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NKJ-report

Maintenance of the cultural landscape as a resource for sustainable agricultural development

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Title:

NKJ-report: Maintenance of the cultural landscape as a resource for sustainable agricultural development

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Summary:

The Nordic Joint Committee for Agricultural Research (NKJ) promotes and supports cooperation between the Nordic Research Councils. The main goal for NKJ is to support a sustainable agricultural development. In June 2005 NKJ therefore decided to establish a working-group to follow up the Aukureyri declaration. This declaration focuses on the future tasks for Nordic agriculture and on the cultural landscape as a resource especially with regard to rural development. The working-group has given an account of Nordic research regarding use of the cultural landscape as a resource for sustainable agricultural development. Based on this the working-group give attention to needs for research and give recommendations for future Nordic agricultural research. Furthermore the working-group has evaluated different kinds of research cooperation.

Sammendrag:

Nordisk kontaktorgan for jordbruksforskning (NKJ) vedtok i juni 2005 å nedsette en arbeidsgruppe innen området kulturlandskap med formål å utrede status for kulturlandskapsforskningen i Norden med fokus på jordbrukets næringsmessige utnyttelse av arealer. Bakgrunnen for vedtaket var Akureyri-deklarasjonen om jordbrukets framtidige roller og kulturlandskapet som ressurs, ikke minst i sammenheng med bygdeutvikling. Arbeidsgruppen har utarbeidet en oversikt over pågående forskning i de nordiske landene og kommet med anbefalinger om hvilke forskningsoppgaver som er mest aktuelle samt foretatt en vurdering av ulike samarbeidsformer.

Land/county:	Norway, Sweden, Denmark, Finland and Iceland

Responsible leader	Project leader
Erik Revdal	Ann Norderhaug

Foreword

The Nordic Joint Committee for Agricultural Research (NKJ) promotes and supports cooperation between the Nordic Research Councils. The main goal for NKJ is to support a sustainable agricultural development. In June 2005 NKJ therefore decided to establish a working-group to follow up the Aukureyri declaration. This declaration focuses on the future tasks for Nordic agriculture and on the cultural landscape as a resource especially with regard to rural development (Appendix 1). The working-group should give an account of Nordic research regarding use of the cultural landscape as a resource for sustainable agricultural development. Based on this the working-group should draw attention to needs for research and give recommendations for future Nordic agricultural research. Furthermore the working-group should evaluate different kinds of research cooperation.

The working-group consisted of:
Ann Norderhaug, Head of Cultural landscape research, the Norwegian Institute for Agricultural and Environmental Research (chairman)
Sirpa Kurppa, Professor, MTT Agrifood Research Finland
John Hermansen, Head of research unit, Danish Institute of Agricultural Sciences
Anna Gudrun Thorhallsdottir, Professor, Agricultural University of Iceland
Lena Bergils, Head of Business, Leader+ : Intryck Hälsingland, Sweden
Line Rosef, Researcher, the Norwegian Institute for Agricultural and Environmental Research, has been secretary for the group.

All members of the working group have participated actively in the preparation of the report.

In addition Eivor Bucht, Professor, Swedish University of Agricultural Sciences, participated in one of the working-group meetings

The working-group wants to thank all who have contributed to this report!

Ann Norderhaug
(chairman)

Line Rosef
(secretary)

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Nordisk kontaktorgan for jordbruksforskning (NKJ) vedtok i juni 2005 å nedsette en arbeidsgruppe innen området kulturlandskap med formål å utrede status for kulturlandskapsforskningen i Norden med fokus på jordbrukets næringsmessige utnyttelse av arealer. Bakgrunnen for vedtaket var Akureyri-deklarasjonen om jordbrukets framtidige roller og kulturlandskapet som ressurs, ikke minst i sammenheng med bygdeutvikling. Arbeidsgruppen fikk følgende sammensetning:

Forskningssjef Ann Norderhaug, Bioforsk, Norge (leder av arbeidsgruppa)
Professor Sirpa Kurppa, MTT, Miljøledningen, Finland
Forskningsleder John Hermansen, Danmarks JordbrugsForskning
Professor Anna Gudrun Thorhallsdottir, Islands lantbruksuniversitet
Verksamhetsledare Lena Bergils, IH-kansliet, Leader+ Intryck Hälsingland, Sverige

I tillegg har professor Eivor Bucht, Institutionen för landskapsplanering, Alnarp, deltatt på ett møte.

Bioforsk v/Line Rosef har fungert som sekretær for arbeidsgruppen.

Arbeidsgruppen skulle utarbeide en oversikt over pågående forskning i de nordiske landene og komme med anbefalinger om hvilke forskningsoppgaver som er mest aktuelle samt foreta en vurdering av ulike samarbeidsformer.

Arbeidsgruppen har hatt to møter (eller snarere workshops), 8. desember 2005 i Oslo samt 1.-2. mars 2006 i Sigtuna. Arbeidet har videre basert seg på en spørreundersøkelse vedrørende aktuell forskning i de nordiske landene. Et spørreskjema (se vedlegg) ble sendt ut til universiteter, høyskoler, forskningsinstitutter m.v. for å kartlegge aktuell forskning. Svarene har dannet grunnlag for arbeidsgruppens anbefalinger om aktuelle forskningsoppgaver. Arbeidsgruppens medlemmer har alle deltatt i skrivingen av rapporten.

1.2 Bakgrunn og mandat

På det første møtet ble bakgrunnen for oppgaven, arbeidsgruppens mandat samt arbeidsmetoder nærmere drøftet:

Det nordiske landbruket har fått en ny rolle som innebærer at sekundærproduktene (dvs. kulturlandskapet med kulturverdier og biologisk mangfold, økosystemtjenester, resiliens m.v.) på mange måter er like viktige som primærproduktene (dvs. mat, fôr, fiber) og vil bl.a. ha meget stor betydning som grunnlag for næringsutvikling og for framtidig bygdeutvikling.

For at landbruket skal kunne spille den nye rollen og opprettholde kulturlandskapets natur- og kulturverdier samt produsere økosystemtjenester og andre kollektive goder er det nødvendig å ha kunnskap om sammenhengen mellom tradisjonelle driftsmetoder og økosystemer m.v. dvs. å vite hvordan sekundærproduktene ble produsert og opprettholdt.

Det er videre viktig å vite hvordan denne kunnskapen kan implementeres i dagens landbruksproduksjon på en måte som gjør at også dagens landbruk blir i stand til å opprettholde kulturlandskapets mange verdier og andre kollektive goder.

På denne bakgrunn oppfatter arbeidsgruppen sitt mandat på følgende måte:

- synliggjøre det nordiske kulturlandskapets mange verdier og andre kollektive goder
- klargjøre hva som skal til av forskning for å skape forståelse for *hvordan* de ble produsert og opprettholdt over tid

- klargjøre hva som skal til av forskning for at denne kunnskapen skal kunne *implementeres* i dagens landbruksproduksjon på en hensiktsmessig måte
- lage en oversikt over hva som pågår av slik forskning komme med anbefaleringer om hvordan pågående forskning først og fremst bør suppleres
- vurdere hvordan supplerende forskning kan gjennomføres mest hensiktsmessig (samarbeidsformer m.v.)

1.3 Viktige kulturlandskapsverdier

Arbeidsgruppen gir konkrete eksempler på verdier som det vil være viktig å opprettholde hvis kulturlandskapet skal fortsette å være og kunne videreutvikles som en ressurs:

Biologiske verdier/Biologisk mangfold
Kulturlandskapet spiller en meget viktig rolle for det biologiske mangfoldet i de nordiske landene. Biodiversitet er forutsetningen for evolusjon og utvikling. Konvensjonen om biologisk mangfold (1992), Landskapskonvensjonen (2000), det politiske 2010-målet om å stoppe tap av mangfold m.v. pålegger oss derfor et ansvar for å ivareta mangfoldet og landbruket har her en viktig sektorrolle. Dessverre er landbruksutviklingen i Europa i dag en av de største truslene mot det biologiske mangfoldet.

Andre økosystemtjenester og resiliens
Økosystemtjenester (som for eksempel pollinering, opprettholdelse av jordens fertilitet og luftrensing basert på insekters og mikroorganismers aktivitet) er viktige sekundærprodukter i landbruket som sterkt framheves bl.a. i WTO-sammenheng. Biodiversitet spiller en avgjørende rolle for opprettholdelse av økosystemtjenester. I denne sammenheng er det viktig å understreke at forvaltningen av kulturlandskap innebærer en økosystemforvaltning med dimensjoner i tid og rom. Ved utvikling av landbruket og opprettholdelse av kulturlandskapskvaliteter vil det i tillegg være nødvendig å ha kunnskap om øko-sosiale sammenhenger og økosystemenes toleranse/bærekraft (resiliens).

Dyrka jord
Nødvendigheten av å bevare dyrka mark i en verden med både sult og vannmangel bør kanskje spesielt understrekes i Norden der det gjennomgående er god tilgang på vann. I Norge ble også viktigheten av bevaring av dyrka mark understreket i Stortingsmeldingen om biologisk mangfold på lik linje med bevaring av mangfold av arter, vegetasjonstyper og landskap.

Nærmiljøkvaliteter
Kulturlandskapskvaliteter skaper gode nærmiljøer og det finnes eksempler på bygder som har snudd fraflytting til innflytting ved å satse på kulturlandskapet. Dugnad og fellessatsing på kulturlandskapet skaper i tillegg ofte nye sosiale nettverk og engasjement.

Kulturminner
Kulturlandskapet rommer mange typer kulturminner. Fornminner og bygninger er eksempel på kulturminner som er lette å oppfatte. Kulturmiljøene som omgir dem og de strukturelle sammenhengene som århundrers drift har skapt, kan imidlertid være litt vanskeligere å se. Til kulturlandskapet er det også knyttet mange immaterielle kulturminner som stedsnavn, tradisjoner, sagn og kunnskap om gamle driftsformer. Betydningen av slik "taus kunnskap" blir understreket i Konvensjonen om biologisk mangfold.

Opplevelsesverdier
De mange fellesgodene i kulturlandskapet har både enkeltvis og sammen stort potensial som opplevelsesverdier, disse kan utnyttes både av de fastboende og i sammenheng med turisme.

Estetiske verdier
Vakre landskap har stor betydning både som nærmiljø og for turisme. Det tradisjonelle jordbrukets kulturlandskap kjennetegnes generelt av lysåpenhet og stor variasjon. Psykologiske studier viser at mennesker verdsetter denne typen landskap spesielt høyt.

Etiske verdier
Kulturlandskapet er skapt gjennom generasjoners naturressursutnyttelse og arbeid og utgjør en vesentlig del av vår natur- og kulturarv. Dette er med på å gi kulturlandskapet også etiske verdier.

Historien i landskapet
I det nordiske landskapet kan vi fortsatt ved hjelp av struktur, forekomst av kulturminner og spesielle arter eller vegetasjonstyper lese vår historie direkte i landskapet. En slik historisk forankring kan bety mye for bygders og enkeltmenneskers identitet. Historien i landskapet kan iblant også gi forklaringsmodeller for regionens og til og med nasjonens historie.

Sosiale verdier
Kulturlandskapet representerer sosiale verdier i form av bl.a. historiske røtter, identitet, nærmiljøkvaliteter, nettverksbygging ved fellesinnsats, muligheter for undervisning i flere forskjellige fag (historie, etnologi, biologi, friluftsliv m.v.) og kvaliteter som kan brukes i sammenheng med helseprosjekter (som for eksempel det norske "Grønn omsorg"- konseptet og lignende).

Økonomiske verdier
Kulturlandskapsverdiene representerer på mange forskjellige måter også økonomiske verdier. De kan utnyttes for turisme og på den måten utgjøre en viktig økonomisk faktor lokalt, men også regionalt og nasjonalt. Kulturlandskapsverdiene kan også utnyttes ved merkevarebygging bl.a. ved dokumentasjon av de fellesgoder produksjonen av merkevarene resulterer i. Ved bruk av biologisk mangfold (for eksempel artsrike beitemarker) kan i tillegg spesielle kvalitetsvarer produseres (som kjøtt med spesiell smak eller fettsyreinnhold). Indirekte vil sannsynligvis sekundærproduksjon av kulturlandskapskvaliteter bety stadig mer for økonomien i landbruket, ved at de styrker tilliten til det nordiske landbruket og legitimerer økonomiske overføringer.

1.4 Kunnskaps- og forskningsbehov

Hvis disse verdiene skal opprettholdes trengs det kunnskap og forskning innen mange fagfelt og framfor alt tverrvitenskapelig forskning! I dag finnes det egentlig ikke kulturlandskapsforskning. Forskere flest har ofte inngående kunnskap om et relativt snevert område og arbeider mer sjelden med en slik sammenkobling av kunnskap som trengs, hvis kulturlandskapets komplekse natur skal kunne forstås. Det er flere grunner til dette, en viktig grunn er at det er vanskelig å få penger til slik tverrvitenskapelig forskning. En nordisk ramme for kulturlandskapsforskning burde derfor være bra, også fordi sammenlignende studier i flere land kan øke forståelsen. I en slik nordisk kontekst ville det også ligge til rette for å utvikle bra metodikk for tverrfaglig forskning, noe som det er stort behov for. Problemene er ofte de samme i flere land, dvs. at det skulle kunne være stor overførbarhet i nordisk metodeutvikling.

