research material contains no such cases. This may be due to the fact that interests not mentioned in the legislation are usually not brought up in courts.

#### 5.4.1.2. Protection of health values in local plans

According to the Building Act, the local plan “should meet the demands of health” (BA, §34.1). The Land Use and Building Act now in force also stipulates (§54.2) that “[t]he local detailed plan shall be drawn up so as to create the preconditions for a healthy [and] safe...living environment”.

The sentence ‘health= LOCAL (amenity EFFECTIVE outcome)’ reveals that local plans have been overturned in Finland when health and amenity values were ignored and the decision increased effective use of the land. This is based directly on the following decision:

**KHO 1987 A 45:** In a case where housing was extended in an area affected by air traffic, the local plan was not in accordance with the provisions on suitable use of land or adequate use with regard to health and amenity values (BA, §34).

Health values and the effective use of land are likely to be weighed in the same decision. Often the goal of using land more effectively, in order to make use of the existing municipal engineering, pertains to areas that have been left undeveloped because they were

considered unsuitable for housing. The application of De Morgan's Law<sup>101</sup> provides no additional information on the interest weighing involving health values that have been ignored.

The fact that health values have been taken into consideration and protected in a local plan has been sufficient for ratification of the plan ('HEALTH = LOCAL OUTCOME'). This is based on the following two decisions that have identical values for the attributes, as the sentence shows.

**KHO 1986 A I 4:** It was decided that the local plan may contain provisions (BA, §96.3) concerning the construction of houses in an area where radon gas in the soil causes problems.

**KHO 1983 A II 64:** A local plan was revised to allow the construction of a hazardous waste disposal plant. The plan was considered to be in accordance with the provisions in §34 of the Building Act on the adequacy for health, because the hazardous waste disposal plant could be situated according to the provisions in §23a of the Waste Management Act. The ground and the surroundings were considered to be fit for the proposed use because the constructional and functional requirements to protect both the ground and the groundwater could be realized according to the Waste Management Act.

These decisions express the weight health values have in decision-making concerning local plans. The fact that these decisions involve so few attributes reduces the information obtainable from them. The application of De Morgan's Law<sup>102</sup> provides two additional configurations on the protection of health values, which imply that local plans are ratified when both health values and amenity values are protected ('HEALTH = LOCAL AMENITY OUTCOME'), and also that local plans are ratified when health values are protected and the decision does not increase effective use of the land ('HEALTH = LOCAL effective OUTCOME'). This is additional information, while the original configuration states that protected health values are sufficient for ratification of the plan.

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<sup>101</sup> 'Health = DECISION amenity EFFECTIVE outcome (outcome)'.

<sup>102</sup> HEALTH = DECISION OUTCOME (AMENITY + effective + OUTCOME) => HEALTH = DECISION AMENITY OUTCOME + DECISION effective OUTCOME + DECISION OUTCOME.

#### 5.4.2 Denmark

The research material on Denmark contains only one case which concerns health values. The analysis produces one attribute combination pertaining to health values in a situation where regional plans did not protect health values.

**Table 44.** Minimized truth table for the attribute *not protected health values* (Denmark).

File: SUSTAIN4.QVN

Model: HEALTH = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + AMENITY + WATER + TRAFFIC + EFFECTIVE + OWNERS + OUTCOME

Outputs Minimized: 0

Method: Quine-McCluskey (Minimal)

local OVERALL water OUTCOME

##### 5.4.2.1. Protection of health values in regional plans

Regional plans shall include guidelines for the location of enterprises or major development projects that may cause pollution or that may have significant effects on the environment in other ways (PA, §6.3 items 3–4).

According to the sentence [‘health = local OVERALL (water OUTCOME)’] regional plans have been upheld in Denmark even though health values and water supplies were not protected in the decision. This would seem to be clearly against the criteria of sustainable development. This sentence is based directly on the following decision:

**NKNO No. 168 1998:** A regional plan, which prohibited all activities that could pose a threat to groundwater in areas concerned, was revised to allow the extension of a piggery. This would increase the amount of nitrate in the groundwater of a drinking water area. The county council proposed an exception to the guidelines. Since there were no other provisions to be applied, the decision was upheld.<sup>103</sup>

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<sup>103</sup> The decision is made on 23 June 1998 and the amendment to the Planning Act (L 1998, 479) concerning drinking water came into force on 1 August 1998 (Lov om ændring af lov om vandforsyning m.v., lov om miljøbeskyttelse og lov om planlægning L 1998, 479).

The fact that groundwater could not be protected against an increased nitrate content was considered to endanger drinking water supplies. However, because the legislation in force at the time contained no provisions that would protect drinking water interests, it was decided that the increased nitrate content of the groundwater would not be taken into consideration in the interest weighing<sup>104</sup>.

#### 5.4.2.2. Protection of health values in master plans

There are no provisions on how health values should be taken into consideration in master plans. Correspondingly, the research material contained no cases dealing with this issue.

#### 5.4.2.3. Protection of health values in local plans

A local plan in Denmark may contain provisions on keeping an area free of new construction if buildings might be prone to collapse or flood or if other risk might be posed to health (PA, §15.2 item 15). How this provision is taken into account in interest balancing could not be assessed owing to the lack of such cases in the research material.

### 5.5 Water supplies

Regulations concerning water supplies are an important aspect pertaining to health and the human environment. In Finland, the Building Decree stipulates that the “opportunities for water supply ... must be taken into account” in local plans (BD, §32.2 item 3). According to the Land Use and Building Act (§28.3 item 4) regional plans shall pay special attention to “sustainable use of water”, and master plans shall pay special attention to “opportunities to organize ... water supply” (§39.2 item 4). In Finland, there are no provisions concerning the consideration of health issues in local plans.

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<sup>104</sup> Water supplies are dealt with in chapter 5.5.

In Denmark, protection of water supplies and the quality of watercourses are only regulated in regional plans (PA, §6.3 items 12–13).

**Table 45.** Minimized truth table for the attribute *water supplies* (Denmark).

File: SUSTAIN4.QVN

Model: WATER = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + TRAFFIC + EFFECTIVE + OWNERS + OUTCOME

Outputs Minimized: 0

Method: Quine-McCluskey (Minimal)

local OVERALL health OUTCOME

Regional plans shall include guidelines for the use and protection of water resources and shall indicate areas of interests with regard to drinking water (PA, §6.3 item 12–13). County councils have the authority to situate water supplies and to administer the use of water supplies in the area (footnote 72 of the LBKG 1997/563). Interest in drinking water was added to the Planning Act in 1998 (L 1998, 479). It is based on the authority of county councils to situate polluting institutions in regional plans. Drinking water areas shall be given different priorities according to how important the area is for present and future water supplies (footnote 73 of the LBKG 1997/563)<sup>105</sup>. There are no provisions on water supplies in provisions on master or local plans.

Regional plans have been ratified in Denmark even though the plans did not protect water supplies or health values ('water = local OVERALL health OUTCOME'). This sentence is based on the same Nature Protection Board of Appeal decision (NKNO 168/1998<sup>106</sup>) that protected health values in regional plans.

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<sup>105</sup> The Nature Protection Board of Appeal ruled (NKNO 77A/1995) that natural resources in a regional planning area were given more weight than the protection of drinking water resources. This was because there was a need for the natural resources in the area and the drinking water could be protected by setting conditions on the permit. In an other decision the majority of the Nature Protection Board of Appeal decided to refuse a permit to exploit natural resources in a regional planning area, because it was possible to get enough natural resources in the area without this permit, and because the area had significant landscape and cultural and historical values (NKNO 77B/1995). Both decisions are based on Natural Resource Act (Lov om råstoffer nr 1007/1996).

<sup>106</sup> The decision is dealt with in chapter 5.4.2.1. on Protection of health values in regional plans.

## 5.6 Protection of amenity values

The amenity (BA, §34.1, beautiful views; PA, §11.5 item 2, urban environments) of human environments is regulated in local plans in Finland and in master plans in Denmark. The protection of cultural heritage is an aspect of protecting the amenity of the human environment. It comprises the protection of both landscape and buildings either for historical reasons or for aesthetic values. Culturally and historically valuable buildings and landscapes are protected by international agreements<sup>107</sup> and national legislation; these should be implemented by means of physical planning. In addition, buildings, townscapes and landscapes having only the value on the amenity of the environment should be protected by means of physical planning.

### 5.6.1 Finland

Amenity values seem to be important aspects in decision-making concerning whether a plan is legal. All the attribute combinations in the sentence for amenity values not taken into consideration imply that the plan was overturned. Correspondingly all attribute combinations where amenity values have been taken into consideration include the attribute that the plan was ratified.

**Table 46.** Minimized truth table for the attribute *not protected amenity values* (Finland).

File: SUSTAIN2.QVN

Model: AMENITY = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + WATER + TRAFFIC + EFFECTIVE + OWNERS + OUTCOME

Outputs Minimized: 0

Method: Quine-McCluskey

LOCAL outcome +

LOCAL RECREAT effective owners OUTCOME

Local OVERALL RECREAT outcome +

Local overall RECREAT nature TRAFFIC EFFECTIVE OWNERS outcome

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<sup>107</sup> Convention on conservation of the world cultural and nature inheritance (23 November 1972).