Forvaltning av biologisk mangfold krever som nevnt en økosystemtilnærming. Dette er en tilnærming som nå fokuseres i sammenheng med naturvitenskapelig forskning generelt. Kulturlandskapsøkosystemer er ofte mer kompliserte enn naturlige økosystemer fordi menneskepåvirkning av forskjellig slag her fungerer som økologiske faktorer i tillegg til andre biotiske og abiotiske faktorer. Forvaltning av det biologiske mangfoldet i kulturlandskapet forutsetter også kunnskap om gamle driftsformer, herunder for eksempel detaljstudier av effekter og dynamikk, sammenlignende studier mellom ulike regioner og tidsrom, mellom gamle og nye husdyrraser, indikatorer på god hevd og framfor alt, utvikling av nye driftsformer som tar utgangspunkt i en helhetstenking vedrørende arealbruk og ivaretar det biologiske mangfoldet samtidig som de er økonomisk bærekraftig. Det er i denne sammenheng viktig med praktisk/anvendt forskning og langtidsstudier, noe som det i dag også er vanskelig å få finansiert. For å opprettholde viktige habitater i kulturlandskapet vil det i tillegg være viktig å utvikle kunnskap om genetiske og landskapsøkologiske forhold.

Opprettholdelse av andre typer økosystemtjenester krever også økosystemtilnærming. Kunnskapen om økosystemtjenester og en felles forståelse av begrepet er fortsatt forholdsvis liten. Det trengs derfor utvikling av metoder og indikatorer for å kunne identifisere økosystemtjenester. Dette behovet øker hvis en utvider problemstillingene knyttet til økosystemtjenester til å omfatte resiliens med sine sosio-økologiske sammenhenger og systemer. Intergrated Product Policy (IPP) har blitt utviklet for å integrere miljøhensyn i produksjonsprosesser med bærekraftig utvikling (inkluderende både økologiske, økonomiske, sosiale og kulturelle forhold) som mål. Ecodesign (design for environment) blir i denne sammenheng brukt som metode, men det finnes mange utfordringer hvis ecodesign skal kunne implementeres i landbrukets sekundærproduksjon. Det er behov for å utvikle nye planmodeller og økonomiske modeller som i tillegg til økonomi baseres på empiriske data for flere kulturlandskapsverdier. Det er også viktig å forstå hva som påvirker bondens motivasjon for å trekke

inn kulturlandskaps- og bygdeutviklingsaspekter i gårdens drift.

Ivaretakelse av kulturmiljøer og kulturminneverdier i kulturlandskapet forutsetter dokumentasjon og forskning rettet mot de ulike typene kulturminner. Ellers vil kunnskap om produksjon og opprettholdelse av mange av de ovenfor nevnte verdiene være delvis inkludert i det kunnskaps- og forskningsbehov som nå er nevnt.

For implementering i dagens landbruksproduksjon av kunnskap om hvordan kulturlandskapsverdiene kan opprettholdes, trengs kunnskap om drivkrefter på forskjellige nivåer og om den effekt de får i det fysiske landskapet. Det vil også være viktig å skape forståelse for at innovasjon kan være å ta vare på og utvikle verdiene, ikke bare å ta vare på dem musealt. Kvalitetsforskning på produkter produsert ved bruk av kulturlandskapsverdier kan i denne sammenheng spille en viktig rolle.

1.5 Anbefalinger

For at vi skal kunne opprettholde det nordiske kulturlandskapets kvaliteter som en ressurs for en bærekraftig landbruksutvikling synes behovet for mer helhetlig (holistisk) kunnskap og tverrvitenskapelig (ikke flerfaglig!) forskning å være det største generelle behovet. På bakgrunn av analysen av kunnskapsbehov og pågående forskning ønsker arbeidsgruppen også å understreke behovet for forskning som gjør det mulig å implementere opprettholdelse av kulturlandskapskvaliteter i dagens landbruksdrift ved nye driftsmetoder og hensiktsmessig arealbruk. Forskning vedrørende økosystemtjenester, resiliens og økodesign er hovedutfordringer i denne sammenheng. Parallell og sammenlignende forskning i de ulike nordiske landene der en også utnytter de ulikheter i kunnskap som finnes mellom landene synes å være en samarbeidsform som peker seg ut. I tillegg vil nordiske seminarer og symposier gi muligheter for kunnskapsutveksling og synliggjøring av de ressurser som kulturlandskapet representerer, også for andre enn forskere.

2. Abstract

In June 2005 NKJ decided to establish a working-group to follow up the Aukureyri declaration (2004) (Appendix 1). This declaration focuses on the future tasks for Nordic agriculture and on the cultural landscape as a resource especially with regard to rural development.

The working group should write a report with the aim:

- To highlight the values and qualities of the Nordic cultural landscapes
- To make clear the need for research to create understanding on how these "secondary agricultural products" were produced and maintained over time
- To make clear the need for research to make it possible to implement such knowledge in today's agricultural production in an appropriate way
- To produce a review of this type of research going on today
- To recommend how to best supplement today's research
- To consider how this supplementary research is best carried out (cooperation etc.)

The working-group has paid attention to several secondary products of agriculture that may be as important as the primary products (i.e. food, fodder, fibre):

- Biodiversity and other ecosystem services
- Resilience
- Cultivated land as a resource in the landscape
- Local landscape as living environment
- Cultural monuments and environments
- Experience and recreational values
- Aesthetic values
- Ethical values
- The historical values
- Values for social infrastructure, innovations and welfare
- Values for multifunctional economy

Maintenance of these values and qualities of the Nordic cultural landscapes involves a lot of challenges and we have a need for improved knowledge within several disciplines as well as interdisciplinary. There is, among others, a need for knowledge regarding:

- landscape identity and values: ecological aspects (historical ecology), land use and their relationship with cultural history and geology/geomorphology

- tools for describing and monitoring characteristic features (e.g. cultural history): typology of European landscapes

- public perception and support of inhabitants and users of landscapes

- relationship between human well-being and changes in the landscape/landscape identity

- translation of landscape identity into physical planning and management

We also need indicators for natural and cultural values that together capture the complexities of the ecosystem and the heritage character and yet remain simple enough to be easily and routinely monitored to meet the components of natural and cultural values. Five evaluative dimensions (ecological, productive, economic, social and cultural) should be considered in this connection .

Regarding ecosystem services it will be important to (1) identify the important 'ecosystem service providers'; (2) determine the various aspects of community structure that influence function in real landscapes, especially compensatory community responses that stabilize function, or non-random

extinction sequences that rapidly erode it; (3) assess key environmental factors influencing provision of services, and (4) measure the spatio-temporal scale over which providers and services operate.

Furthermore improved knowledge of traditional farming methods is essential for the maintenance of valuable cultural landscapes.

To produce a review of ongoing research regarding these subjects, a request for information was sent to research institutions across the Nordic countries (see Appendix 2). This survey included:

- research regarding the creation of cultural landscapes and maintenance of its natural and cultural values

- research regarding implementation of maintenance and use of cultural landscape values in the agricultural production of today

Based on a comparison between the knowledge we need to be able to maintain the cultural landscape values (as biodiversity and cultural heritage), and the produced research review, the working group has concluded that there is still a need for research in many different disciplines and especially a need for interdisciplinary research. Complex cultural landscapes can be understood only in an interdisciplinary context.

There is a special need for development of a common understanding of the term ecosystem services, as well as methods and indicators to be able to identify them. This is true also with regard to resilience.

The main need regarding research concerning how to maintain the landscape values, is probably research concerning ecosystem functions, ecosystem services and resilience. Since authentic and well functioning traditional agricultural landscapes are dwindling, it is of high importance to study their ecosystems now and to compare effects of old and new management methods, old and modern farm animal breeds, differences between regions etc. There is also a need for studies of land use changes and management effects on the genetic level of biodiversity, especially with regard to the effects of landscape fragmentation. The need for long-term and practically oriented research must in this connection be underlined. In addition there is a special need for research to identify indicators for "good management".

To implement maintenance of the values in today's agricultural production it is also necessary to develop a more holistic management of cultural landscapes and their values. It is therefore of utmost importance to find new farming practices and management methods taking both sustainable economy and sustainable ecology into account. Key challenges in this connection are ecodesign, ecosystem services and resilience. This kind of research is still in a preliminary phase in the Nordic countries. Improvement of economic and planning models by use of more empirical data, to make them more realistic and reliable, is also a requirement, as is development of indicators for evaluations of policy support, measures etc. Research helping us to understand options and motivations of both farmers and the public, may play a key role for a successful implementation.

With this background, the working group will recommend supplementing of current cultural landscape research first and foremost by research focusing on how maintenance of cultural landscape values can be implemented in farming practices and land use. Ecosystem services, resilience and ecodesign are in this connection key challenges. The working group will furthermore underline a general need for transdisciplinary cultural landscape research to develop a more holistic knowledge, management and administration of the cultural landscapes.

A Nordic approach will strengthen such research since this would make it possible to use the different knowledge existing in the different Nordic countries. The working group would also like to focus on the advantage the possibilities for parallel and comparative research Nordic research projects may give. Seminars and symposia can be used to transfer existing knowledge between the countries. In addition Nordic seminars and symposia may be used to highlight the "resource values" of the cultural landscape and influence options and motivations of farmers and the public regarding maintenance of the values of the Nordic cultural landscape.

3. Introduction

Farming and nature exercise a profound influence over each other. A considerable part of Europe is farmed, and farming has shaped innumerable cultural landscapes and a variety of semi-natural habitats. Due to efficiency in food production, expansion of the European Union (EU), liberalization of the global food trade and the WTO- negotiations, the production of food and the area of cultivated land in Europe may decrease and there is a general trend for unused areas and areas of high-intensity land use to increase at the expense of areas of (traditional) extensive low-intensity land use (e.g. WallisDeVries *et al*. 2002).The speed of the urbanisation process in Europe also contributes to these land use changes (Verburg et al. 2006). This development threatens our natural and cultural heritage as well as social and aesthetic values created by the long histories of producing food, fodder and fibre by extensive low-intensity land use. The cultural landscape containing these qualities is of important public interest in the cultural, ecological, environmental and social fields and constitutes a resource favourable to economic activity. Furthermore the protection, management and planning of the landscape qualities can contribute to job creation. Agriculture and forestry, as major land users, play a key role in determining the health of rural economies as well as the rural landscape. Though agriculture may be less important to the economies of rural areas than it used to be, it still has a valuable contribution to make to their economy and environmental sustainability. Farming thus has multiple functions and European agriculture is challenged to see agricultural production in a broader perspective (Olsson 2003). The traditional production of food, fodder and goods is still focused upon, but at the same time the production of public benefits (such as nice scenery and cultural heritage) and ecosystem services (like water purification, maintenance of biodiversity and limiting the environmental load) have become more important. A major goal is to develop sustainable agriculture that maintains cultural landscapes, public benefits, ecosystem services and natural resources for the future. Investigations show that maintenance of cultural landscapes and production of public benefits are factors in the agricultural policy that are accepted and appreciated by people in general (Olsson 2003, Norges Forskningsråd 2005).

With this background, the Nordic Council of Ministers in the Akureyri agreement 13th of August 2004 (Appendix 1), underlined that the Nordic agriculture has to enter a new role. The importance of multifunctional agriculture and the cultural landscapes as a resource for the Nordic agriculture is stressed in the agreement. However, to maintain valuable cultural landscapes and collective benefits as a resource for multifunctional agriculture and rural development, it is necessary to know how they were created and maintained in interaction with agriculture, and how to implement this knowledge in the agricultural production of today.

The Nordic Joint Committee for Agricultural Research (NKJ) promotes and supports cooperation between the Nordic Research Councils. Since the main goal for NKJ is to support a sustainable agricultural development, the Committee decided in June 2005 to establish a working-group to follow up the Akureyri agreement. This Nordic working-group was appointed in December 2005.

3.1 Members of the group

The working group consisted of:
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participated in one of the meetings.

3.2 Mandate and aim

The aim of this report is:

- To highlight the values and qualities of the Nordic cultural landscapes
- To make clear the need for research to create understanding on how these "secondary agricultural products" were produced and maintained over time
- To make clear the need for research to make it possible to implement such knowledge in today's agricultural production in an appropriate way
- To produce a review of this type of research, going on today
- To recommend how to best supplement today's research
- To consider how this supplementary research is best carried out (cooperation etc.)

3.3 Methods

The Working group had two meetings, the first at Gardermoen, Norway, 08.12.05 and the second in Sigtuna, Sweden 1-2.03.06. During the first meeting we discussed and defined values and qualities of the Nordic cultural landscape that we should fix our attention to. During the two meetings we also discussed challenges and need for research if these qualities should be maintained by agriculture as a resource for the future. In order to produce a review of ongoing research in the working area of the group, a request for information was sent to universities, university colleges and research institutions across the Nordic countries (see Appendix 2). This survey included:

- research regarding the creation of cultural landscapes and maintenance of its natural and cultural values

- research regarding implementation of maintenance and use of cultural landscape values in the agricultural production of today

By questionnaire the research institutions were asked for information about the responsible institution for research projects of current interest, the project title, project leader, research field, transdisciplinary, title of papers, Nordic aspects and abstract (see Appendix 3). Based on the replies a summary for each country was written and a conclusion regarding how to best supplement today's research was drawn. We also discussed how future Nordic research regarding cultural landscapes could be carried out in the best way.

All group-members participated in writing this report.

4. Cultural landscape values and qualities

The working-group has paid attention to several secondary products of agriculture that may be as important as the primary products (i.e. food, fodder, fibre):

4.1 Biological diversity

Biodiversity – comprising the scaling from genetic to species, habitat and landscape level - is one of the most important preconditions for evolution and development. Many important habitats for biodiversity and wildlife throughout Europe are semi-natural: they have been created and maintained by millennia of extensive low-intensity land use (Lawton 1999, Vos & Meekes 1999), and their maintenance is completely dependent on human interference such as mowing, grazing or burning (Willems 2001). The semi-natural habitats are replaced by new, intensified human activities such as urbanisation, the replacement of small farms by more economically efficient, large-scale farms and fertilisation (Statistisk sentralbyrå 2001, 2002a, 2002b, Dramstad *et al*. 2003). At the same time, the extensive, low-intensity land use practices necessary to maintain the varieties of habitats are no longer economically feasible, and are therefore discontinued (Burel 1995, Kahmen *et al*. 2002). The result is abandonment, scrub encroachment, and succession from open semi-natural habitats to more uniform forests by way of tall herbs and bushes (e.g. Ellenberg 1988). The cessation of low-intensity land use in semi-natural habitats has recently been identified as one of the major factors adversely affecting the flora and fauna and reducing the biodiversity in Europe (Dolman & Sutherland 1992, Fischer & Stöcklin 1997), including Scandinavia (Nordisk Ministerråd 1995, Norderhaug & Ihse 2003).