**Table 47.** Minimized truth table for the attribute *protected amenity values* (Finland).

File: SUSTAIN2.QVN

Model: AMENITY = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + WATER + TRAFFIC + EFFECTIVE + OWNERS + OUTCOME

Outputs Minimized: 1

Method: Quine-McCluskey

LOCAL recreat effective OUTCOME +  
 LOCAL culture EFFECTIVE OUTCOME +  
 LOCAL effective OWNERS OUTCOME

#### 5.6.1.1. Protection of amenity values in regional plans

The legislation on regional or master plans includes no provisions regulating the amenity, beauty or pleasantness of the living environment.

Regional plans have, however been overturned if amenity values have not been protected even though recreational values were protected ('amenity = Local OVERALL RECREAT Outcome'). This attribute combination is directly based on the following decision:

**KHO 1991 T 197:** A recreation area for downhill skiing was marked in a regional plan for a hill having landscape value. The decision was overturned because future development didn't require new areas for downhill skiing in the surroundings and the hill was valuable owing to the landscape.

Even though it was mentioned that the area in question was considered to be a valuable landscape, the decisive issue in this case was the fact that the area was not needed for future development purposes (BA, §22.2).

#### 5.6.1.2. Protection of amenity values in master plans

The attribute combination ('amenity = local overall RECREAT nature TRAFFIC EFFECTIVE OWNERS outcome') implies that master plans in Finland have been overturned if amenity values together with natural values have been ignored even though recreational values have been protected when the decision has also increased traffic and



effective use of the land and had caused inconvenience to landowners. This attribute combination is based directly on the decision KHO 1993 A 40 which was described in the chapter on nature conservation in master plans. Although this decision implies that the ruling was determined on the basis of whether it promotes sustainable development (BA, §1.2), the decisive factor, was however the unreasonable inconvenience to landowners (BA, §22.2). The building volume that would have been permitted was considered to be excessive. Even in this case, diminished amenity values seem to be an undesirable consequence but not a decisive factor.

### 5.6.1.3. Protection of amenity values in local plans

According to the Building Act, the requirements of amenity and beauty should be met and aesthetic values must be protected and maintained as far as possible in local plans (BA, §34.1). “[P]articular efforts must be made to promote the practical utilization of the built environment and to ensure that traditional, aesthetic and other values in the built environment are not destroyed”<sup>108</sup> (BA, §34.3). The Land Use and Building Act, too, stipulates (§54.2) that “[t]he local detailed plan shall be drawn up so as to create the preconditions for a...pleasant living environment”.<sup>109</sup>

The fact that amenity values were not taken into consideration in local plans has been sufficient to led to overturning of the plan (‘amenity = LOCAL outcome’). The attribute combination is based on the following decisions: KHO 1985 A II 74, KHO 1993 A 37 and KHO 1995 A 38, which were dealt with in the chapter on natural values in local plans; KHO 1991 A 81, which was dealt with in the chapter on recreational values in local plans; KHO 1987 A 47, which was dealt with in the chapter on cultural values; KHO 1987 A 45, which was dealt with in the chapter on health values; and finally KHO 1981 A II 48 and KHO 1983 A II 68 both of which are described next.

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<sup>108</sup> This provision was added in 1985 (amendment 18 January 1985/61) to promote the conservation of historical strata.

<sup>109</sup> According to the new Planning Act in Finland, the protection of the landscape and cultural heritage should be taken into consideration in regional (§28.3 item 6), municipal (§39.2 item 8) and local plans (§54.2).

**KHO 1981 A II 48:** The revision of a local plan was judged not to be in accordance with the Building Act §34, when it was planned that 14 one-storey buildings would be replaced with two-storey buildings. The buildings were in good shape and could be repaired. The decision was that sufficient attention had not been paid to the existing buildings and the townscape.

**KHO 1983 A II 68:** The revision of a local plan was judged not to be in accordance with the Building Act §34 because it protected only some of the buildings that architecturally belonged together.

In the case KHO 1981 A II 48, the fact that amenity values had been ignored led to overturning of the local plan even though the decision would not have increased effective use of the land. The case KHO 1983 A II 68 was coded 'amenity = LOCAL outcome' and therefore the configuration for amenity values that had been ignored is based mostly on the information obtained from this case. The other local plan decisions in which amenity values were not protected included the ignoring of nature, health, recreational and cultural values combined with assessment of the effective use of land with regard to the inconvenience to landowners. In line with Mill's method of agreement, these attributes were, however, treated as supplementary attributes which were not necessary for the outcome.

Local plans have been ratified even though amenity values were not protected although recreational values were, when the decision has not caused inconvenience to landowners or has not increased effective use of the land ('amenity = LOCAL RECREAT effective owners OUTCOME'). The configuration for ratified local plans in which amenity values were not protected, is based directly on the decision KHO 1993 A 48, which was dealt with in the chapter on recreational values in local plans.

The attribute combination ('amenity = LOCAL outcome) would imply that ignored amenity values in local plans would be sufficient to overturn the decision. However, if recreation values are protected and the decision does not increase effective use of land and does not cause inconvenience to landowners, the decision has been ratified ('amenity = LOCAL RECREAT effective owners OUTCOME'). This indicates that ignored amenity values are not sufficient to cause the local plan to be overturned.

All attribute combinations in which amenity values have been taken into consideration pertain to local plans. Local plans have been ratified when amenity values were protected even though recreational values were not, if the plan has not increased the effective use of land ('AMENITY = LOCAL recreat effective OUTCOME'). The plan has also been ratified even though it increased the effective use of land while amenity values were protected but cultural values were not. ('AMENITY = culture EFFECTIVE OUTCOME'). The second attribute combination is based on the decisions KHO 1986 T 2667 and KHO 1994 A 26, which are described next.

**KHO 1986T 2667:** It was judged that a local plan could be revised in a way that reduced the construction density in an area that was valuable owing to the landscape and its cultural and historical values.

In this case cultural values and amenity values were protected and the decision didn't increase the effective use of land. In reducing the permissible building volume, these were weighed to be more important than the inconvenience to landowners.

**KHO 1994 A 26:** The revision of a local plan was judged to be in accordance with the Building Act §34 regulating the townscape, even though some of the old buildings were not protected. Buildings that were not suitable for further use, and buildings that did not contribute to the amenity of the townscape and had partly collapsed, were not protected.

In this case, ignored cultural values were assessed with regard to the effect on the townscape. When it was considered that the townscape, and thus amenity values, were protected, the plan was ratified even if it meant the loss of some of the cultural values.

Local plans have also been ratified even though they caused inconvenience to landowners if they did not increase the effective use of land and if amenity values were protected. The third attribute combination ('AMENITY = effective OWNERS OUTCOME') is based on decision KHO 1983 A II 59, but differs from this decision with regard to the value for the attribute 'landowner'. This case is described below.

**KHO 1983 A II 59:** A local plan was revised in a way that reduced the right to use land in an area consisting of buildings valuable to the townscape.

In this case the protection of amenity values were considered to be more important than the inconvenience to landowners. The inconvenience to landowners does not have as much weight in the balancing of interest as it has concerning regional and master plans. According to the Building Act (§34.1) "...[i]f possible, attention must ...be given to the prevailing land ownership situation...and that no unreasonable restrictions are placed on private landowners that can be avoided without essentially overriding the demands made of the ...plan". The configurations for local plans in which amenity values were protected, are obtained by applying De Morgan's Law<sup>110</sup>.

### 5.6.2 Denmark

In Denmark, amenity values also seem to play a decisive role in the ratification of plans.

**Table 48.** Minimized truth table for the attribute *amenity values* (Denmark).

File: SUSTAIN4.QVN

Model: AMENITY = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + WATER + TRAFFIC + EFFECTIVE + OWNERS + OUTCOME

Outputs Minimized: 0

Method: Quine-McCluskey (Minimal)

LOCAL EFFECTIVE outcome +  
LOCAL CONSERV outcome +  
Local overall nature EFFECTIVE outcome

**Table 49.** Minimized truth table for the attribute *amenity values* (Denmark).

File: SUSTAIN4.QVN

Model: AMENITY = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + WATER + TRAFFIC + EFFECTIVE + OWNERS + OUTCOME

Outputs Minimized: 1

Method: Quine-McCluskey (Minimal)

local OVERALL CULTURE OUTCOME

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<sup>110</sup> 'AMENITY = (culture OUTCOME + effective OUTCOME)(recreational + EFFECTIVE + OWNERS + outcome)' => 'AMENITY = culture recreational OUTCOME + culture EFFECTIVE OUTCOME + culture OWNERS OUTCOME + effective recreational OUTCOME + effective OWNERS OUTCOME'. Of these configurations, three form the solution: 'AMENITY = culture EFFECTIVE OUTCOME + effective recreational OUTCOME + effective OWNERS OUTCOME'.