By signing the Convention on Biological Diversity (1992) and the European Landscape Convention (2000), European countries have pledged themselves to the conservation of biological diversity and landscapes, acknowledging that the quality and diversity of European landscapes constitute a common resource.

4.2 Other ecosystem services

Ecosystem services – services provided by nature to bio-geo-chemical cycles of our living environment- are increasingly acknowledged, and the importance of agriculture for ecosystem services is stressed in connection with the WTO-negotiations.

Ecosystem services are natural functions of an ecosystem that can be used for the benefit of humans, such as clean water, habitats for fish, and pollination of native and agricultural plants (De Marco & Coelho 2004). An ecosystem always has multiple ecological functions, and those functions interact and are interrelated. Each ecological function can be an indicator of the condition of the ecosystem to a high degree. Usually, one or several ecological functions of the ecosystem play important roles in local natural, social, and economic systems (Guo *et al*. 2003). Examples of ecosystem services are shown in Table 1, classified according to the Millenium Ecosystem Assessment (2003). Many ecosystem services such as pollination and soil fertility have been degraded by recent land use changes due to intensified farming. In this connection it is important to underline that cultural landscape management implies ecosystem management with dimensions both in time and space.

Table 1. Ecosystem services, classified according to the Millenium Ecosystem Assessment (2003), and their ecosystem service providers. 'Functional units`refer to the unit for assessing functional contributions of ecosystem service providers; spatial scale indicates the scale(s) of operation of the sevice. After Kremen (2005)

Service	Ecosystem service providers/ trophic level	Functional units	Spatial scale	Potential to apply this conceptual framework for ecological study
Aesthetic, cultural	All biodiversity	Populations, species, communities, ecosystems	Local–global	Low
Ecosystem goods	Diverse species	Populations, species, communities, ecosystems	Local–global	Medium
UV protection	Biogeochemical cycles, micro-organisms, plants	Biogeochemical cycles, functional groups	Global	Low
Purification of air	Micro-organisms, plants	Biogeochemical cycles, populations, species, functional groups	Regional–global	Medium (plants)
Flood mitigation	Vegetation	Communities, habitats	Local–regional	Medium
Drought mitigation	Vegetation	Communities, habitats	Local–regional	Medium
Climate stability	Vegetation	Communities, habitats	Local–global	Medium
Pollination	Insects, birds, mammals	Populations, species, functional groups	Local	High
Pest control	Invertebrate parasitoids and predators and vertebrate predators	Populations, species, functional groups	Local	High
Purification of water	Vegetation, soil micro-organisms, aquatic micro-organisms, aquatic invertebrates	Populations, species, functional groups, communities, habitats	Local–regional	Medium to high*
Detoxification and decomposition of wastes	Leaf litter and soil invertebrates; soil micro-organisms; aquatic micro-organisms	Populations, species, functional groups, communities, habitats	Local–regional	Medium
Soil generation and soil fertility	Leaf litter and soil invertebrates; soil micro-organisms; nitrogen-fixing plants; plant and animal production of waste products	Populations, species, functional groups	Local	Medium
Seed dispersal	Ants, birds, mammals	Populations, species, functional groups	Local	High

4.3 Resilience

A resilient ecosystem has the capacity to tolerate disturbances without collapsing into a qualitatively different state, and can withstand shocks and rebuild itself when necessary. Furthermore, resilience is linked to social systems, which makes it necessary to also take the socio-ecological connections into account. In this connection, biodiversity is a key factor. Humans continuously interact with various ecological systems, forming what is known as socio-ecological systems (SES). Resilience consists of linked socio-ecological systems, and has three defining characteristics: 1) The amount of change that the system can undergo and still retain the same controls on function and structure, 2) The degree to which the system is capable of self-organization, and 3) The ability to build and increase the capacity for learning and adaptation (Holling 1973, Carpenter et al. 2001). The resilience of socio-ecological systems depends largely on underlying, slow-changing variables such as climate, land use, nutrient stocks, human values and policies. Resilience can be degraded by a large variety of factors including: loss of biodiversity, toxic pollution, and inflexible, closed institutions, subsidies that encourage unsustainable use of resources and focus on production and increased efficiency that leads to a loss of redundancy. Reduced resilience increases the vulnerability of a system to smaller disturbances that it could previously cope with, and the system is at high risk of shifting into a qualitatively different state. Even in the absence of disturbance, gradually changing conditions, e.g., nutrient loading, climate, habitat fragmentation, can surpass threshold levels, triggering an abrupt system response.

4.4 Cultivated land as a landscape resource

The need for maintenance of cultivated land in a global situation with famine and water shortage, should be stressed especially in the Nordic countries where the water supply is good (Pimentel & Pimentel 2006). In Norway the importance of maintenance of cultivated land was presented on the

same level as preservation of species and habitats in the report to the Storting regarding biodiversity (Det kongelige miljøverndepartement 2001). Sweden has been used as a reference for describing the impact of production intensity on the ability of the agricultural landscape to generate ecosystem services (Björklund *et al*. 1999). Furthermore, the global trends towards food consumption associated with affluent life styles have been shown to bring a need for more land for food production, and the Nordic European countries are, indeed, already in a fairly high stage in this category (Gerbens-Leenes & Nonhebel 2005).

4.5 Local landscape as living environment

The cultural landscape qualities may create nice and attractive local environments. Some rural societies have managed to reverse depopulation to immigration and increase of the population, by going all out for restoration and maintenance of the cultural landscape qualities. In addition voluntary work and joint important areas often create new social networks and commitment (Aronsson & Gjerdehag 1999). In Finland landscape biodiversity has been described as a conception and construction for residents in rural areas (Soini 2004, Soini *et al*. 2006, Soini & Aakkula 2006).

4.6 Cultural monuments and environments

The Nordic cultural landscapes contain numerous types of cultural monuments and environments. Antiquities and old buildings are mostly easy to identify and in the Nordic countries their values are established by the law. Their connections to the surrounding environment may, however, be more difficult to understand, identify and appreciate. The true value of immaterial cultural monuments, such as traditions, place names, legends and knowledge of old (pre-industrial) farming systems is also often overlooked. However, the Convention on Biological Diversity (1992) stresses the importance of local traditional knowledge for a sustainable rural development and in situ preservation (cf. Tunón 2004).

4.7 Experience and recreation values

The natural and cultural heritage of the cultural landscapes both individually and together represent a large potential as experience values for tourism as well as for local people (Austad & Ådland 2002). Furthermore, Dramstad et al. (2001) in Norway have described the visual dimensions that are relevant for landscape experience.

4.8 Aesthetic values

Beautiful landscapes and nice views are of vital importance for tourism but also for local people. The "traditional" rural landscapes are light open and characterized by variation regarding both content and form. Psychological studies confirm that these kinds of landscapes are perceived as pleasant and make most people feel fine (Dramstad *et al*. 2001, Strumse 2002).

4.9 Ethical values

The cultural landscapes are created by the activity and work of generations and represent an important part of our cultural heritage. This contributes to give the cultural landscapes ethic values.

4.10 The historical values

In the Nordic countries we can still read our history in the landscapes. Traditional landscapes express a unique sense or spirit of place, many have symbolic value, are shaped by ideology and contribute to local or national identity (Antrop 2005). The landscape structure, the many cultural monuments and environments, the semi-natural vegetation types and occurrence of indicator species may tell a lot about former land use and the life of our ancestors in different parts of the countries. This historical foundation may be of utmost importance for the identity of rural societies as well as individuals. In addition explanation models regarding the history of different regions may be developed based on the history told by special landscapes.

4.11 Values for social infrastructure, innovations and welfare

Mansvelt (1997) has given a good theoretical description of interrelations of agro-landscape realms in the framework formed by physical survival requirements and ideal development requirements. Historical roots, identity, local environment qualities, social network development by joint important areas and possibilities for teaching in different subjects (history, ethnology, biology, ecology etc.) (Bele *et al.* 2004, Bele & Flæsen Almendingen 2004) are examples of social values connected to the cultural landscapes. Furthermore the cultural landscape qualities may be utilized in public health work and as good medicine in connection with projects like the Norwegian "Grønn omsorg"-projects ("Green care").

4.12 Values for multifunctional economy

The cultural landscape qualities also represent economic values. As mentioned, the beautiful and comprehensive cultural landscapes are of utmost importance for tourism and thereby for the economy of local societies as well as for regions and for the Nordic nations. In addition the cultural landscape values in several ways may be used for development of labelled products for instance by documentation of the public benefits produced as secondary products by farming practices (cf. Kaprifolkött http://www.bioforsk.no/dok/senter/adm/present/kv7.pdf) Documentation of a special product quality (regarding taste, fatty acid content etc.) by utilisation of species-rich semi-natural grasslands, summer farming areas etc. is another possibility for development of labelled products. Such high quality products now become more and more important for the economy of European agriculture. The secondary production of cultural landscape values may also indirectly be of importance for the economy of the farmers by strengthening the confidence in Nordic agriculture and legitimate payment and economical support.

5. Challenges and need for research

5.1 New farming systems

The driving forces of the Nordic agricultural production systems, during this decennium, have been technological changes, including IT technology, and implementation of the new mechanisms of the opening European market, with a result of decreasing prices of primary farming products and an increasing international competition. Animal breeding together with intensified animal feeding methods have created a potential for an intensified animal production and shortening production cycles. In plant breeding, potential of GMOs has been a critical topic of argumentation. At present, regulations for two alternative production systems, that of GMO free organic and conventional (potentially GMO involved), are being developed side by side, at EU level. Most possibly GMO based cultivars will be accepted into practise, first for potato (for starch), rapeseed and sugar beet. One often over-emphasised situation envisaged by the general public, is of large monocultural areas of GMO-based cultivars devoid of any form of biodiversity or cultural landscape elements.

Farmers have reacted to the situation by introducing new, less labour-intensive technologies into their farms, and by investing into expanding field acreages or increased size of production units. Typical technologies in plant production are direct drilling and precise farming. The majority of the bigger farms have become more and more specialized with just a few crops. A high percentage of arable farms have also become developed into part-time farming. It has become more commonplace to purchase external contract services, such as harvesting. Large animal husbandry units have become more highly automated for feeding and circumstance control. Milking robots have become common. Activity to hire more farm acreage has increased and price for farm acreage at market level has increased, at least in principal agricultural areas. Around the urban areas, price of land area has increased because of the competition between rural and urban activities. With this tendency, farmers have less and less time for sustaining farming landscape. This activity has turned more to the interest of other groups of rural inhabitants. Through the EU, more emphasis has been given to landscape protection. The driving forces and future scenarios concerning European landscape development in rural areas are being presented by Busch (2006), and dynamics of the landscape impact and indicators of development have been described by EEA (2005).

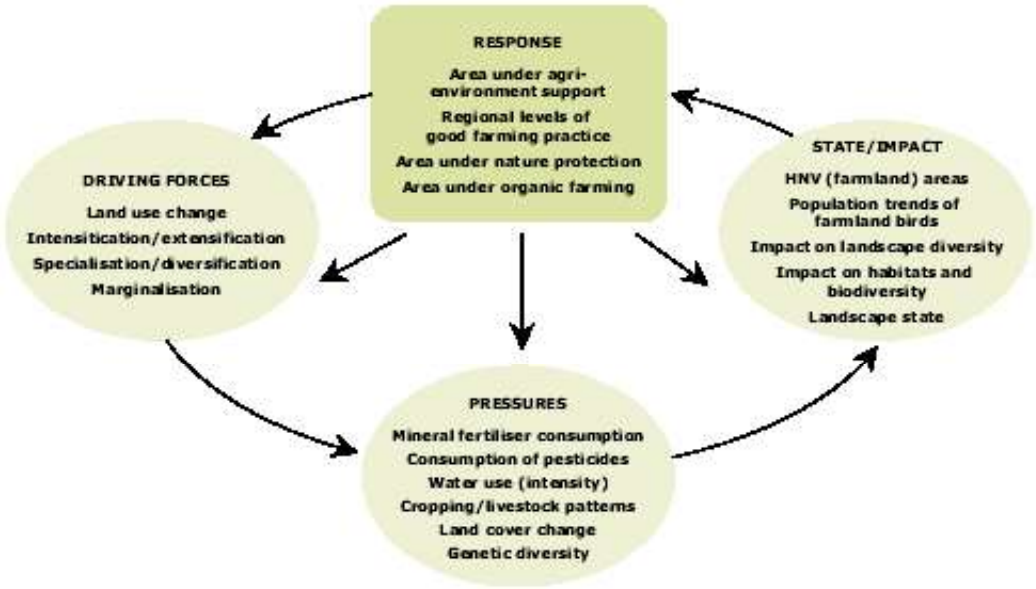

Figure 1. Environmental assessment of agriculture's impact on biodiversity and landscape based on the DPSIR framework (EEA 2005).

Among consumers, opposition against large animal production units have become more common, both in the general countryside and at the edges of urban settlements, in particular. One major problem concerns the treatment of manure and the unpleasant smell from manuring activities. Threat of spreading diseases has restricted animal units for external visits. Simultaneously, unawareness and suspicions of maltreatment of production animals have become common among the general public, and understanding of the interaction between farm economy and rural landscape has become obscure in the mind of consumers.

Meanwhile, whereas an expansion of farm size and specialization has occured in many regions, abandonment of farming acreage has become a problem in other regions. This has happened in the eastern and northern parts of Finland, in the northern part of Sweden, and in the north and west of Norway, as well as in the mountain summer farming areas. This tendency, in similarly as the aforementioned tendency towards intensification, are causing a major impact to the landscape of principal and peripheral rural areas. Attempts have been made to mitigate some of the most negative impacts, such as agri-environmental approaches and specific subsidies for sustaining cultural heritage, valuable habitats and restoring or sustaining wetlands, or dry and mountainous meadows.

In between the intensified agricultural production and highly abandoned rural areas, some farms have directed their entrepreneurial approach to multifunctional strategy. EU and national governments have supported this activity by means of networking and innovation support. Typical mechanism for channeling the support has been the Leader programs, and rural technical colleges have in many areas concentrated on R&D for rural SME's. In addition to colleges, a lot of small consulting/mediator organisations have appeared in rural areas to provide their services for R&D product expertise or management services.

Bio-energy production has been developed since the 1980's, and has recently gained a massive interest, induced by threats of major increases in the prices of fossil energy. Raw materials for bio-energy are based on willow, forest waste products, biomass from canary grass and masses of farming waste products, such as straw and manure, and waste products from food processing. Farms are, in most cases, expected to utilize life cycle end product that is left after bio-energy processing. The terminal use is normally an organic or mineral additive, to be spread into soil, very often on areas of landscaping. The energy self-sufficiency of agriculture, itself, is very low, at present, and a strong development can be expected in this area in near future. How fast that will happen depends very much on the development of energy pricing with fossil energy. What the environmental impact will be, in terms of landscape change, depends much on the decisions concerning selection of raw materials for bio-energy and structure of a production system.

Of other secondary production systems equine farming is one of the major ones. This is actually the only field of agriculture that has been growing, without any direct subsidies. The highest average number of horses is in Denmark (28.3/1000 inhabitants). The major equine sports are thoroughbred racing, trotting and horse riding. The number of Europeans taking active interest in riding is about 6.4 million (2% of the population). Trotting is important in Austria, Belgium, Denmark, Finland, France, Germany, Netherlands, Italy, Spain and Sweden and, to some extent, in Great Britain and Ireland. According to the estimations in the Netherlands, Great Britain and Sweden, annual net revenue per horse, in equine industry, varies between 2200 - 2800 euros. Compared to GDP level, the value of money paid as prices in trotting competitions is highest in Sweden and next highest in Finland (1999). In Sweden, Hjelt has estimated that 0.8 % of the value of total consumption in private sector has been used for equine industry (in 1996). Three percent (3,7 million hectares) of the agricultural land area is used for production of horse pasture and fodder. Equine industry forms about 4 % of the total income of European agriculture, and its importance is increasing, partially, as an alternative to other sectors of animal production losing their economic profitability. The farms that give up other forms of animal husbandry can use their housing and other facilities to equine industry with reasonable amount of rebuilding investment, and with horse management the farmers can continue their activity. Importance of horses as a landscape and biodiversity modifying animals is increasing when cattle have been moved from natural pastures, into animal sheds or smaller exercise yards. Many of the training centres are situated on the sites of cultural heritage, which because of the riding or trotting services become accessible to public. The capability of the equine enterprises to keep up the surrounding of cultural landscape and heritage varies a lot depending on the attitude, knowledge and financial resources of the enterprise. The industry has thus also quite an effect on the environment as public goods.

Of tertiary service systems, farm tourism is the most extensive field. Tourism activities are normally based on bed and breakfast service, where farm facilities are being utilized for summer season all year around. Normally, this activity is connected with catering services performed either on the farm or nearby, at the facilities of the customer. More specific are fishing tourism, combination of handicraft production, artistic activities, other cultural activities, survival-game type of experience services, or even 'live action role-playing game' (LARP) activities. Type of specialization depends highly on qualifications of entrepreneurs and type of networking of various activities. Many of these are linked to farm surroundings and landscape, as a basic resource.

Welfare services and services for senior citizens are a gradually growing sector in rural activity. This tendency is in clear correlation with demographic development of the Nordic population. Rural areas have space and building facilities to arrange such activities. Surrounding landscape is a critical resource here. Research resources have been activated for such an activity: the previously financed COST action, number 866, will be started under theme of "Green care in agriculture"! This project will be surging potential of farms to offer health-enhancing activities for physically or mentally disabled people. This activity has a strong link to landscape. The tradition of building hospitals for disabled people in beautiful landscapes gives an association between former activities and the landscape.

Environmental education is, also, one potential form of multifunctional activity. This type of education when performed within a farm framework, naturally, would be concentrated on environmental issues about food and the food chain and rural life. Such activity has been initiated in Norway and Finland. From Finland, the activity has been distributed to Estonia. Landscape is self-evidently an essential part of environmental education. This could, also, be one way to enhance general discussion concerning rural landscape, hopefully resulting in mutual understanding on environmental issues at rural and rural frontier areas.

When we compare the population working for principal agriculture, secondary non-agricultural production and tertiary production for services, welfare, senior care etc., there is variation between males and females; males are predominant in principal agriculture and women in tertiary production. Development of tertiary activities is actually a major prerequisite for women to settle in the peripheral countryside.

The illustrations of the Nordic rural sphere, its dynamics and relation to influences from outside and interdependence between primary, secondary and tertiary production and sustainability (including rural landscape) have been presented by Havnevik (1999). Mutersbaugh (2005) has recently, in general terms, made one of the first attempts to bind such quality values as landscape protection into certified commodities and describes the process by 'just-in-space' production.

With this background, maintenance of the values and qualities of the Nordic cultural landscapes involves a lot of challenges and we have a need for improved knowledge within several disciplines as well as interdisciplinary.

5.2 Need for knowledge on dimensions, functions and complexity of socio-economic systems

"Landscape means an area, as preceived by people, whose character is the result of the action and interaction of natural and/or human factors" (Council of Europe 2000). Landscapes are a part of the cultural heritage of humankind and heritage is considered as a sort of intellectual capital. Thus, the preservation of landscapes fits in the framework of the protection of cultural and natural heritage (Antrop 2006). However, landscapes are not static, but dynamic, evolve continously and reflect social and economic needs of a particular society at a given moment (Antrop 2006). The interaction between nature and culture is considered as an essential characteristic of landscapes (Palang & Fry 2003), as is also change (Antrop 2003).

Because conceptually landscapes have a holistic and complex character which bridges the natural and cultural aspects, they are valued in many ways (Antrop 2005). Most people interpret the landscape with what they know and remember, ie. they "read" the landscape within their own cultural context (Lowenthal 1997). The evaluation, ie. what are considered values, are thus going to change with time.

In 1991, the U.S. Environmental Protection Agency convened an expert group of ecologists, economists and other social scientists for the purpose of advancing the state of the art of ecosystem valuation methods. This Ecosystem Valuation Forum concluded that the time was ripe for making new progress in solving some of these problems, while acknowledging that it may not be possible to develop a single unifying definition of value. Instead, the goal should be to understand how various concepts of value are structured, how they relate to each other, and how they can guide us toward a more integrated valuation process. The Forum recommended that next steps in addressing these issues should be organized around case studies, particularly those that would enable researchers to improve linkages between ecological and economic methods and to develop improved protocols for valuation studies (Bingham et al. 1995).

Vos and Meeks (1999) stress the importance of "human perception" in valuating landscapes. According to them, landscapes are not determined solely by natural processes; each landscape is also assigned a particular 'identity' by human perception. The concept of landscape identity has historical, geomorphological, cultural and other aspects that are complementary to ecological aspects. To ensure the effective planning and management of future landscapes it is therefore necessary to understand how people perceive their environment (and changes in it) and to have public support. These researchers recommended research on the following topics:

- landscape identity and values: ecological aspects (historical ecology), land use and their relation with cultural history and geology/geomorphology
- tools for describing and monitoring characteristic features (e.g. cultural history): typology of European landscapes
- public perception and support of inhabitants and users of landscapes
- relationship between human well-being and changes in the landscape/landscape identity
- translation of landscape identity into physical planning and management

The coherence of particular properties defines identity and changing the characteristics and coherence leads to loss of identity or its change into a new one (Antrop 2005). What values are essential for a landscape to keep its identity and what processes can break down its coherence and continuity needs to be identified. According to Gómez-Sal and his coworkers (2003), the evaluation of a specific landscape requires indicators for the different aspects considered. These indicators need to be researched, their relationships structure known, and they have to be placed in a hierarchy. Once a set of precise and sufficient indicators is selected for each evaluative aspect/dimension, they can be used as a tool for evaluating. The challenge is to derive a manageable set of indicators for natural and cultural values that together capture the complexities of the ecosystem and the heritage character, and yet remain simple enough to be easily and routinely monitored to meet the components of natural and cultural values. Five evaluative dimensions (ecological, productive, economic, social and cultural) are considered, each of which can be analysed by specific indicators – see figure 2.

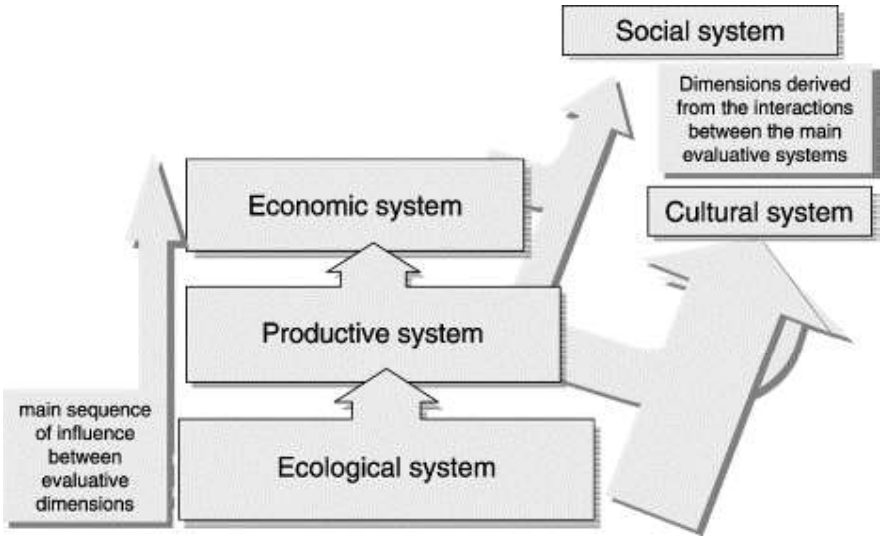

Figure 2. Each evaluative aspect/dimension within the landscape and connections between those. The ecological system is the basis (after Gómez-Sal et al. 2003).

Table 2. The main characteristics of evaluative dimensions of scenario resource management system and resulting landscape (after Gómez-Sal et al. 2003):

Evaluative dimension[a]	Aim	Character	Magnitudes	Evaluation	System state variable[b]	Connection between systems[c]
(1) Ecological (ecosystem)	To know the sustaining capacity (integrity, functionality, structure) of agroecosystems and their conservation value	Non-finalist	Ecological: biomass, energy, diversity, scarceness, information, time, space, persistence, etc.	Efficiencies of different types; ratios between earlier magnitudes	Stability (recoverability, patrimonial value)	At the bottom, scarcely dynamic, fragile
(2) Productive (production system)	Obtaining of agrarian products, includes physical, technological and management systems	Finalist	Physical: energy, materials, seeds, harvests, fertilizer, work, etc.	Performance, yield, ratio between resources and products (inputs/outputs)	Sustainability	Intermediate position, generates resources, medium dynamism
(3) Economic (conventional economic system)	Ensures means of life, may include monetary and financial subsystems	Finalist	Monetary: money	Profitability, ratio between investments and income (earnings)	Economic viability	Dominant, control capacity very dynamic, destabilising
(4) Cultural	To document and evaluate cultural patrimony. This is a fundamental component comparable to the ecosystem	Non-finalist	Heritage: architecture, arts and crafts, infrastructures, knowledge, cultural landscape, etc.	Originality, scarceness	Patrimonial/heritage value	Basic, fragile, result of the interaction between several systems (1, 2, 5)
(5) Social (social system)	Ensuring the well-being of the population and the quality of life, and attending to basic needs	Finalist	Human development: social integration, health, culture, etc.	Indicators of development	Equity, redistribution of wealth	Intermediate position, affected by the degradation of (1) and (4) and by dysfunction of (3)

Synthetic vision of their main characteristics, analogies and differences (from Gómez Sal, 1995a, 2001).
[a] Dimension of agricultural development.
[b] Main descriptor.
[c] Dynamics.

Together with knowledge on the use of resources generated over the slow co-evolution of agrarian societies with nature, the cultural dimension includes historical and architectural aspects and both the living and inert infrastructures that form an essential part of rural landscapes. It is very difficult to separate the cultural system from the ecosystem and the loss of useful knowledge on the resources and the ecosystems that generate them—cultural erosion—is as serious as the physical erosion caused by the abandonment of adapted uses of the ecosystem (Gómez-Sal et al. 2003). The importance of the cultural value is stressed by other researchers. More and co workers (1996), discuss the differences

between the value of existence and the intrinsic value of resources. They claim that those that have more intrinsic value have more cultural character and therefore more conservation value.

An important factor linking nature and social sciences is the mutual relationship between people and the landscape – people do not only influence landscapes but also are influenced by landscapes. Various cultural and natural processes interact in landscape dynamics, and need to be integrated in a holistic discipline (Palang et al. 2005). Bridging human and natural sciences is needed to create and coordinate landscape-related issues, within academia and between science and society (Tress et al. 2001).

5.3 Need for knowledge on ecosystem services of cultural landscapes

Cultural landscapes are usually considered providing many ecosystem services with the assumed relationship between biodiversity and ecosystem services and the underlying role of biodiversity in providing services (Swift et al. 2004). This assumption, however, has been criticized. According to Srivastava & Vellend (2005) there is substantial evidence that diversity is able to affect function, particularly for plant communities, but it is unclear if these patterns will hold for realistic scenarios of extinctions, multitrophic communities, or larger spatial scales, such as is the case for cultural landscapes.