#### 5.6.2.1. Protection of amenity values in regional plans

In Denmark, regional plans shall include guidelines for designating and protecting nature reserves having special natural qualities (PA, §6.3 item 8), including landscape values (footnote 68 of the LBKG 1997/563) in the open country. Regional plans have been ratified if both amenity and cultural values have been protected ('AMENITY = local OVERALL CULTURE OUTCOME'). This sentence is based directly on the decision NKNO 130/1997, which was described in connection with cultural values in regional plans. This decision was on revising a regional plan to allow smaller shopping centres than had been planned earlier. Protected amenity and cultural values were not the decisive reasons to uphold the regional plan. The revision of the regional plan was justified because the construction of the planned shopping centres would cause several local shops to close.

#### 5.6.2.2. Protection of amenity values in master plans

A master plan shall include a framework for protecting settlements or urban environments (PA, §11.5 item 2). Master plans have been overturned if amenity values and natural values were ignored and the decision increased the effective use of land ('amenity = Local overall nature EFFECTIVE outcome'). This sentence is based on decision NKNO 82/1995<sup>111</sup>, which was described in connection with natural values in master plans. In this case, the regional plan gave high priority protection of nature and landscape values in an undeveloped area close to the coastline. The conflict between the regional plan and the master plan that planned residential use of the area was considered to be so significant that the master plan was not upheld.

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<sup>111</sup> Landscape values are also assessed when permits for the use of natural resources are granted. The Nature Protection Board of Appeal has ruled against these permits if the area has been marked for agriculture in a regional plan (NKNO 172A/1999, NKNO 172B/1999). It has ruled for the granting of permits if the operation has only restricted effect on landscape and if the area can be restored for agricultural use (NKNO 172C/1999). The interests that have been balanced in these cases have been significant landscape values, historical or cultural values and geological values, and on the other hand economical reasons like the quality and quantity of the natural resources and the accessibility of the natural resources. The cases are based on the Natural Resource Act.

### 5.6.2.3. Protection of amenity values in local plans

According to the Planning Act, valuable urban environments and landscapes should be protected by local plans (PA, §15). In shore areas, buildings should be integrated into the landscape (PA, §11a.4 item 1). In local planning reports, the visual effect of buildings in shore area should be assessed and special reasons should be presented for buildings taller than 8,5 metres (PA, §16.3)<sup>112</sup>. In urban zones close to the shore area, exemptions granted concerning the extent or height of the buildings must be justified in the report accompanying by the local plan, in situations where such buildings will have a visual impact on the shore (PA, §16.4).

Even though amenity values are not mentioned in the provisions pertaining to local plans, the protection of cultural values, such as valuable buildings, settlements, the urban environment and landscapes also protects amenity values. Local plans in Denmark have been overturned if amenity values were not taken into consideration and the decision has increased the effective use of land or the area has been included in a nature conservation programme ('amenity = LOCAL outcome (EFFECTIVE + CONSERV)'). The two attribute combinations are based directly on the following decisions:

**NKNO No. 131 1997:** A municipality included the right to extend a factory in a local plan. On the basis of an earlier local plan, the factory was located in an urban zone in a coastal area where the maximum height of buildings was 8 metres. The extension was 10–12 metres high. The decision made by the Nature Protection Board of Appeal's chairman was that this extension would be a significant change which should be justified and the impacts of which must be assessed. Therefore, with regard to the extended height, the local plan was not in force.

**NKNO No. 107 1996:** A municipality drew up a new local plan for a summer cottage area. The old plan didn't allow the construction of new buildings and was very strict about allowing the extension of existing buildings. The new plan allowed more dense construction in an area close to the coastline. The Nature Protection Board of Appeal's decision was that the new local plan was not in force. According to the Planning Act (§16.3) the report accompanying a

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<sup>112</sup> National Plan Directives on coastal areas (kysteirklæret nr 215 af 19. December 1991, §8.1) included these provisions until 1994 (L 1994 439).

local plan in areas close to the coastline should contain an evaluation of the visual appearance.

These two decisions have been given the same attribute values. They imply that both the height of buildings and the density of construction are relevant issues in assessing whether the plan increases effective use of land in the area. Increase in effective use of land in areas close to the coastline has an impact on the evaluation of the visual appearance and is therefore considered in connection with the amenity values of plans. The third decision on ignored amenity values assesses amenity values in areas that are included in conservation programmes.

**NKNO No. 14 1993:** A municipal council drew up a local plan which contained plans to erect a windmill park in a rural zone, one km away from an area included in an EU bird protection area. A permit enabling the erection of four windmills in the area was granted. On the decision of the Nature Protection Board of Appeal's chairman the revision of the local plan was overturned and the permit to erect the windmills was revoked because of the height of the buildings in an area close to the coastline.

The decisive factor in this case was the visual appearance of 30 meters high windmills. Although the area was close to an EU bird protection area, the case didn't contain any evaluation of the effect of windmills on the conserved natural values. In all of these three plans amenity values were given more weight than the inconvenience to landowners. Mill's indirect method of difference could not be applied because there were no local plans in which amenity values would have been protected. Nor did Mill's method of agreement yield any additional information, because the attributes in the cases were diverse and could not be reduced.

### **5.7 Summary of results on protection aspects of sustainable land use**

Conservation and protection of land is usually the opposing interest to the need to locate activities somewhere, which is dealt more systematically in the next chapter. Conservation of nature may concern the conservation of nature because it is valuable itself. This is the biodiversity aspect of sustainable land use and has traditionally been maintained by establishing nature conservation areas. Ecological balance has not been taken into account

in the decisions under regulation of natural values, neither has the parks been protected as part of nature conservation. Parks and other green areas have been protected as part of recreational values. Recreational values have proven to be in conflict also within it self: The same area could be left for the recreation of the landowners themselves or it might be planned for public recreation. Areas reserved for public recreation might be designated for outdoor recreation that doesn't need any cultivation of the area. Or it might be planned for public recreation that requires construction. The last kind of recreational use is often in conflict with nature conservation.

Amenity values in land use planning consist of conservation of buildings and landscape, but it might concern natural values and parks also. The decisions of Finland show that amenity values have been more important in the interest weighing than provisions would have indicated.

Health values in land use planning concern natural values; like avoiding danger from flood, earth or rock fall, or landslide; but not taking into account ecological balance, like bearing in mind the capacity of the environment to recover in order to ensure that serious or irreversible damage is not inflicted upon ecosystems. Health values should include protecting water supplies, which has recently been added to the provisions.



## **6 REGULATING THE LOCATION OF ACTIVITIES AS PART OF SUSTAINABLE LAND USE: REARRANGING THE RECONSTRUCTION OF THE COMPARED LEGAL MATERIALS**

### **6.1 Minimizing Traffic**

According to sustainable development, activities that have an impact on the community structure should be placed so as to minimize traffic and promote the effective use of land.

#### **6.1.1 Reducing the need for traffic**

There are few legal rules for reducing the need for traffic by means of physical planning, although reducing traffic has been a significant issue in efforts to cut environmental problems<sup>113</sup>. In physical planning, the approach to the reduction of traffic has been to pay attention to the placement of different functions and to promote the use of public transport and non-motorized traffic. In order to promote sustainable development in physical planning, housing, work, services, cultural activities and hobbies should be located in a way that reduces the need for traffic and promotes the use of public transport.

In land use planning, this has been taken into consideration in Finland by regulating traffic areas in local plans (BA, §34) and in Denmark by regulating traffic areas in both master plans and local plans (PA, §11.5 item 7, §15.2 item 4). Public transport in Denmark is regulated in regional plans alone and only as concerns the metropolitan area (PA, §6.6). The aim of minimizing traffic is not specifically mentioned in either Danish or Finnish land use regulations.

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<sup>113</sup> On regulating traffic with land use planning, see Herala 2003.

For both Finland and Denmark, attribute combinations deal with plans in which the decision increased traffic, and in both countries this has led to overturning of the plan.

#### 6.1.1.1. Finland

**Table 50.** Minimized truth table for the attribute *increased traffic* (Finland).

File: SUSTAIN2.QVN

Model: TRAFFIC = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + EFFECTIVE + OWNERS + OUTCOME

Outputs Minimized: 1

Method: Quine-McCluskey

Local overall RECREAT nature amenity EFFECTIVE OWNERS outcome + LOCAL OUTCOME

#### **Reducing the need for traffic in regional plans**

Building Act contains no stipulations on traffic issues, but merely contains overall regulations stating that sufficient amounts of land should be reserved for various future purposes (BA, §22.2). The Building Decree requires that a report shall be compiled, in which also possible ways of providing for traffic arrangements are included, if necessary (BD, §18.2). The Land Use and Building Act stipulates that in regional planning, special attention shall be paid to "environmentally and economically sustainable arrangement of transport" (LUBA, §28.3 item 3). There are no cases in the research material on regional plan decisions in which reducing traffic would have been an issue.

#### **Reducing the need for traffic in master plans**

The same regulations as those governing regional plans shall also be applied with regard to master plans (BA, §29.1; BD, §27), although the Building Act mentions that master plans shall outline the main features of land use for various purposes, such as traffic, among others (BA, §28.1 item 4). The Land Use and Building Act requires that utilization of the existing community structure and opportunities to organize traffic shall be taken into account when drafting a master plan (LUBA, §39.2 items 3–4).

Master plans have been overturned in Finland when the decision increased traffic and the effective use of land while nature and amenity values were not taken into consideration and the decision caused inconvenience to landowners even though recreational values were protected [‘TRAFFIC = Local overall (RECREAT nature amenity EFFECTIVE OWNERS outcome)']. This attribute combination is based directly on the single decision in the research material that dealt with master plans (KHO 1993 A 40) which involved traffic issues. This decision was described in connection with natural values in master plans. The decisive interest in this case was the overly efficient use of land in an area planned for tourism and recreation and the inconvenience to landowners. The increase in traffic would have been a consequence of the significant increase of tourists in the area and the opening of a new road connection.

#### **Reducing the need for traffic in local plans**

In Finland, a local plan shall take into consideration the demands of traffic (BA, §34), which has been interpreted to mean that the network for traffic has to meet the needs of activities in the area. The Building Decree defines the need for traffic to be that traffic routes are suitable for their purpose, that they link the various parts of the city and that they connect the city with neighbouring municipalities (BD, §32.2 item 12); also, that the needs of goods and passenger traffic are taken into account (BD, §32.2 item 13) and that streets and roads meet traffic needs and promote traffic safety (BD, §32.2 item 14).

The Land Use and Building Act (§54.2) stipulates that “[t]he local detailed plan shall be drawn up so as to create the preconditions for... the organization of traffic.” The “opportunities to organize traffic, especially public transport and non-motorized traffic” shall be taken into account when master plans are drafted (LUBA, §39.2 item 4).

The last attribute combination (‘TRAFFIC = LOCAL OUTCOME’) points out the connection between local plans and increases in traffic, and argues that even though local plans increased traffic in the area, the plans were ratified. The attribute combination is based on four decisions, two of which are described below. The other two deal with the placement of commercial services (KHO 1997T3215 and 1997 145), and are dealt with later in the chapter on the placement of services.

**KHO 1985 A II 132:** A local plan was revised so that an area meant for business and housing was marked only for business use. The plan was not considered to be in accordance with §34 of the Building Act because the network for traffic was inadequate for the planned use.

**KHO 11.1.1989 T 98:** A local plan was not in accordance with the requirements for traffic (BA, §34), when the plan didn't include sufficient roads for public transport.

These cases have been omitted after deliberations (see TABLE 9); case KHO 1985 A II 132 because it deals mainly with the suitability of the terrain, and case KHO 1989 T 98 because it deals mainly with the requirements concerns on traffic, not the increase of traffic, which is of interest in this study because of it's impacts on sustainable land use. As the regulations already indicate, in the physical plans, *reduction of the need for traffic* is not considered to be a legally regulated interest which would have weighed in the interest balancing. On the contrary, according to the regulations on the content of plans, *the need for traffic demand* must be taken into consideration. This is also the case in decisions KHO 1997T3215 and 1997 145, which consider the increase of traffic in connection with the construction of new shopping malls outside city centres. In these cases, however the conclusion reached was that this interest couldn't be taken into consideration owing to lack of regulations.

#### 6.1.1.2. Denmark

The cases analysed contain only local plan decisions that increased traffic in the area and were overturned.

**Table 51.** Minimized truth table for the attribute *traffic* (Denmark).

Model: TRAFFIC = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE +HEALTH +AMENITY +WATER +EFFECTIVE + OWNERS + OUTCOME  
 Outputs Minimized: 1  
 Method: Quine-McCluskey (Minimal)

LOCAL outcome

**Reducing the need for traffic in regional plans**

In Denmark, regional plans in the metropolitan area should pay attention to arranging public transport (PA, §6.6). A regional plan shall include guidelines for major traffic facilities in other areas as well (PA, §6.3 item 2). The research material doesn't contain any cases that would concern increase of traffic.

**Reducing the need for traffic in master plans**

A master plan shall indicate the overall goals for development of transport services (PA, §11.3–5), but there are no provisions nor cases that involve reducing the need for traffic in master plans.

**Reducing the need for traffic in local plans**

A local plan may contain provisions on "roads and paths and other matters related to traffic, including the rights of access to traffic areas and with the intent of separating different kinds of traffic" (PA, §15.2 item 4).

In Denmark, the fact that a decision would increase traffic has been sufficient to overturn local plans ('TRAFFIC = LOCAL outcome'). This sentence is based on two local plan decisions, NKNO 59/1995, which was described in connection with natural values in local plans, and NKNO 86/1995, which stated that the construction of the ring road requires both revision of the master plan and a more detailed local plan. The Nature Protection Board of Appeal took no stand at all concerning the effects on the amount of traffic. A ring road should be based on a master plan and a detailed local plan, but the decision does not ban the increase of traffic as such. This decision clearly causes a misleading outcome for traffic, and thus it was decided in chapter 3.1.1., which dealt with local plans that had been overturned, to exclude this decision from the research material.

This leaves us with only one decision (NKNO 59/1995). The remaining decision implies that local plans which increase traffic have been overturned in areas covered by a nature conservation programme when natural values have not been protected ('TRAFFIC = LOCAL CONSERV nature outcome'). This decision gives indications only concerning

areas protected by a nature conservation programme, where natural values should be given high priority. However, in this case, the Nature Protection Board of Appeal did not issue a statement on any material aspects of the case, because the plan was judged to be invalid on the grounds of a procedural fail. With regard to this, we cannot make assumptions as to whether an increase in traffic would have caused the local plan to be overturned.

#### 6.1.2 Placement of commercial services

The placement of commercial services outside the city centre have become an issue with regard to the promotion of sustainable development, because such placement increases traffic by private cars and affects the accessibility of services in the area. This aspect of sustainable development has not been included in the attributes, but has risen to become an important issue in the planning of a sustainable community structure.

##### 6.1.2.1. Finland

Finland had no regulations on the placement of commercial services until the Land Use and Building Act (§58.3) came into force in 1999. This legislation, which includes regulations concerning regional, master and local plans, applies, e.g. to large retail units outside city centres. The placement of shopping centres is regulated with the aim that physical plans should promote the accessibility of services (LUBA, §5.1 item 10). The accessibility of services is also mentioned as one of the criteria concerning the content of master and local plans (LUBA, §39.2 item 3, §54). According to the new Land Use and Building Act, permission to build big shopping centres outside the city centre can only be granted if they are included in local plans (LUBA, §125.2<sup>114</sup>). There are no special provisions regulating transport networks to shopping centres, but all plans should include provisions concerning traffic arrangements, especially the appropriate arrangement of public transport and non-motorized traffic (LUBA, §28.3 item 3, §39.2 item 4, §54.2). Two

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<sup>114</sup> The new Finnish Land Use and Building Act came into force on 1 March 1999 and applies to provisions which regulate the placement of large shopping centres and the availability of services (§207.2).

decisions of the Supreme Administrative Court highlight the issue. Both were handed down when the old Building Act was still in force.

**KHO 1997T3215 (17 December 1997):** A local plan was revised in a way that allowed the construction of a shopping centre in an area that a regional plan had marked for industrial use. The Supreme Administrative Court didn't consider the plan to be against the requirements for sustainable development as defined in the Building Act, nor did the Supreme Administrative Court consider the plan to be against the law in any other way.

**KHO 1997 145 (23 December 1997/3290):** A local plan was revised in a way that allowed the construction of a shopping centre on an area that a regional plan marked for central functions. According to the provisions of the regional plan, a retail shop selling groceries and bigger than 1000 m<sup>2</sup>, could not be placed in the area. According to the Supreme Administrative Court's decision, the regional plan could not contain provisions as to what could be sold in the area and that provisions setting the maximum size of shops didn't prevent the ratification of the plan. The construction of a shopping centre was not seen as spreading the community structure. The placement of the shopping centre near existing roads meant that even if the amount of traffic increased, this was not in conflict with the criteria of sustainable development subscribed in the Building Act.

In the light of these Supreme Administrative Court decisions, the placement of shopping centres outside the city centre could not be claimed to be in conflict with sustainable development as subscribed in the Building Act. The configurations attached to these two decisions indicate that local plans were ratified even though they increased traffic ('TRAFFIC = LOCAL OUTCOME'). Even the new provisions on the placement of commercial services don't include direct requirements on reducing the need for traffic. The provisions on arrangement of public transport and non-motorized traffic to shopping centres might lead to less need of using private cars for shopping, and the demand to promote accessibility of services might reduce the willingness to plan new shopping centres away from town centres and residential areas.

#### 6.1.2.2. Denmark

In Denmark, the legislation governing physical planning was revised in 1987 (L 1987 355) and 1997 (L 1997 324) so as to regulate commercial services. Areas for retail shops shall

be located in the city centre or, in large cities, in the centres of different parts of the city (PA, §5d.1). Retail shops can't be placed outside the city centre unless they are small shops that serve a restricted area, shops that sell products requiring much space, shops directly linked with production or shops that can't be located in the city centre because townscape is protected (PA, §5d.2).

The placement of commercial services shall be indicated in regional plans (PA, §6.3 item 5), master plans (PA, §11.5 item 4) and local plans (PA, §15.8). Retail shops should be accessible by all means of transport, especially walking, by bike and by public transport (PA, §5c.2). All plans should promote retail shops having a sustainable structure, which means that the distance between retail shops and consumers should have a certain limit (PA, §5c.3). The following decision, which was not included in the researched data, illustrates the issue.