To be able to evaluate and appreciate services provided by the cultural landscape we need two different approaches, an economic approach and an ecological approach. We need to analyse and quantify the demand for ecosystem services and their supply within the cultural landscapes, and estimate their economic value, physically and aesthetically. Without quantifying the economic value of the services, it is hard to justify economic support to keep cultural landscapes. Quantifying economic value of different services has been done, e.g. for pollination (De Marco & Coelho 2004).

In general, ecological understanding of ecosystem services is quite limited (Kremen 2005). We need to analyse the relationship between biodiversity and different ecosystem services within the cultural landscape at different levels, small scale and large scale. We should (1) identify the important 'ecosystem service providers'; (2) determine the various aspects of community structure that influence function in real landscapes, especially compensatory community responses that stabilize function, or non-random extinction sequences that rapidly erode it; (3) assess key environmental factors influencing provision of services, and (4) measure the spatio-temporal scale over which providers and services operate (Kremen 2005).

5.4 Improved knowledge of old, traditional farming methods

Agriculture has existed for thousands of years in northern Europe. Crops, methods and tools have varied over time and with place, due to many different factors and interactions between them, for example global and local climate, natural conditions and resources, soil quality, topography and water supply. Also demography, the social, cultural and religious situation and traditions have influenced the agricultural methods and techniques. Even if we are able to scrutinize only the last thousands or five hundred years more closely, we will find variations and differences, not only between countries and regions but also on a smaller scale. As late as 50 – 75 years ago, there could be considerable differences between neighbouring villages within the same parish regarding certain parts of the agricultural schemes as for instance hurdling of hay, pollarding trees, stacking corn sheaves, handling the milk products, animal care, manuring, ploughing and the way the farmers combined different kinds of natural resources. There was no one solution to problems and requirements, there were several. At the same time, it is remarkable how quickly some innovations spread, even if the diffusion seems to have been random. The farmers chosed and picked up the methods, tools and crops they found to be the very best for their specific need. While today's agriculture is mostly concentrated on maximum of profit, the farmers of yesterday had their hearts set on minimising the risks. Thus knowledge of the local agricultural history is important since the key to the cultural landscape of that particular village, farm or community is found there.

Today many scientists and authorities have removed themselves from insight into and understanding of these traditional agricultural methods. Instead a more simplified and generalized model is mostly applied. Large areas, sometimes whole regions, are used in the same way and the local traditions and know-how is facing extinction. Thus there is a need for detailed documentation and research, especially on an elementary, interdisciplinary level to save and maintain such specific knowledge. The

reason is not only the human need for anchoring and historical roots, but also the possibility that older methods and know-how might convey important information to facilitate future solutions to difficult problems, not at least in the field of environment.

History, especially the history of the last century, has provided us with many successful innovations but also several mistakes in introducing new methods and crops. Severe mistakes could probably have been avoided, if authorities and scientist had been aware of and respected local conditions and traditions. Today, farmers, who have stubbornly refused to accept guidelines from "abroad" and instead kept to their traditional routines, are often regarded as a kind of environmental pioneers. In their fields, meadows and forests you can find high biodiversity, effective ecosystem services and several collective benefits. This kind of environment is also most alluring for tourists and local people.

Improved knowledge of traditional farming methods is essential for the maintenance of valuable cultural landscapes. Such improvement would also facilitate measures necessary to fulfil the pledges of Article 8 j in the Convention on Biological Diversity (1992).

References to this chapter:(Lagerstedt & Helm 1944, Dovring & Folke 1953, Osvald 1962, Sjöbeck & Nihlén 1966, Emanuelsson & Johansson 1969, Granlund & Helm 1971, Eskeröd 1973, Gadd 1985, Arnborg et al. 1987, Tollin 1991, Ekstam & Forshed 1992, Blomkvist et al. 1993, Emanuelsson 1993, Myrdal et al. 1994, Ekstam & Forshed 1996, Ekeland & Gustafson 1997, Stenseke 1997, Cserhalmi 1998, Larsson et al. 1998, Gustafson 1998, Norderhaug et al. 1999, Ekeland et al. 1999, Pettersson et al. 2001, Wedin et al. 2001, Minnhagen - Alvsten et al. 2002, Myrdal 2003, Tunón 2004, Jansson et al. 2005, Emanuelsson et al. 2005, Peterson 2006).

5.5 Challenges of ecodesign

Integrated Product Policy (IPP) has been developed for systemic integration of environmental issues within production processes and product development. IPP initiates from the aim of the sustainable development, including ecological, economical, social and cultural sustainability. Ecodesign or 'design for environment' (DFE) are regarded as methodologies or tools of the Integrated Product Policy (IPP). The principal approach of ecodesign is production-consumption chain based life-cycle-assessment (LCA). Substitution of physical products with services, which means dematerialization within the production process and immaterialization within the chain of demand is the secondary basic idea of IPP. Dematerialization refers to technological production using less energy and fewer or lighter-weight materials. Immaterialization is a similar approach, militating against the consumption of material goods. The final aim of IPP is to maximize the produced function or service with minimized amount of resources used; and minimized amount of environmental impact.

The main general challenges for implementing ecodesign for the rural, agricultural secondary activities are:

- The traditional policy approaches are sectoral and, even as integrated, these do not facilitate a production-consumption chain approach in a systematic and holistic way. This is especially true with multifunctional rural production or services that go over the borderline between conventional sectors.

- Integrated approach is not strong at enterprise level, because there is no such an integrative tool available that would link the IPP approach of a production chain into a generic management system of an enterprise. There is neither a tool available for systematic ecodesign of a cluster or industrial park or for a network of rural enterprises. However, most of rural enterprises working on secondary activities need such networks or stronger forms of cooperation, which also link them to urban frameworks.

- Integrated approach is not strong at a regional level either, even though efforts have been taken in that direction with foresight processes, for instance in the foresight approach towards the Sustainable Territorial Development of the Rural Areas of Europe (European Commission 2004). This guide proposes foresight as a good way to explore the meaning of sustainability at regional level, to bring understanding to local stakeholders about what it means in terms of the kind of changes that are necessary to achieve sustainability and the consequences of not doing so in terms of a decline in quality of life, damage to the environment or the destruction of

natural capital that has taken many generations to create and accumulate. Foresight is described, also, as a useful tool for reconciling the conflicting economic, social, cultural and environmental objectives of different stakeholders in a region. The maintenance of valuable man-made landscapes is seen as one of the key considerations of the multi-functionality of land use in Europe and attempts to make explicit the different kinds of value created by agricultural activity. In the foresight process, regional authorities are proposed to have a key role to play in managing communication between the stakeholders on the one hand and the relevant sponsors from government administration.

More specific challenges for implementing ecodesign, linked to elements concerning landscape are:

- Many of the resources, such as cultural landscapes, available for multifunctional economic activities in rural areas belong to public goods, which behave in market economy in a specific way, especially in the Nordic countries, where every man has equal rights. It is not easy to produce marketable services that are based on public goods. At policy level, the cultural approach is taken into account, as for instance in the objectives presented in the Pan-European Biological and Landscape Diversity Strategy (Council of Europe and UNEP 2004), that emphasize the socio-economic and cultural (including landscape and tourism) benefits in assessing the national values of farming activities and agricultural areas and raises awareness on the importance and potential economic benefits of developing and promoting marketing of local and traditional products supporting maintenance and conservation of agricultural landscapes. In the indicator-based assessment report of the European agriculture policy, EEA emphasizes that landscape issues are hardly mentioned in the European policy documents reviewed. The 6th EAP (European Parliament and Council 2002) set an objective of integrating landscape protection and restoration into agricultural and regional policy. The BAP for agriculture (Commision of the European Communities 2001) refers to maintaining landscapes and providing investment aid and capacity building programmes for landscape management under its objectives. Specific references to landscape are found in the Landscape Convention (Council of Europe 2000) and the Pan-European biodiversity and landscape diversity strategy (PEBDLS)(Council of Europe and UNEP 2004). The Landscape Convention aims to 'promote European landscape protection, management and planning, and to organize European co-operation on landscape issues' (Article 3 of the Convention). However, neither of the two policies set specific targets nor have they well-defined instruments for enforcing compliance (EEA 2006). This is a long way from marketing of eco-designed services based on cultural landscape.

- A great amount of European Commission activity is concerned with the issue of biodiversity, but mostly restricted to general policy concerning land use. Biodiversity action plan (BAP) for agriculture (Commision of the European Communities 2001) is the basic EU document, followed by the Nature and Biodiversity –a continuing policy development consultation on the Communication on Halting the loss of Biodiversity by 2010 – and beyond http://europa.eu.int/comm/environment/nature/biodiversity/develop_biodiversity_policy/policy_develop_process/index_en.htm, and in a wider scale, the Pan-European Biological and Landscape Diversity Strategy PEBDLS (Council of Europe and UNEP 2004). The integration between the threatening changes in land use and CAP (Common Agricultural Policy) has been processed in a seminar: Land abandonment, biodiversity and the CAP (European Commission 2004). The latest discussion report is that from Malahide (Message from Malahide 2004) and a Finnish national example is that of Pitkänen & Tiainen (2001).

The Indicator Reporting on the Integration of Environmental Concerns into Agriculture Policy (IRENA) by the EEA (2005) presents the approaches to landscape as follows: 1) Extensive farming systems are important for maintaining the biological and landscape diversity of farmland, including Natura 2000 sites. Such systems are regarded as threatened, however, by two different trends: intensification and abandonment. 2) While intensification, in terms of the use of external inputs, seems to have levelled off during the1990s, the trend towards farm specialization continues in the EU-15. The decline in the proportion of 'mixed livestock' farms by about 25 % from 1990 to 2000 is particularly significant as these farms are often associated with high biodiversity and landscape quality. 3) Risks for the marginalization of farmland have been identified in Ireland, southern Portugal and large parts of Italy. (IRENA does not mention Scandinavia in the risks of marginalization, but it is most evident this is a major problem here, too.) This leads potentially to farm abandonment with an associated loss of high nature value farmland

and characteristic agricultural landscapes. 4) High nature value (HNV) farmland contains the most biodiversity-rich areas within agricultural landscapes. HNV farmland areas are considered to be mainly found in the Mediterranean region, upland areas in the United Kingdom and Ireland, mountain areas and in some parts of Scandinavia. The IRENA indicators for biodiversity and landscape are presented on the DPSIR frame as follows:

Table 3. IRENA indicators relevant for assessing agriculture`s impact on biodiversity and landscapes.

DPSIR	IRENA indicators	
Driving forces	No 12	Land use change
	No 15	Intensification/extensification
	No 16	Specialisation/diversification
	No 17	Marginalisation
Pressures	No 8	Mineral fertiliser consumption *
	No 9	Consumption of pesticides *
	No 10	Water use (intensity) *
	No 13	Cropping/livestock patterns *
	No 24	Land cover change
	No 25	Genetic diversity
State	No 26	High nature value (farmland) areas
	No 28	Population trends of farmland birds
	No 32	Landscape state
Impact	No 33	Impact on habitats and biodiversity
	No 35	Impact on landscape diversity
Responses	No 1	Area under agri-environment support
	No 2	Regional levels of good farming practices
	No 4	Area under nature protection*
	No 7	Area under organic farming

* In the context of biodiversity it appeared advisable to include the input use indicators 8, 9 and 10 in the pressures category. As cropping and livestock patterns are expressions of other driving force indicators and often impact directly on farmland biodiversity, indicator 13 is classified here as pressure indicator. Indicator 4 is used in two different contexts: to discuss the link between agriculture and biodiversity and as part of the policy response.

Compared to the previous multiple documents, very few issues are presented about biodiversity regarding entrepreneurship or business. The opening in that direction is given by World Business Council for Sustainable Development in the document: Business & Biodiversity: A Guide for the Private Sector (WBCSD and IUCN 1997) and the International Finance Corporation of the World Bank Group in the web-page material: How can I capitalize on the business opportunities associated with biodiversity maintenance and protection?
http://www.ifc.org/ifcext/enviro.nsf/Content/BiodiversityGuide_Addressing_Opportunities_Ecosystem

- Exploitation of ecosystem services would be effective with a development approach that is based upon a long, well-established vision of rural land-use, entrepreneurship and rural governance. This is highly dependable upon the CAP Reform. Until now, the Reform emphasizes that over half of the population of the 25 Member States of the EU is living in rural areas covering 90 % of the territory (European Commission 2004). Farming and forestry are, according to CAP, the main land uses in rural areas, and as such play an important role at the heart of rural communities as the basis for a strong social fabric and economic viability and the management of natural resources and the landscape. Landscapes and the countryside are places where people live, work, travel around and find essential resources such as water and soil in which to grow crops and feed livestock. Landscapes therefore reflect the activities of the people who live in them. Simultaneously, landscapes reflect the functions of ecosystem services that surrounding nature is capable of providing to people. People have always shaped landscapes according to their needs, whether by building roads, bridges, houses or workplaces. Different agricultural activities produce quite different landscapes such as pasture to feed animals, arable land to grow crops, orchards, olive groves or vineyards. At the same time, functions of ecosystem services are variable, as well.

  The European Water Framework Programme has described common principles that are needed in order to coordinate Member States' efforts to improve the protection of Community waters

in terms of quantity and quality, to promote sustainable water use, to contribute to the control of trans-boundary water problems, to protect aquatic ecosystems, and terrestrial ecosystems and wetlands directly depending on them, and to safeguard and develop the potential uses of Community waters (European Parliament and Council 2000). The Thematic Strategy of Soil Protection emphasises the role of soil as a habitat and gene pool, an element of the landscape and cultural heritage and a provider of raw materials (Commision of the European Communities 2002b). The approaches concerning valuable rural landscapes are several. The European policy aspect has been presented in the High nature value farmland – trends characteristics and policy challenges (EEA 2004). European Forum on Nature Conservation & Pastoralism (EFNCP 1998) brings together ecologists, nature conservationists, farmers and policy makers. This non-profit network exists to increase understanding of the high nature conservation and cultural value of certain farming systems and to promote their maintenance. The Plant Protection Strategy has more specific links to ecosystem services. PPPs are used in a wide spectrum of applications, such as agriculture, landscape gardening and along transport routes (Commision of the European Communities 2002a). Most important in the context of ecosystem services and in eco-design would be the capability of the Nordic countries to implement the Reform and the previous EU strategies and approaches into Nordic rural governance and planning of its' products and services.