**NKNO No. 40 A. 1994:** A municipal council granted an exemption to the local plan to enable the construction of a department store (3000 m<sup>2</sup>) in a centre area that had been planned for secondary functions. The local plan divided the centre area into an area for primary functions (e.g. shops) in the south and an area for secondary functions (e.g. small institutions) in the north. The Nature Protection Board of Appeal cancelled the exemption. The use of a major part of the northern section of the centre (marked for secondary centre functions) for primary centre functions (shops) was considered to be against the principles of the local plan.

In this case, the municipal council attempted to make an exemption from its own local planning decision by allowing the construction of retail shops in areas not planned for this use. This was, however, not in accordance with the regulations; the planning of retail shops requires a planning decision that takes into account the area as a whole, balancing the interests placed in the area.

## 6.2 Effective Use of Land

Effective use of land is regulated in regional plans in Finland (BA, §22.2) and in local plans in Denmark (PA, §15.2 item 7).



Reduction of traffic and conservation of nature require a dense community structure. Dispersed housing, which is *inter alia* a legal right in Finland, splinters the community structure. There are no regulations to prevent large-scale dispersed housing because of the effects it has on sustainable development. Only dense use of land can be forbidden in areas lacking proper physical plans. In Denmark, the keeping apart of rural areas and urban areas regulates the extension of cities.

### 6.2.1. Finland

A dense community structure requires that attention be paid to the amenity of the environment and sufficient amount of green areas. In Finland, recreation areas may not be reduced in local plans without special cause (BA, §34.2)<sup>15</sup>.

With regard to Finland, attribute combinations for decisions that have not increased the effective use of land all relate to local plans.

**Table 52.** Minimized truth table for the attribute on *not increased effective use of land* (Finland).

File: SUSTAIN2.QVN

Model: EFFECTIVE = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + OWNERS + OUTCOME

Outputs Minimized: 0

Method: Quine-McCluskey

LOCAL HEALTH amenity outcome +  
 LOCAL RECREAT traffic owners OUTCOME +  
 LOCAL CULTURE AMENITY traffic OUTCOME +  
 LOCAL AMENITY traffic owners OUTCOME

Most of the configurations which imply that the decision has not increased the effective use of land are configurations of attributes pertaining to local plans that were upheld. There is, however, one configuration for regional plans which indicates that the plan has been

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<sup>15</sup> The provision is not included in the new Land Use and Building Act, which instead includes provisions on paying attention to sufficient availability of areas suitable for recreation in all plans (LUBA §28.3 item 7, §39.2 item 9, §54.2).

overturned. All of the local plan decisions in which the decision has increased effective use of land have been upheld, while the master plans that increased effective use of land were overturned.

**Table 53.** Minimized truth table for the attribute on *increased effective use of land* (Finland).

File: SUSTAIN2.QVN

Model: EFFECTIVE = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + OWNERS + OUTCOME

Outputs Minimized: 1

Method: Quine-McCluskey

local overall RECREAT nature amenity TRAFFIC OWNERS outcome +  
 LOCAL recreat amenity TRAFFIC OUTCOME +  
 LOCAL amenity TRAFFIC OWNERS OUTCOME +  
 LOCAL culture TRAFFIC OWNERS OUTCOME

#### 6.2.1.1 Effective use of land in regional plans

When the Building Act was in force, there were no provisions on the effective use of land. According to the Building Act "...[a]n eye should also be kept on the economy of land use..." (BA, §22.2), which is, however, interpreted to mean "...economic consequences of the plan's implementation..." (BD, §18.2). A regional and community structure appropriate for the region is mentioned in the Land Use and Building Act (LUBA, §28.3 item 1) as a factor affecting the content of regional plans. Because the issue was not regulated in the previous Building Act, the research material has no cases on the effective use of land in regional plans.

#### 6.2.1.2 Effective use of land in master plans

The Building Act provision stating that the economy of land use should be promoted (BA, §22.2) also applies to master plans (BA, §29.1). According to the Land Use and Building Act, the economy of the functionality, economy and ecological sustainability of the community structure should also be taken into account in master planning (LUBA, §39.2 item 1).

There is one attribute combination for master plans ['EFFECTIVE = local overall (RECREAT nature amenity TRAFFIC OWNERS outcome)'], which implies that master plans have been overturned when the decisions increased the effective use of land even though recreational values were protected whereas nature and amenity values were ignored and the decisions caused inconvenience to landowners. It is based directly on the decision KHO 1993 A 40, which was described in connection with nature conservation in master plans. The Supreme Administrative Court overturned the master plan decisions of a county council and a municipal council because the land use was too effective in the interest of requirements on pleasant surroundings and environmental consequences, and the plan was not considered to be in accordance with sustainable development. The land had been used for farming, forestry and farm-based tourism. The plan was revised to allow more effective use of the land for summer cottages, tourist services and business. Besides the too effective use of land which was mentioned in the decision, also the inconvenience it meant to landowners was an additional reason for overturning the plan.

#### 6.2.1.3 Effective use of land in local plans

There are no provisions on the effective use of land in local plans. The Building Act stipulated, however, that the land in local plans should be utilized in a practical way and the costs of implementing the local plan should not become a strain (BA, §34.1). In spite of the lack of provisions, local plans have involved the decisions in which effective use of land has been brought up in the interest weighing.

Local plans have been overturned even though they did not increase the effective use of land, and even though health values were taken into consideration, if amenity values were ignored ['effective = LOCAL (HEALTH amenity outcome)']. Local plans have been ratified if they did not increase the effective use of land or traffic and protected recreational values, provided that the decisions did not cause inconvenience to landowners. Local plans have also been ratified when they did not increase the effective use of land or traffic, if both cultural and amenity values were also protected. The third configuration states that local plans have been ratified when they did not increase the effective use of land or cause inconvenience to landowners, and if amenity values were upheld. ['effective = LOCAL

(RECREAT traffic owners OUTCOME) + (CULTURE AMENITY traffic OUTCOME) + (AMENITY traffic owners OUTCOME)']

The research material contains the following local plan decisions that did not increase the effective use of land: KHO 1993 A 37 and KHO 1995 A 38 (described in connection with natural values in local plans); KHO 1986 T 2667 (described in connection with cultural values in local plans); KHO 1981 A II 48 and KHO 1983 A II 59 (described in connection with amenity values in local plans); and with the Supreme Administrative Court decision KHO 1993 A 48 (described in chapter 5.2.1.3. on protection of recreational values in local plans).

In these decisions, the interests that have been weighed in connection with the assessment on increased effective use of land, have been nature values, or amenity values or both, and occasionally also cultural and recreational values. The configurations are not directly based on the cases, but are the result of both Mill's method of agreement<sup>116</sup> and the indirect method of difference. For instance, attributes for traffic and health were not included in the original cases, but are the result of applying Mill's indirect method of difference on positive cases, i.e. cases which increased the effective use of land.

Local plans increasing the effective use of land have been ratified even though recreational and amenity values were not protected or when recreational and cultural values were not protected even though that the decision caused inconvenience to landowners. Local plans increasing the effective use of land have also been ratified even though amenity or cultural values were not protected and even though the decision increased traffic and caused inconvenience to landowners. ['EFFECTIVE = LOCAL OUTCOME (recreat amenity) + (recreat culture OWNERS) + (amenity TRAFFIC OWNERS) + (culture TRAFFIC OWNERS)'].

The attribute combinations are based on the following decisions: KHO 1997 145 (described in connection with increased traffic in local plans); and KHO 1987 A 45

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<sup>116</sup> The prime implicants, after applying Mill's method of agreement, are 'effective = DECISION (amenity outcome + CULTURE AMENITY OUTCOME + AMENITY owners OUTCOME + RECREATIONAL owners OUTCOME)'.

(described in connection with health values in local plans).<sup>117</sup> The original cases include attributes for amenity, health and traffic, which are weighed against each other together with the attribute for the increase in the effective use of land. Even the configurations for cases which have been judged to increase the effective use of land are not based directly on the original cases<sup>118</sup>, but are the result of applying Mill's indirect method of difference. Here, the balancing of interests shows us that recreational, cultural and amenity values are interpreted as having less weight than the need to use land more effectively.

### 6.2.2 Denmark

The research material only contains cases on decisions increasing the effective use of land.

**Table 54.** Minimized truth table for the attribute *increasing effective use of land* (Denmark).

File: SUSTAIN4.QVN

Model: EFFECTIVE = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + OWNERS + OUTCOME

Outputs Minimized: 1

Method: Quine-McCluskey (Minimal)

LOCAL amenity outcome +  
 local overall recreat OUTCOME +  
 local overall nature amenity outcome +  
 LOCAL conserv recreat nature outcome

#### 6.2.2.1 Effective use of land in regional plans

There are no provisions or cases on regulating the effective use of land in regional or master plans.<sup>119</sup>

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<sup>117</sup> Decisions KHO 1985 A II 132, 1977 T 2068 and 1976 T 2574 were previously eliminated from the research material as misleading, and are thus not included in the analysis, even though they include values pertaining to the effective use of land.