- The evolution of the secondary agricultural economic activities based on our rural landscape, in the coming years, will be greatly influenced by globalisation of the basic food market, CAP Reform, capability of the Nordic countries to implement other European policies into the rural economy, price of fuel, centralisation of services and the progressive withdrawal of outreach services by commercial/state services such as banks and post offices etc., interaction between urban and rural areas from urban border into the general Nordic countryside, trends of consumer attitudes, and capability of the rural entrepreneurs to engage the ideas of ecodesign into rural services for making a new business. The age structure of European population has the inevitable trend to older cohorts. Partially linked to that is the trend of expanding importance of service market overrunning the trend of material markets. The demand of private services, on the areas of welfare and leisure, is expected to increase. There is not much information available in terms of ecodesign of rural landscape based services, but some institutions already work on the idea; such as the European Roundtable on Sustainable Consumption and Production http://www.erscp2004.net/default.asp, and SEED International (Sustainable Education and Ecological Design) http://www.seedinternational.com.au/SEED_Int.html.

5.6 Understanding farmer's options and motivations to include cultural landscape and rural development aspects in their farming practise

The interaction between the actual farming practises, the possibility of maintaining cultural landscapes, and improving the contribution to rural development, is closely connected to the behaviour and decisions by the individual farmer. This may be influenced by regulations and public support schemes, but probably more important is the perception by farmers on how the farm most appropriate is managed and how the farm is supposed to develop in order to stay in business (Noe & Halberg 2002). Research experience concerning how farmers would include environmental issues in their management practices with the aim of fulfilling, on the one hand, their own goals and, on the other, the social expectations regarding environmental impact, illustrated that farmers basically do have an interest in how the farm performs in aspects beyond direct regulation and that are of interest to others (Halberg 1999). Research experience also shows that it is possible to develop indicators to be used in decision support and as communication tools to address such issues (Halberg et al. 2005).

The theoretical framework in the work mentioned included seeing the farm as a human activity system (Gibon et al. 1999). While the view of a farm as a production process is appropriate to instigate parameters for production and farm economy, it is less suited to instigate externalities that have a major normative component. In considering the farm as a human activity system, the farmer (family) is having his goals fulfilled through farming activities. The farmer uses information from the surroundings as well as from the production system to adapt the activities to the family's goals and to respond to the pressure from the surroundings. Therefore, this model gives a good framework for describing and

analysing social values in terms of sustainable development as well as the communication between the farmer and the surroundings related to the adaptation and development of the farm.

In the reflection by farmers on the development of the farm under stimuli from the surroundings it was shown earlier that indicators for environmental issues could be developed whereby such reflection was supported and instigated. It is reasonable to expect that locally important impacts of the production system will have an even greater influence on direct management initiatives. This underpins the concept of supporting the farmer's opportunities to understand and reflect on the impact of the production on the local/regional scale i.e. the performance in relation to the site-specific matters of concern and rural development.

If we consider farming to have a potential for (improved) contribution to rural development, significant research and development efforts will be needed to meet the challenges in this area. The analytical model described earlier can form a good starting point for such an effort. However, a number of challenges still remain. First of all, the issues that need to be addressed in such a context include a wide variety of research disciplines. There is a need to investigate conceptual frameworks for working interdisciplinary with these issues. Secondly, the indicators that are relevant in a local context are probably of a less universal character, which is why it may be difficult to communicate and transfer research results. There is need to establish an empirical basis for investigating this issue, and to evaluate how farmers can include such aspects in their decision making.

5.7 Anchoring and participation

"Anchoring" in this context means several different things. One aspect is the increasing knowledge and awareness of certain phenomena. Another aspect is gaining acceptance from actual groups for measures aiming at changing existing conditions. The farmer's landscape contains examples of both kinds, but also unknown changes, that are neither discussed nor accepted by the farmers, although there might be measures with a significant impact on the work, economy and methods of agriculture. Scientists and the authorities have the same problem. Communication often doesn´t work between these two different worlds, the practical everyday life of the farmer on one side and the theoretical scientific results and rules laid out by the authority on the other. This is a draw-back for all parties.

Up until the first decades after the Second World War, scientists, politicians and employees often had a rural back-ground and a comparatively good knowledge about farming and the conditions under which the farmers lived and worked. Even if they themselves lived and worked in the cities, they visited their parents or grandparents or other relatives in the countryside, helped them with certain chores and kept in touch with the development, problems, and solutions.

During the last 25 – 30 years fewer and fewer have this kind of connection. Instead most people within science, authorities and politics come from an urban culture. The gorge between rules/ scientific results and practical farming is rapidly increasing. There is also a gap between non-farming population in the country-side and densely-populated urban areas. It is therefore time for a new, open and intense dialogue between these groups with a strong bottom-up perspective.

If the Nordic agricultural industry shall shift its main production from food, fodder and fibre to public benefits, ecosystem services, biodiversity, tourism etc and maintaining cultural landscapes, the farmers must be motivated and get involved from the very beginning. There is a need for several parallel processes. Why? How? When? Who is paying? What are the risks and how to avoid them? How to specify public benefits? Now tourism enterprises often sell a product they don't own, i.e. the cultural landscapes created by centuries of farming and maintained by the farmers of today. By what measures can the land-owners and farmers get a share of the profit? What scientific proofs are there for different kind of methods to favour biodiversity or traditional landscape? What are the threats? For how long time will recommendations and rules last? Is there a risk that a coming, heavy demand for bio-energy complicates already planned measures? And so forth. There must be a constant co-operation between the parties involved and a development based on mutual respect. There is a great lack of knowledge, and research is absolutely essential, above all a general, interdisciplinary and holistic survey.

While there are several good examples of anchoring and sharing new ideas and know-how, the tradition and experience varies from country to country and much of the knowledge obtained becomes topical.

So, there is a need for a strengthened co-ordinated research effort, including development of improved research methodology, whereby the interaction between changed farming practice, locally defined development goals for rural districts, and the national and international expectations of the qualities to be created in the rural areas, can be better understood.

References to this chapter: (Ronnby 1995, Havnevik 2000, Brulin 2002, Edin et al. 2002, Herlitz 2002, Johansson et al. 2002, de Vylder 2002, Karlsson 2002, Myrdal 2002, Friberg 2003, Westholm & Amcoff 2003, Sandström & Tivell 2004, Folkrörelserådet Hela Sverige skall leva 2006, Leader+ 2006)

5.8 Management strategies and models

Maintenance and management of cultural landscapes and their values implies a holistic approach since the cultural landscapes are complex systems that cannot be described by just summing up their different values and qualities i.e. the whole is more than the sum of the parts. Hägerstrand (1991) stated that landscape management included everything present in a certain area as well as that which flows into and out of the area. Landscape management and planning thus requires a comprehensive strategy. However, landscapes are often not considered and managed as an integrated whole.

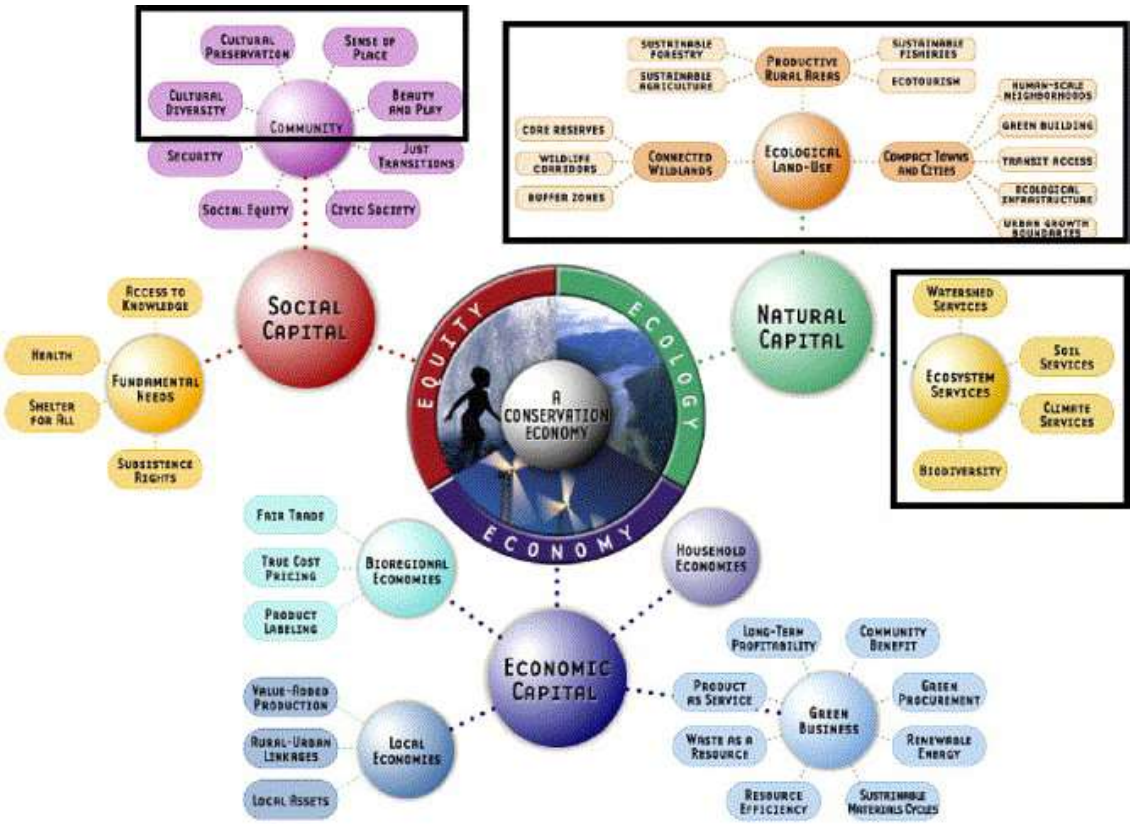

Figure 3. The patterns map of conservation economy by Ecotrust (2003). The rectangular boxes indicate the areas where landscape aspects are implied. Landscape is not seen as an integrating, holistic concept. After Antrop (2006)

A Nordic Council of Ministers report (Emanuelson & Johansson 1989) suggested a strategy for maintaining biodiversity of cultural landscapes by effort on three different levels: On the basic level i.e. in the agricultural production landscapes, biodiversity may be maintained by general awareness, by avoiding unfavourable activity, and by less time-consuming management. Especially valuable landscape elements and semi-natural vegetation types (the second level), however, need a more specified and time consuming management. At the top level, valuable cultural landscape complexes with many different semi-natural vegetation types and valuable landscape elements creating “an authentic

whole" should be managed as reference areas in a specified and well documented way, also taking landscape ecology into account.

Furthermore, Austad (2000) formulated six strategies for agriculture to maintain cultural landscape values. First, in the best-maintained and most 'authentic' cultural landscapes, semi-natural vegetation types should be protected and preserved, as traditional agricultural systems are valuable because they were sustainable for centuries and can be models for the future. Second, revitalization and intensification of the outfields and low-intensity farming systems should be stimulated. Thirdly, more incentives and substantial financial support are needed for farming that maintains biological-historical values. Fourthly, organic farming and agro-forestry should be encouraged. Fifthly, local knowledge and traditions should be combined with concepts of landscape ecology to develop 'new' cultural landscapes and agro-systems. Sixthly, more research is needed on traditional sustainable agriculture as well as more applications of its results.

In this report we have focused on the natural and cultural values as well as the social and economic values produced by agriculture as secondary products. These five assessment dimensions are also focused by Gómez-Sal et al. (2003) in a reference model suitable for conserving agricultural landscapes in certain developing country contexts. In this case, landscape conservation is not considered an option of quality, like in developed countries, but an inescapable necessity for a sensitive human development. This scenario is characterised by: (a) the maintenance of a wide ecological basis, (b) the production system not being intensive but compatible with the ecosystem sustaining capacity, (c) the ecological value increasing by means of improving quality of goods and services, (d) increasing cultural heritage (patterns, landscape elements and knowledge about the resources) and (e) the search for equity, social integration and distribution of wealth. They consider that the five evaluative dimensions (ecological, productive, economic, social and cultural) have enough capacity for landscape assessment, since they are very descriptive and they include most of the elements contributing to the values of the landscape. Such reference models and scenarios are important to develop also for European countries!

6. Results of the survey

The answers of the questionnaire (see Appendix 4) that was sent to universities, university colleges and research institutions across the Nordic countries regarding research on cultural landscapes, were summed up for each country. Before discussing the results the answers were divided into three groups:

- Research concerning what (is valuable) and where? (Group 1)
  Implementing ecosystem services, developing methods of documentation and survey, connection between large scale and small scale.

- Research concerning how to maintain the landscape values? (Group 2)
  Implementing connections between agricultural methods and different landscape values, effects of management on ecosystem functions as well as landscape ecology, connections between economy and ecology, reasons/motive power for landscape changes.

- Research concerning how to implement maintenance of the values? (Group 3)
  Implementing new farming practices, environmental planning both on a large and a small scale, indicators for evaluations, training/education, local engagement, the economical importance of cultural landscapes, policy support and measures.

6.1 Denmark

A total of 8 responses on current projects were received from Denmark. In addition, we are aware of a significant effort within research in 'Cultural Landscape' at 'Skov&Landskab', KVL, and within rural development at 'Center for research and development in rural areas', CFUL. Skov & Landskab are dealing with the physical planning, the administration and management (private and public) of the landscape as well as management of vegetation and biodiversity. Skov & Landskab also deal with planning methods and geographical information systems (GIS). Main themes for CFUL are Entrepreneurship and Human and social capital in rural areas. The activities of these research groups are included in the following description to the extent we are aware of them.