<sup>118</sup> Prime implicants that directly derive from the original cases are 'EFFECTIVE = DECISION (health amenity OUTCOME + TRAFFIC OUTCOME)'.

<sup>119</sup> There is, however, a case ruling against splintering dwelling in rural areas. The Nature Protection Board of Appeal (NKNO 115/1996) ruled against allowing construction of new buildings in an unbuilt area. The plot was situated 400 meters from the village and 50 meters from a nature conservation area. In the regional plan,

### 6.2.2.2 Effective use of land in master plans

In order to avoid spreading of the community structure, the reservations of the reserved areas that have not been put to use should be cancelled when master plans are revised (PA, §11a.2). Master plans that have increased the effective use of land have been ratified even though recreational values were not taken into consideration, or they have been overturned when nature and amenity values have not been protected [ $\text{'EFFECTIVE} = \text{local overall (recreat OUTCOME)} + (\text{nature amenity outcome})$ ']. The attribute combinations are based directly on two decisions: NKNO 82/1995, which was described in connection with nature in master plans; and NKNO 24/1994, which was described in connection with recreational values in master plans. In these decisions, the effective use of land does not have a decisive role, but it is a consequence of the intended construction in an area close to the shore, which was protected, or of construction intended for a park in the city centre, which was allowed (votes 5–5). The interest weighing in these decisions also shows that recreational values, nature and amenity values are often weighed against the effective use of land.

### 6.2.2.3 Effective use of land in local plans

Local plans may include provisions “that regulate the density of residential housing” (PA, §15.2 item 7). In Denmark, local plans that increased the effective use of land have been overturned if amenity values were not protected or if the area was designated as a national park or strict nature reserve and recreational and natural values were not protected [ $\text{'EFFECTIVE} = \text{LOCAL outcome (amenity)} + (\text{conserv recreat Nature})$ ']. The first prime implicant is based directly on decisions NKNO 107/1996 and 131/1997, which were described in connection with amenity values in local plans; and the second prime implicant on the decision NKNO 23/1994, which was described in connection with natural values in local plans. In arriving at these decisions, amenity values, recreational values and natural

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the area was marked for nature conservation and agriculture. Landscape values have been the issue in another case as well (NKNO 153A/1998), where the construction of windmills in a nature protection area was banned even though the construction would have been in accordance with regional and municipal plans that ordered attention to be given to landscape protection. The plans allowed construction in a wide area provided that it will be evaluated case by case. In this case, the windmills were considered to be very dominating in an area which consisted of significant landscape values. Both decisions were based on the Planning Act §35, which aims to preserve landscape values and recreation values in undeveloped areas.

values were weighed against the effective use of land. In all of the cases, local plan decisions were overturned, not because they increased effective use of land, but because amenity values were not assessed in a summer cottage area (NKNO 107/1996), or because of the height of a building in a coastal area in urban zone (NKNO 131/1997) or because of aims of nature conservation on a strict nature reserve (NKNO 23/1994).

### 6.3 Landowners' rights

Expectations or inconvenience to landowners is taken into consideration in various ways, depending on the plan. Both in Finland and in Denmark, landowners' rights are protected by the Constitution (PL §15<sup>120</sup>, GL §73), but can be restricted by law. In Finland, when a regional plan or a master plan is drafted or amended an eye should be kept on ensuring that implementation of the plan does not cause landowners unreasonable inconvenience (BA, §22.2, §29). In local plans, attention must be paid to the prevailing land ownership situation, if possible (BA, §34). The corresponding regulations are included in the Land Use and Building Act (§23.4, §39.4, §54.3). In Denmark, land ownership is not included in planning premises, but landowners are entitled to compensation if, owing to master or local plans, the lot cannot be used in an economically reasonable way in accordance with the actual use of neighbouring properties (PA, §48.3).

The research material contains values for the attribute describing the inconvenience to landowners only concerning Finland.

#### 6.3.1. Finland

The research material concerning Finland includes cases that have caused inconvenience to landowners and cases in which it was judged that unreasonable inconvenience was not caused. The following table shows configurations which imply that landowners have not suffered unreasonable inconvenience.

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<sup>120</sup> §6 of the Constitution of Finland that was in force until 1 March 2000.

**Table 55.** Minimized truth table for the attribute *doesn't cause inconvenience to landowners* (Finland).

File: SUSTAIN2.QVN

Model: OWNERS = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OUTCOME

Outputs Minimized: 0

Method: Quine-McCluskey

LOCAL RECREAT effective OUTCOME +  
LOCAL AMENITY effective OUTCOME +  
local OVERALL RECREAT nature OUTCOME

There are also two configurations for master plans in which landowners were judged to have suffered unreasonable inconvenience.

**Table 56.** Minimized truth table for the attribute *causes inconvenience to landowners* (Finland).

File: SUSTAIN2.QVN

Model: OWNERS = LOCAL + OVERALL + CONSERV + RECREAT + NATURE + CULTURE + HEALTH + AMENITY + WATER + TRAFFIC + EFFECTIVE + OUTCOME

Outputs Minimized: 1

Method: Quine-McCluskey

local overall RECREAT nature amenity TRAFFIC EFFECTIVE outcome +  
local overall CONSERV Nature outcome

#### 6.3.1.1. Inconvenience to landowners in regional plans

The regulations of the Building Act stipulate that overall plans should "not cause landowners unreasonable inconvenience" (BA, §22.2).

Regional plans have been ratified when the decision did not cause inconvenience to landowners and recreational values were protected even though natural values were not taken into consideration ['owners = local OVERALL (RECREAT nature OUTCOME)']. The attribute combination is based directly on the only Supreme Administrative Court decision included in the research material and dealing with landowner's rights (KHO 1977 A II 50). It describes the interest balancing between inconvenience to landowners and



recreational values in regional plans. The interest weighing considered landowners rights to use the area for their own recreation against the interests of the municipality to extend areas for public recreation and tourism. In this case, sufficient amounts of land needed for future recreational use and tourism was reserved in the regional plan while landowners were not considered to suffer unreasonable inconvenience (PA §22.2).

#### 6.3.1.2. Inconvenience to landowners in master plans

The same regulations as for regional plans are also applied to master plans. Master plans have been overturned when the decision caused inconvenience to landowners and increased traffic and the effective use of land and ignored nature and amenity values even though recreational values were protected. The second attribute combination in which master plans caused inconvenience to landowners in areas covered by a nature conservation programme, when natural values were not protected, concerns master plans that have also been overturned. ['OWNERS = local overall outcome (RECREAT nature amenity TRAFFIC EFFECTIVE) + (CONSERV Nature)']

The attribute combinations are based directly on decisions KHO 1997 T 2532 and KHO 1988 A 57, which were described in connection with natural values in master plans; and KHO 1993 A 40, which was described in connection with recreational values in master plans. Nature values and amenity values seem to have been weighed together with inconvenience to landowners against recreational values, and have caused master plans to be overturned. Conserved areas that were completely undeveloped could not be left out of a master plan even though conservation would mean compensations to landowners (KHO 1997 T 2532). On the other hand when surroundings were not under conservation the area could not be protected in a master plan (KHO 1988 A 57). Placing of business operations and traffic areas on a farm engaged in agriculture and forestry was considered to be unreasonable to the landowners (KHO 1993 A 40).

### 6.3.1.3. Inconvenience to landowners in local plans

According to the Building Act, no unreasonable restrictions should be “placed on private landowners that can be avoided without essentially overriding the demands made of the [local] plan” (BA, §34.1). We have only attribute combinations concerning local plans that have been ratified when the decision did not cause inconvenience to landowners, because the research material did not contain any decisions on local plans that would have caused unreasonable inconvenience to landowners. At the same time the decision did not increase the effective use of land and protected recreational or amenity values [‘owner = LOCAL OUTCOME (RECREAT effective) + (AMENITY effective)’]. The attribute combinations are based on decisions KHO 1993 A 48, which was described in connection with recreational values in local plans; and KHO 1983 A II 59, which was described in connection with amenity values in local plans.

After applying Mill’s method of agreement and producing prime implicants for the original cases, we can assume that ignored amenity values have no effect on the interest weighing, contradictory to what the case KHO 1993 A 48 implies, when recreational values were protected and the decision didn’t cause inconvenience to landowners or increase the effective use of land. The second configuration is based directly on the decision 1983 A II 59, which gave amenity values the decisive role when the decision didn’t increase the effective use of land or cause inconvenience to landowners.

### 6.3.2. Denmark

There are no sentences for the attribute ‘inconvenience to landowners’ in Denmark. We can see from the raw data matrix that the research material does not include any values for the attribute ‘inconvenience to landowners’ (Table 2). There are neither any provisions regulating the landowners’ right in the content of plans. However, if a local plan “reserves a property or part of it for public use, the owner may demand that the municipality takes over the property and pays compensation”. The municipality is required to do this “if the particular lot cannot be used in an economically reasonable way in accordance with the actual use of neighbouring properties”. (PA, §48)

#### 6.4 Summary of results on location of activities as part of sustainable land use

Reducing the need for traffic has not been an issue neither in provisions nor in cases concerning land use planning except for placement of large retail shops. According to the Building Act in Finland, there were no provisions implying the need to reduce traffic in land use planning. The contemporary Land Use and Building Act tackles the problem indirectly by regulating that a local plan may prevent or limitate harmful environmental impacts, and ensure the availability of retail services. In Denmark, traffic growth is dealt with by regulating that “planning shall promote a societally sustainable structure of retail trade that limits the distance people need to transport themselves in order to shop”.

Effective use of land is desired in urban areas as part of sustainable land use. In costal areas and other areas reserved for recreation and tourism height of buildings and dense construction are however considered to be against sustainable land use because of landscape and amenity values.

Landownership has been one aspect in location of activities that has to be considered in land use planning. Because of equity of landowners no landowner should suffer from unreasonable inconvenience compared to other landowners; otherwise they are entitled to compensation.

## 7 INTERPRETING THE RESULTS

The results depend on the representativeness of the cases included in the research material, on the accuracy of the attributes chosen, and on the deliberations made during the research process. On the other hand, QCA points out possible contradictions in cases and can thus draw attention to factors that were overlooked in the early stages of the research. The results may be interpreted as *explanations* of why something occurs. I chose to use qualitative comparative analysis in order to gain an *understanding* of different combinations of regulatory aspects linked with different aspects of sustainable development in land use planning and to determine the interest weighing done on the basis of the regulations.

In this research it has been important to separate the two countries being compared, to be able to draw conclusions solely concerning either Finland or Denmark. If a truth table is designed separately for both countries being compared, then a minimized truth table will give a configuration of attributes for the outcome sustainable development in each country. The separate files on each country need to be combined in order to reveal similarities between the two countries. An intersection between the truth tables of the two countries will show the similarities pertaining to the legal regulation of sustainable development in Finland and in Denmark.

### 7.1 Conclusions on the Use of QCA in Comparative Law

Mill's method of agreement, which has been applied to generate prime implicants based on the attribute combinations present and absent in the cases, has proved to be useful in analysing court decisions when there are a minimum of two cases included in the requested outcome. Because regional, master and local plans differ in content and therefore the interest weighing done for different types of plans is dissimilar, the decisions on different types of plans have been kept apart. This has brought about the requirement of several cases for different types of plans. Even though QCA is based mainly on qualitative research methods, and thus works with a few cases, attention should be paid to the extent of the research material. In this study, the lack of data on different kinds of overall plans

has affected the usefulness of qualitative comparative analysis in examining overall plans. Some of the features of the analysis could not be applied because Mill's method of agreement requires several cases before the prime implicants yielding more information about the cases than is included in the form of attribute combinations for one case can be produced. With regard to local plans, Mill's method of agreement produced more information than just configurations of the original cases. The logic for comparing sets of attributes and for excluding attributes that seem to be irrelevant for the outcome is useful in interpreting the cases. It focuses on the essential aspects of interest weighing pertaining to the decisions. It can, however, be misleading if the prime implicants accepted mechanically, because the most minimal results sometimes involve the loss of information. The deliberation on whether to accept the suggested result or not requires analysis of the cases and other legal sources.

Since QCA applies De Morgan's Law and thus extends the information from positive cases by adding the information from negative cases and vice versa, attention should be paid to whether the attributes are sufficient conditions to overturn the decisions. If other attributes are attached when coding the cases, using de Morgan's Law leads to the assumption that any of these attributes (with opposite value than in the original positive case) has the effect to overturn the decision.

Care should also be taken to include both positive and negative cases for different kinds of attributes and plans, because Mill's indirect method of difference also requires negative cases to be able to extend the information deduced on different configurations obtained from a positive or negative outcome. In other words, even though one Supreme Administrative Court ruling might be sufficient in Finland to show how law is interpreted under certain circumstances, in order to be able to get the most out of analysing cases with QCA, preferably both positive and negative cases should be included in the research material. The logic underlying Mill's indirect method of difference applies De Morgan's Law, which indicates that information on negative cases can be utilized to add information on positive cases and vice versa. This has usually proved to be quite acceptable in analysing court cases, but it can't be utilized mechanically, either. In some cases, when the decision has been exceptional and has included information that could not be attained from

the defined attributes, the use of Mill's indirect method of difference has provided an interpretation that was rejected. These situations can, however, be very useful in the analysis, because they emphasize the exceptionality of the case.

The results of a QCA analysis are limited to attribute combinations included in the analysis. The missing combinations can, however, be formulated by constructing a Boolean minimization of the equation, which includes all existing attribute combinations, with both 'outcome' 1 and 0. This equation for the attribute combinations that do not exist in the research material is formulated by using De Morgan's Law. Together with the equation for existing combinations of attributes, these two equations establish the substantive boundaries of the analysis of the research topic. This is done after conducting an analysis with QCA, which allows maximum complexity. On the basis of theory or logical thinking, the researcher has to decide whether the equation for the non-existing combinations for attributes is assumed to represent 'outcome' 1 or 0. (Ragin 1987: 105–109) This possibility was not utilized in the present study because the interest weighing in the cases is so vaguely regulated, if it is regulated at all, and it does not provide the basis for logical assumptions concerning the outcome of hypothetical configurations. The other reason for not using logically possible but nonexistent sets of attributes is that now all the assumptions of the analysis are based on aspects drawn from the cases.

The Boolean algebra used in the qualitative comparative analysis, the Boolean addition and multiplication, which imply the logical AND and the logical OR, have also proved to be functional in this research. Boolean addition, which implies that there may be several combinations of attributes leading to the same outcome, is logically quite acceptable and has proved to be the case in most of the equations produced. The interest weighing done in planning decisions inherently includes the possibility of several different attribute combinations. Boolean multiplication, which implies the intersection of different attributes, illustrates combinations of attributes that are present and absent. Boolean multiplication is combines the relevant attributes and their values together. It does not stick to one case, but combines information from all the relevant cases. The researcher can define the relevant decisions case by case. Because of the ability to combine information from a variety cases without prejudice, the use of QCA often extends the information gathered manually by

interpreting court decisions. The intersection of different functions reveals the similarities of the items being compared. This has proved to be useful when comparing the two countries that I have chosen to keep in separate files.

The feature that attributes, in this case different aspects of sustainable development regulated by law, are analysed within the context of all conditions, whether they are present or absent in the case concerned, is very suitable in analysing how provisions are interpreted in court decisions. Even when information from selected cases is combined, in QCA the information linked with specific cases is not lost. When analysing court decisions, it is essential to pay attention to all features of the cases. In QCA, as much attention is paid to features that are present and to those that are absent, an issue which might be forgotten otherwise in these analyses.

Selecting attributes and coding cases are essential for the analysis. Defining background attributes and attributes related to the research topic are crucial. Relevant background attributes allow different kinds of cases to be kept separate. In this research, it was necessary to keep regional, master and local plans apart because the plans were regulated differently. Because there were three types of plans we needed to use two attributes (local and overall) to separate them. To keep down the number of attributes (only 12 were allowed by the software) conservation areas were coded as only one attribute even though there are two types of protected areas with separate regulations. This proved to be not a very good idea because the presence of the attribute was coded to be an area belonging to a nature conservation programme while the absence of the attribute was coded to apply to areas founded as national parks or strict nature reserves. This seemed reasonable because decisions covered by other areas could then be left not coded for this attribute. This may have been misleading because it was interpreted by the software to mean that these decisions could mean either belonging to a protection programme or establishment as a national park or strict nature reserve. This was not a problem when interpreting other attributes because they apply to only one condition, e.g. natural values being protected or not being protected. When natural values were not mentioned in the case, it has been coded as don't care (-), which implies that it may be present or absent, but either way it has no impact on the outcome. The reason that the outcome variable has to be coded as present or

absent (Ragin 1987: 87–88) is not a problem when analysing court decisions with QCA because the decisions are either ratified or overturned. Some misinterpretation may occur with regard to cases that are overturned for reasons other than those of interest in the research. Such cases can either be excluded from the data or coded as ratified for the aspect considered in the study.

One feature that should not be overlooked is that the analysis stresses similarities rather than differences. To be able to recognize the differences one has to compare different tables, e.g. in this study tables on upheld plans and tables on overturned plans.

The QCA analysis reveals cases where interest weighing lacks a base in law. In both countries, decisions that the reduction of park areas in city centres were majority rulings where needs for construction were balanced against needs for recreation and conservation. The need for construction was assessed as being more important. The inclusion of cases like this would lead to an unsustainable logic when revised according to De Morgan's Law; thus, these cases can either be excluded from the outcome (after paying attention to them in the argumentation) or to find a rule in the decisions. In the present situation, the rule might have been to add 'city centre' as one of the attributes, but this would imply that parks and recreation areas in city centres would as a rule be reduced when there are needs to expand other functions located next to park areas. This subject would need more research, especially research that would take into account the new regulations on national parks in urban areas, the aim of which is to protect and maintain them among other parks and recreation areas (LUBA, §68).