Several projects deal with the cultural landscape values. A number of projects concentrate on methods to map (and perceive) biodiversity, landscape characteristics, and nutrient load on landscape levels through development of relevant indicators and the use of geographical information systems. A few projects focus on the conceptualization and instigation of the terms 'multifunctional agriculture' and 'eco-system services' which include aspects of economic and social importance. It is characteristic that the latter projects are in a very preliminary phase.

The effect of different farming practises on nature quality and biodiversity are also subject to research. The main efforts are directed towards aspects of organic farming.

Regarding the implementation of measures which create an impact on the cultural landscape, projects include development of models directed for policy and assessing the land use as well as socioeconomic impact of different measures. These projects are EU based. Other projects focus on stakeholder involvement in formulating goals and relevant measures to obtain an improved cultural landscape or rural development. These projects include both organizational aspects and aspects of appropriate indicators which can be used for communication across stakeholder specialization and interests. Also guidelines for grassland management addressing nature quality aspects are developed.

6.2 Finland

In Finland, the number of replies received was 44; some of those representing more than one project. A fair number of projects focusing on description of the physical landscape, identification of values linked to the Finnish rural landscape and methods for identification have been performed. Projects have been describing the genetic diversity of plant and animals in the rural landscape. Visual change of the landscape has been described, and GIS methods developed for space-time assessment of the ecosystem. The bordering fringes between cultivated land and forest has been defined as an important

structure for landscape diversity. Also, indicators for rural landscape have been developed. Links between landscape and values have been identified and, also, silent knowledge linked to landscape values focused upon.

A few projects have been performed on methods of preserving rural cultural landscape. There have been projects on traditional landscape and ways to preserve those. Coastal meadows have been studied and conservation methods introduced into those at practical scale. A quite recent project is focusing on new cultivated plants for diversifying cultivated habitats. In this project, the approach of farmers and public for field plant diversification is under focus of research. The most extensive introduction in the rural landscape preservation approach has been taken in the Finnish Agri-Environmental Scheme, by which preservation of specific pieces of field landscape and maintenance of original races of plants and animals is being subsidised. The impact of the scheme is being assessed by an intensive investigation project. In Lapland, we have introduced a project of landscape laboratory for identifying of methods for preserving arctic landscape.

In Finland, we have a high number of projects focusing on the implementation of the landscape values at ecological, economical and social level and for agri-environmental policy. There has been a project on ecosystem services, landscape architecture and river landscape. The project that focus on economic approach linked to landscape include aspects on bio-energy production, riverside economy, tourism, contract models, eco-design and supply-demand balances. Social approach to landscape includes projects on rural networking, women's approach to landscape, environmental education, rural village as a social landscape and identification of consumers' identity linked to landscape. In recent years there has appeared a high number of projects with a policy approach, mostly focusing on agri-environmental policy, but focusing, also, on multi-functionality and ecological footprint; the methodology for evaluating effectiveness of agri-environmental schemes as tools of agri-environmental policy.

6.3 Norway

In Norway, a total of 80 replies were received. Some of the reported projects concern mapping of cultural landscape qualities and values, monitoring, and monitoring methods on different scales. Land use and landscape changes as well as vegetation history have been studied by different methods, including geographical information systems (GIS). A landscape perception study is also performed.

Several of the projects deal with re-vegetation, restoration and management of valuable cultural landscapes, semi-natural vegetation types and cultural monuments. Most of these projects focus on the effects of restoration and management on specific species, population dynamics and vegetation composition, but also on cultural monuments and animal welfare.

Some of the projects deal with the role of agriculture in producing cultural landscape values and scenarios for declining agriculture, cultural landscapes and tourism, models for instigateion of multifunctionality, the stakeholder's preferences, the need and effects of policy support and measures, decision making and (local) planning. A few projects deal with new farming methods and the possibilities for combining economic and ecological sustainability, for instance by development of labelled products. As a whole, however, there are few implementation projects. "True" interdisciplinary projects are also few, even if some of the projects are based on more than one discipline.

6.4 Sweden

Almost 50 different institutions, mostly universities, have been asked if –and that being the case – to what extent there is research going on concerning cultural landscapes. Replies accounting 16 different research projects have been received, which in one way or another are connected to the cultural landscapes. Almost all of the projects concern the physical environment and visible landscape values. No reports have come from the ethnological institutions. From these institutions you could, however, expect research on the immaterial values of the cultural landscape. A certain part of the ongoing research is performed outside the universities, for instance through different foundations. This sector is not reported, even if we, to some extent, are aware of the projects.

According to the answers of the questionnaire, most projects deal with a certain theme or a specific aspect of the utilization of cultural landscapes. But there are also several larger, more general and interdisciplinary projects (in some cases a research program rather than a single project). The Nordic dimension or aspect is rare, even if you can find some co-operationing projects.

The replies to the questionnaire show a great research variety and breadth. Several of the projects have as an expressed goal to investigate methods to promote biodiversity and collective benefits of agriculture. However, many important research areas are not included in the received replies. This impression might have changed slightly, if there had been time to search for and examine projects outside the established scientific institutions.

In some cases there is a close co-operation between different projects and disciplines, but on the whole the research on cultural landscape is very much divided according to the different disciplines. As a whole you may say that there is today not really a discipline that could be called "Cultural Landscape Research" i.e. a discipline of its own or as a coherent conception or title. On the other hand there is probably no need for a specific institution, cultural landscapes contain so many different aspects and themes, that it would be hard to squeeze them all into one institution.

Based on the Swedish replies to the questionnaire, the following conclusions may be drawn: There is a need for a research programme based on broad interdisciplinary studies on an empiric and basal level as well as on more sophisticated levels. It will be a merit if such a programme is inter-Nordic.

To ensure more and better interdisciplinary cultural landscape research, a stronger coordination between important institutions should be established. It is also absolutely necessary to secure a better and continuing contact between the research society and farmers as well as other landscape managers

6.5 Iceland

In Iceland there was very little response to the questionnaire that was sent out to 18 persons within 14 institutions in Iceland. In general, the concept "cultural landscape" is neither well known nor accepted, nor is there an agreement on what is Icelandic cultural landscape. The projects listed in the appendix are therefore a list of ongoing projects that could be listed within the framework of cultural landscapes.

As Iceland has suffered severe erosion, several large projects have been and are on soil erosion and in later years on primary succession in relation to land reclamation. Also, the relation between grazing, especially sheep grazing, and land degradation and erosion was an important research topic which in later years has led to several projects on the general effect of sheep and horse grazing on vegetation composition and sward development which are ongoing.

In the last few years, analysis of the Icelandic landscape and landscape patterns has been a growing field involving several researchers and evaluation of values within the Icelandic landscape, not least in relation to a growing interest in forestry in Iceland.

The historical aspect of land use are the focus of several large, multidisciplinary projects that were launched a few years ago, where history, archaeology and biology come together. Most of these are joint projects with several universities, both in Europe and N-America.

Mapping and registration of plant and animal species in Iceland, as well as mapping of vegetation and habitat types is an ongoing project by the Icelandic Institute of Natural History. Important data is still missing for several fields, such insects, mosses and lichens, as limited funds have been reserved for these fields in the past.

7. Future research

Based on a comparison between the knowledge we need to be able to maintain the cultural landscape values (see chapter 4), and this research survey, we can conclude that there is still a need for research in many different disciplines and especially a need for interdisciplinary research. Several of the research projects in all the Nordic countries are multidisciplinary but still, not many seems to be really interdisciplinary. Complex cultural landscapes can be understood only in an interdisciplinary context. However, interdisciplinary research is time-consuming and usually it is difficult to get money for such expensive research. In this connection a Nordic approach could be especially valuable: Nordic projects make it possible to compare research results from different regions and countries and may thereby increase the understanding. At the same time the financing is divided between the countries. In addition a Nordic approach would probably be a good basis for development of interdisciplinary methods, lacking today. The problems are often almost the same in several countries and a Nordic development of methods would have a high transfer value.

There is a need for development of a common understanding of the term ecosystem services, as well as methods and indicators to be able to identify them. A Nordic approach could be an advantage in this connection. This is true also with regard to resilience. This is probably the most important needs now, with regard to research concerning "what and where" (group 1, see chapter 5).

The main need regarding research concerning how to maintain the landscape values (group 2), is probably research concerning ecosystem functions, ecosystem services and resilience. Especially in Sweden and Norway there are quite a lot of management projects, but few are focusing on the management effects on the whole ecosystem. The ecosystem approach is generally focused in natural science at present, but this approach is probably even more important in semi-natural ecosystems with their complexity. Since authentic and well functioning traditional agricultural landscapes are dwindling, it is of high importance to study their ecosystems now and to compare effects of old and new management methods, old and modern farming animal breeds, differences between regions etc. There is also a need for studies of land use changes and management effects on the genetic level of biodiversity, especially with regard to the effects of landscape fragmentation. The genetic level has so far been little studied. In addition there is a special need for improved knowledge regarding indicators for "good management".

To implement maintenance of the values (group 3) it is also necessary to develop a more holistic management of cultural landscapes and their values. It is therefore of utmost importance to find new farming practices and management methods taking both sustainable economy and sustainable ecology into account. Key challenges in this connection are ecodesign, ecosystem services and resilience. This kind of research is still in a preliminary phase in the Nordic countries. Improvement of economic and planning models by use of more empirical data, to make them more realistic and reliable, is also a need, as is development of indicators for evaluations of policy support, measures etc. Research helping us to understand options and motivations of both farmers and the public, may play a key role for a successful implementation. In this connection it should also be mentioned that information regarding scientific knowledge may be of utmost importance to influence these options and motivations. It is for instance important to gain appreciation for the fact that innovation may be to maintain and develop cultural landscape values and not just to manage them in a museum way. An efficient communication between the stakeholders in rural areas and the researchers is assumed to be a prerequisite for research to contribute most efficiently, and this must be stimulated in the way research projects and researchers are evaluated.

In connection with implementation, the possibilities for development of labelled products based on cultural landscape values should be underlined (see chapter 3.12), even if we in this report haven't paid special attention to the need for research on this subject. However, there are many reasons to establish the need for documentation of special qualities of such products to avoid a weak labelling that may make the consumers feeling fooled.

8. Recommendations

With this background, the working group will recommend supplementing of current cultural landscape research first and foremost by research focusing on how maintenance of cultural landscape values can be implemented in farming practices and land use. Ecosystem services, resilience and ecodesign are in this connection key challenges. Success of this kind of research depends on development of true transdisciplinary research methods i.e. not just cooperation between related disciplines but between natural sciences, social sciences, the humanities as well as economic studies. The working group will furthermore underline a general need for transdisciplinary cultural landscape research to develop a more holistic knowledge, management and administration of the cultural landscapes.

A Nordic approach will strengthen such research since this would make it possible to use different knowledge existing in the different Nordic countries. NKJ has specified a number of ways in order to stimulate collaboration between different actors within the Nordic countries. The specific choice will depend on the purpose of the collaboration. The working group would like to focus on the advantage the possibilities for parallel and comparative research Nordic research projects may give. Furthermore we would like to stress the possibilities seminars and symposia may give for presentations and transfer of existing knowledge between the countries. In addition Nordic seminars and symposia may be used to highlight the “resource values” of the cultural landscape and influence options and motivations of farmers and the public regarding maintenance of the values of the Nordic cultural landscape.

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10. Appendices

10.1 Appendix 1

MR-FJSL-01/04
Bilag 5 til Referat

Nordisk Ministerråd (Fiskeri, Jord- og Skovbrugs- og Levnedsmiddelministrene)

Ministerdeklaration vedtaget 13. august i Akureyri

AKUREYRI-deklarationen om jordbrukets fremtidige roller og kulturlandskapet som ressurs

Med bakgrunn i de to prosjektene som har behandlet kulturlandskapet og landsbygdens og landbrukets, inklusiv skogens fremtidige roller, vil Vi stille oss bak følgende mål og deklarasjoner, som også omfatter skogen.

Mål:

Målet er å styrke basen for det nordiske samarbeidet, erfaringsutveksling og strategisk samarbeid omkring utviklingsspørsmål som angår landbruket, landskapet og landsbygden med den hensikt å påvirke og forbedre forutsetningene for landbrukets og landsbygdens fremtidige roller.

Målet med det nordiske jordbrukslandskapet og bruken av det skal være å sikre landskaps-verdiene med dets variasjonsrikdom av natur- og kulturverdi. Dette skal betraktes som en helhet og gjøres i et langsiktig og bærekraftig perspektiv, samt fremme jordbrukslandskapet som en ressurs, også rekreativt og opplevelsesmessig for hele samfunnet og for nordisk identitet og utvikling.

Vi deklarerer

- at det finnes behov for å utvikle formene for samarbeid og rollefordeling mellom myndighetene og næringen, i spørsmålet om å utvikle landsbygden og landbruket i linje med samfunnets nye krav og ønskemål, der hensyn tas til markedets vilkår.
- at der er strategisk viktig at de nordiske landene samarbeider om spørsmål vedrørende landbrukets nye roller og om kulturlandskapet og dets kultur- og naturverdier, og at dette settes på den internasjonale dagsorden.
- å sette fokus på spørsmål om landbruket i forvaltningen av natur- og kulturverdier i landskapet som en grunn for langsiktig bærekraftig utvikling og mot landbrukets roller for andsbygdsutvikling.
- at det er en forutsetning for en levende landsbygd at befolkningen og berørte organisasjoner i Norden har muligheter for å delta i ulike planleggings- og beslutnings-prosesser som vedrører landsbygdens, landskapets og landbrukets fremtidige utvikling og roller.
- at de nordiske landene forsterker arbeidet med informasjon, kommunikasjon og kunnskapsutvikling om landbrukets forskjellige roller samt om landsbygdens og jordbrukslandskapets verdier og muligheter.
- at det er viktig å styrke kunnskapsoppbygging og tverrsektoriell forskning og utvikling, herunder verdisetting av kollektive goder omkring utviklingen av landskapet og landbrukets forandrede roller for en bærekraftig utvikling av landsbygden og kulturlandskapet.
- at de nordiske landene skal forsterke fokus på skjøtsel, vedlikehold og utvikling av viktige jordbrukslandskap og landbruket som ressurs for identitet, rekreasjon og bosetting for bredere grupper i samfunnet samt som potensial for nye tjenester og virksomheter; både innenfor og utenfor landbruket.