The QCA has proved to be a helpful tool in analysing the interest weighing in judicial decision-making. It leads to a systematic analysis of the decisions of interest, but in no way does it perform the deliberation included in the interpretation. It can be quite a time-consuming process, too, especially if the data need to be revised in the middle of the research work because of an inconsistency that the analysis has revealed or because of the wish to add data. Time is required because revision of the raw data affects all the tables in the research. This is in fact, the logic behind qualitative comparative analysis: Ideas and evidence interact, and not only do ideas affect the way evidence is analysed but also



evidence inspires ideas leading to revision of the analysis.

## 7.2 Conclusions on sustainable land use in Finland and Denmark

The aims included in sustainable development in land use can be contradictory. Therefore rules for weighing are important in regulating sustainable land use. The weighing of different interests affecting land use requires that the interests are recognised in the legislation. Moreover, the aims of regulation become important when deciding which interest should be given the most weight in concrete cases.

Land use is often regulated by special legislation which stipulates the use of land for different purposes; for instance, conservation, the construction of roads, exploitation of raw materials or use for polluting activities. Regulations on land use planning are meant to control the co-ordination and location of these land use purposes in a way that promotes sustainable development. Direct legal regulations aiming at sustainable use of land are very rare.

Different aspects of sustainable land use planning are nature conservation and the protection of cultural values, especially open shores and undeveloped areas, the placement of human activities so as to reduce traffic (especially the location of commercial services) and the quality of human environment, including adequacy for health and amenity values.

Both the Nature Protection Board of Appeal of Denmark and the Supreme Administrative Court of Finland have taken into consideration only interests that have been stipulated in legislation. The regulation of sustainable development in environmental law would be more effective if a principle of sustainable development were also applied<sup>121</sup>. This would make it possible also to take into consideration features of sustainable development that haven't been mentioned in the legislation. The Supreme Administrative Court of Finland has taken in a case concerning the placement of a shopping centre outside the city centre (KHO 1997 145) a clear stand against the principle of sustainable development being

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<sup>121</sup> See about the principle of legality vs. the principle of good environmental circumstances; Backer 1996: 162 and its footnote no 6.

currently a source of law in Finland. In this case, the Supreme Administrative Court decided that increased traffic would not be taken into consideration because it was not against the criteria of sustainable development prescribed in the Building Act. In Denmark, the Nature Protection Board of Appeal decided that they could not prevent the extension of a pig house, even though it posed a threat to a drinking water area because there were no provisions for prohibiting the extension (NKNO 168/1998). The extension could have been interpreted to be a threat to the adequacy of human health, and therefore against the principle of sustainable development, if sustainable development were interpreted as a legal principle and would thus be directly applicable.

Because the social reality is so complex and is constantly changing, and because different interests are often in conflict, it is impossible to give exact rules as to what kinds of decisions promote sustainable development in land use planning. The state of the environment, however, is clearly unsustainable, and something needs to be done in order to redirect the development. The decision-making authorities, which should promote public interests and should balance them with private interests, are facing major difficulties because of the lack of rules to be used in the weighing process. This study clearly shows that there can be no rules for weighing that would apply to all kinds of decision-making pertaining to land use planning, but that there is a need for different rules to be used in the weighing process when balancing different interests. In fact, there are already some developments pointing in this direction.

Physical planning legislation aims to ensure that land use is not in conflict with nature conservation. Marking an area as a nature conservation area gives the protection of nature a high priority, but there will be interest weighing in concrete cases where the interest to use land, the interest to protect nature and the effect of the use of land on nature that is under conservation will be weighed against each other. Designation of the Natura 2000 Ecological Network is widely misunderstood; it does not prohibit development in the areas concerned, but it can be interpreted as a weighing rule stating that when using land in these areas, natural values should be given extra weight. Nature conservation programmes and the designation of national parks and strict nature reserves also involve the same weighing

rule. Marking the areas for conservation in regional plans in advance gives the municipal authorities a clearer picture of the priorities in the area.

In coastal areas, nature conservation and protection of the landscape have been given high priority, especially outside urban areas. In Finland, some shorelines have been protected by the Government's decision in principle. In other shore areas, too, land use must be based on plans. In Denmark, all shores outside urban areas have been protected against all use except plants and facilities that require a coastal location; other construction should be located behind existing buildings. In urban zones nature conservation, protection of the landscape and public access to coasts should be taken into consideration.

In the placement of different functions, the effect on traffic is essential. The provisions regulating traffic aim only at meeting the increasing demands of traffic, but not at minimizing the need for traffic. In Denmark, public transport should be promoted in metropolitan area. In Finland, an administrative court of appeal has interpreted the demands for traffic to mean public transport as well. Efforts to cut down the need for traffic by regulating the placement of different functions has not even been included as a factor in the content of plans, not to mention weighing rules for steering traffic to areas where it would be the least disturbing. This may be possible in the future, because of the mapping of the remaining quiet areas. Regulation of the placement of large retail shops outside city centres, which generates much traffic, is the first attempt at not just meeting traffic demands but also at reducing the need for traffic. In Denmark, retail shops should be accessible by all means of transport. They should, as a rule, be located in the city centre. In Finland, the placement of large shops must be included in local plans in the future. Master and local plans should be drawn in a way that takes into consideration the accessibility of services.

Effective use of land can be in conflict with the amenity of the human surroundings. However, the reduction of traffic and nature conservation require comprehensive planning of land use. Different uses of land, e.g. for agriculture or urban centre activities, require different scales of effectiveness in land use. Densely built areas covered by municipal engineering, public transport and services –effective use of land – should be promoted.

There are no weighing rules to guide planning in this direction if we don't take into account the provisions to revise plans so that area reservations which have become unnecessary are cancelled. It is usually in the interest of municipalities to use these areas effectively. In Denmark, division of the land into urban, rural and summer cottage zones may also be seen as a weighing rule promoting the effective use of land only in urban zones. Area reservations that are oversized splinter the community structure and therefore promote ineffective use of land. This means that deserted areas and brown fields should be planned for use, but without diminishing parks and other recreational areas or the amenity of the area.

Effective land use requires that parks, recreation areas and the townscape are given high priority. This study shows that even if parks and recreation areas are mentioned as criteria in the content of land use plans, the lack of weighing rules has led to reductions in these areas when effective use of land has been the goal. The provisions on national urban parks and special areas for protection of the landscape are clearly inadequate weighing rules for preventing the reduction of green areas in population centres. The intersection of the land use plans in the comparison countries illustrates that reduction of green areas has been an issue in both countries.

In Denmark, landscape values should be protected in regional plans. Urban environments should be protected by master plans, and both landscapes and urban environments should be protected in local plans. Landscape values have been weighed against the construction of windmills and the use of natural resources. Decisive factors have been how dominating the construction was or how important the use of natural resources were. In Finland amenity, aesthetic and cultural values should be taken into consideration in local plans. Buildings not affecting townscape could be torn down, but a hill that was valuable to the landscape was protected.

Effective land use, which aims at protecting undeveloped areas – and in this way protecting nature as well – can be in conflict with the quality of the human environment. When regulating the adequacy of the environment for health, there are regulations in Denmark stating that no new construction is allowed if buildings may be exposed to

collapse or, flood or if other risk may be posed to health. The Planning Act also has provisions about land use in areas important for drinking water. In Finland, the right to a clean and healthy environment is based on the Constitution. According to the Building Act, local plans shall be drawn in a way that is suitable for health. No dense use of land is allowed in an area that is not adequate for health.

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## APPENDIX

## ATTRIBUTES

**Background attributes:**

Local plan      1=local plan  
                   0=overall plan

Overall plan    1=regional plan  
                   0=master plan  
                   --=local plan

**Conservation**

1=the area is included in a conservation programme (e.g. for the shore or birds, etc.)  
 0=the area is established as a national park or strict nature reserve  
 --=none

**Protected values:**

Recreational 1=recreational values are protected in the decision  
                   0=recreational values are not protected in the decision  
                   --=recreational values are not mentioned in the decision

Nature        1=natural values are protected in the decision  
                   0=natural values are not protected in the decision  
                   --=natural values are not mentioned in the decision

Culture       1=cultural values are protected in the decision  
                   0=cultural values are not protected in the decision  
                   --=cultural values are not mentioned in the decision

**Human environment:**

Health        1=health values are protected in the decision  
                   0=health values are not protected in the decision  
                   --=health values are not mentioned in the decision

Amenity      1=amenity values are protected in the decision  
                   0=amenity values are not protected in the decision  
                   --=amenity values are not mentioned in the decision

Water supplies 1=water supplies are protected in the decision  
                   0=water supplies are not protected in the decision  
                   --=water supplies are not mentioned in the decision

**Community structure:**

Traffic	1=the decision increases traffic in the area 0=the decision does not increase traffic in the area - =traffic is not mentioned in the decision
Effective use of land	1=the decision increases the effective use of land in the area 0=the decision does not increase the effective use of land in the area - =the effective use of land is not mentioned in the decision
Land-owners	1=the decision causes inconvenience to landowners 0=the decision doesn't cause inconvenience to landowners - =inconvenience to landowners is not mentioned

**Outcome**

1=sustainable land use (the decision is ratified)
0=not sustainable land use (the decision is overturned)