For å fastholde fokus på disse viktige områdene ønsker Vi at det under høsten 2004

presenteres en plan for møtes-, nettverk- og prosjektinitiativ for de kommende to år.

Nordisk Ministerråd
J-Nr: 60001.15.001/04
Dato: 13. august 2004

10.2 Appendix 2

Dear Head of Department/Head of Research

Please, help us to work out a survey of Nordic research activities focusing on the contribution of agriculture in maintaining cultural landscape as a resource in rural areas. We appreciate if you fill in the enclosed questionnaire or pass it to the person in your department/university/college/institute with responsibility for this research field. Please, send the answers to Line Rosef, Bioforsk Midt-Norge, Kvithamar, N-7500 Stjørdal, Norway at latest the *15th of February*.

The background for this survey is the renewed focus on multifunctional agriculture. This implies that the secondary products of agriculture (as cultural landscape, biodiversity, ecosystem services, local economic activities) may be as important as the primary products (i.e. food, fodder, fibre).

To maintain cultural landscape and collective benefits as a resource for multifunctional agriculture and rural development, it is important to know how the cultural landscape with all its values was created and maintained in interaction with agriculture, and how to implement this knowledge in the agricultural production of today. We therefore want this survey to include

research regarding the creation of cultural landscape and maintenance of its natural and cultural values
research regarding implementation of maintenance and use of cultural landscape values in the agricultural production of today

The Nordic Joint Committee for Agricultural Research (NKJ) promotes and supports cooperation between the Nordic Research Councils. The main goal for NKJ is to support a sustainable agricultural development. A NKJ working group is established to follow up the Aukureyri declaration (shaped by the Nordic Council of Ministers in Aukureyri 13th of August 2004). The working group consists of Professor Sirpa Kurppa, MTT, Finland, Professor Roland von Bothmer/Eivor Bucht, SLU, Sweden, Head of department Lena Bergils, Intryck Hälsingland, Sweden, Head of research unit John Erik Hermansen, Danish Institute of Agricultural Sciences, Denmark, Professor Anna Gudrun Thorhallsdottir, University of Agriculture, Iceland and Head of cultural landscape research Ann Norderhaug, Norwegian Institute for Agricultural and Environmental Research. The working group is responsible for this survey and shall, based on this, give recommendations for future (Nordic) agricultural research.

In advance, thank you very much for your help! If you have any questions or want to know more about this survey or if you want to get the questionnaire by e-mail, please contact Ann Norderhaug or Line Rosef.

Yours sincerely

Ann Norderhaug
(chairman of the working group)
e-mail: ann.norderhaug@bioforsk.no

Line Rosef
(secretary of the working group)
line.rosef@bioforsk.no

(Sign.)

(Sign.)

Vedlegg: Questionnaire

10.3 Appendix 3

Questionnaire

Name of Institution:	
Name of the Department:	
Title of the project:	
Research field:	
Name of the group leader:	
Size of the group (Permanent positions, PhD-students, researchers, technicians):	
Time frame of the project:	
Is the project transdisciplinary, which research fields are included?	
Title of papers:	
Nordic aspects in the research (i.e. of particular interest for Nordic cooperation)?	
Additional remarks, comments:	

Project abstract:

10.4 Appendix 4

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
Nordic	Nordisk Genbank Husdyr		Kan bruk av lokale raser styrke merkevarebygging i matproduksjon i Norden	Husdyr		2002-2004		Combining conservation and production as sustainable tools for management of genetic resources of plant and animals
Norway	University of Oslo	Centre for Development and Environment (SUM)	Rural Landscape Perceptions in Norway and in Scotland	Ethnology/cultural history	Karen Lykke Syse	2003-2008		
Norway	University of Oslo	Natural History Museum, Dept. of Botay	Agricultural landscape changes- effects on the species diversity of vascular plants	Plant ecology	Rune H. Økland	2001-2004	Botany, Cultural landscape ecology	Opens new insights into ways of analysing landscape-scale plant distribution patterns, in search for patterns of botanical diversity
Norway	University of Oslo	Natural History Museum	The effect of sheep grazing on alpine plant communities, species and populations: what is the importance of plant life histories?	Biology, plante ecology	Rune H. Økland	2003-2007		
Norway	Centre for Rural Research		"Agriculture as a producer of collective goods-inward support and external legitimacy" (Landbruket som fellesgodeprodusent-oppslutning innad og legitimitet utad)	Agri-environmental policies, implemantation, acceptance, legitimacy	Katrina Rønningen	2001-2003	Cultural geography, rural sociology	Focussing on Norway, but with references to the international situation, especially the WTO process
Norway	Centre for Rural Research		Agriculture's role as upholder of cultural heritage	Cultural geography, landscape geography, agricultural	Karoline Daugstad	2003-2005	geography, ethnology, archaeology	The report published by the Nordic Ministry from 2005 contains a number of European and

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
				policies				Nordic comparison of interest
Norway/EU	EU-project, 5th framework programme, coordinator Imperial College, UK	Centre for Rural Research and NTNU, Institute of Biology	Scenarios for reconciling biodiversity conservation with decline in agricultural use in the mountains of Europe - BioScene	Ecology, biodiversity conservation, agricultural and rural development	Jonathan Mitchel (Katarina Rønningen (Nor))	2002-2005	sociology, geography, biologist/ecologist	Mountain areas' situation, agricultural decline, vegetation regrowth, biodiversity conservation, rural development
Norway	Centre for Rural Research		Natural resources in forest and mountain (upland) communities - between marginalisation, commercialisation and conservation	Rural and agricultural restructuring, policy changes, landscape changes, biodiversity challenges, business development	Katrina Rønningen	2004/5-2009	geographers, sociologists, politick science, biologist	
Norway	Norwegian Institute for Agricultural and Environmental Research	Fureneset Rural Development Centre	Landscape management by grazing	vegetation ecology, cultural landscape, grazing by sheep and cattle	Pål Thorvaldsen & Liv Guri Velle	2004-2008		
Norway	Norwegian Institute for Agricultural and Environmental Research	Fureneset Rural Development Centre	Feral sheep in coastal heaths	animal welfare, agriculture, vegetation ecology, cultural landscape, sheep grazing	Samson L. Øpstad & Liv Guri Velle	2001-2006	animal welfare, agriculture, vegetation ecology, cultural landscape, sheep grazing	
Norway	Norwegian Institute for Agricultural and Environmental Research	Fureneset Rural Development Centre	Extensive farming systems	Research regarding implementation of use and maintenance og cultural landscape in agricultural	Liv Synnøve Sognnes	2005-?	agronomy, economy, biology	

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
				production				
Norway	Norwegian Institute for Agricultural and Environmental Research/University of Bergen	Fureneset Rural Development Centre	Rock carving conservation-degradation factors and conservation measures	archaeology, conservation, landscape protection	Gro Mandt, Trond Lødøren (UiB) & Samson L. Øpstad	1997-2006	Archaeologists, geologists, meteorologists, biologists, agronomists	Value for all countries that hold rock carvings
Norway	Norwegian Institute for Agricultural and Environmental Research	Grassland and Landscape Division Kvithamar	Restoration of species-poor grasslands – effects of different grazing regimes upon biodiversity and landscape diversity	vegetation ecology, cultural landscape, grazing, mowing, restoration, management	Line Rosef	1999-2004		
Norway	Norwegian Institute for Agricultural and Environmental Research	Grassland and Landscape Division Kvithamar	Field margins in central Norway	vegetation ecology, landscape ecology, agriculture, management	Hege Hovd	1999-2005		
Norway	Norwegian Institute for Agricultural and Environmental Research	Grassland and Landscape Division Kvithamar	Semi-natural vegetation: retreating plant species	botany, landscape ecology	Bolette Bele	2003-2004		
Norway	Norwegian Institute for Agricultural and Environmental Research	Grassland and Landscape Division Kvithamar	Studies of effects of restoration and management	vegetation ecology, history, agriculture, implementation, rural development	Bolette Bele	2000 and ongoing		
Norway	Norwegian Institute for Agricultural and Environmental Research	Grassland and Landscape Division Kvithamar	Hay meadows – biodiversity and conservation	Plant population dynamics, vegetation ecology, history, geography, ethnology, landscape ecology, management, implementation	Ann Norderhaug	1989 and ongoing		Cooperation with Swedish and other Nordic researchers

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
Norway	Norwegian Institute for Agricultural and Environmental Research, Norwegian University of Life Sciences	Grassland and Landscape Division Kvithamar	Grazing behaviour in Nordic cattle – possible influence of breed on the biodiversity of semi-natural grasslands	Vegetation ecology, animal breeding, ethology	Ann Norderhaug	2005-2006	Biology, agriculture/husbandry, management	A Nordic joint project
Norway	Norwegian Institute for Agricultural and Environmental Research	Grassland and Landscape Division Kvithamar	Traces of pre-industrial forest utilisation	Vegetation ecology, agricultural history	Ann Norderhaug	2002-2004	Ornithology Geography, økologi, planning, nature conservation, forestry	Cooperation with Swedish researchers
Norway	Norwegian Institute for Agricultural and Environmental Research/ The Royal Norwegian Society for Development	Grassland and Landscape Division Kvithamar	Summer farming and maintenance of semi-natural vegetation types	Vegetation ecology, agriculture, implementation	Ann Norderhaug	1998-2002	Agriculture, economy, rural development	The results have been implemented in other projects in different ways
Norway	Norwegian Institute for Agricultural and Environmental Research/ The Royal Norwegian Society for Development	Grassland and Landscape Division Kvithamar	ping the traditional cultural apes of the Barentz Region – P model	Biodiversity, cultural landscapes, conservation, management, rural development	Ann Norderhaug	2002-2007	Biology, history, ethnology, geography, agriculture	Norwegian-Russian cooperation
Norway	Norwegian Institute for Agricultural and Environmental Research	Bioforsk Organic Food and Farming Division	Diversity of spiders in ley and cereal land	Diversity of spiders in agricultural and adjacent areas	Reidun Pommeresche	2001-2007	Vegetation structure, structure and distribution of different types of arable areas and field margins, Intensity in agricultural management	Distribution of spiders in organic and conventional managed arable land and field margins
Norway	Norwegian Institute for Agricultural and	Biforsk Horticulture and Urban	Kulturlandskap i endring i Hardanger, Sogn og Nordfjord	Rural development,	Lars Sekse	2004-2006	Horticulture, agricultural	Comparative studies in other Nordic

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
	Environmental Research/ University of Bergen	Greening-Ullensvang, Department of Geography, NILF Bergen	- konsekvensar for opplevingsturismen på Vestlandet	cultural landscape studies, tourism research			economy, geography	countries would be of interest
Norway	Norwegian Agricultural Economics Research Institute (NILF)	Research Department	Towards the operationalization of multifunctionality in the CAPRI modeling system	Agricultural economics, agricultural policy, landscape planning	Klaus Mittenzwei	2003-2006	Agricultural economists and landscape planning	
Norway	Norwegian Agricultural Economics Research Institute (NILF)	Research Department	Changing cultural landscapes: stakeholders' preferences, values and priorities	environmental economics, agricultural policy, biology	Maria Loureiro	2006-2008	economics, political science, geography, biology	
Norway	Norwegian University of Life Science	Dept. of Plant- and Environmental Science	Natural revegetation	Restoration ecology, urban greening	Per Anker Pedersen	1998-2007	vegetation ecology, landscaping, horticulture, soil science	The subject is of common interest for Nordic countries. Nordic cooperation may expand the range of environments in which the studies are conducted
Norway	Norwegian University of Life Science	Dept. of Plant- and Environmental Science	Revegetation under difficult environmental conditions	Restoration ecology, urban greening	Per Anker Pedersen	2005-2007	vegetation ecology, landscaping, horticulture, soil science	The subject is of common interest for Nordic countries. Nordic cooperation may expand the range of environments in which the studies are conducted
Norway	Norwegian University of Life Science	Dept. of Plant- and Environmental Science	Revegetation along hydropower dams in alpine regions	Restoration ecology, urban greening	Per Anker Pedersen	2005-2008	vegetation ecology, landscaping, horticulture, soil science	The subject is of common interest for Nordic countries. Nordic cooperation may expand the

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
								range of environments in which the studies are conducted
Norway	Norwegian University of Life Science	Dept. of Plant- and Environmental Science	Mowing regimes on roadside areas	Urban greening, horticulture	Per Anker Pedersen	2002-2007	vegetation ecology, horticulture	The subject is of common interest for Nordic countries. Nordic cooperation may expand the range of environments in which the studies are conducted
Norway	Norwegian University of Life Science	Noragric, Department of International and Development studies	Land reform, sustainable development and human rights in South Africa		Tor A. Benjaminsen	200-2005++	Human geography, economics, anthropology, development studies	
Norway	Norwegian University of Life Science	Dept. og Plant- and Environmental Science	Paleo-agroecology (WG 3 in EACC)	Sedimentology/catchment study	Rolf Sørensen	2003-2008	Quaternary geology, hydrology, paleo-botany, agro-history	Cooperation with Univ of Lund and Stocholm
Norway	Norwegian University of Life Science	The Department of Ecology and Natural Resource Management (INA)	Ecology of seeds and seedlings in grasslands	Plant ecology	Knut Anders Hovstad	2002-2006		
Norway	Norwegian University of Life Science	The Department of Ecology and Natural Resource Management (INA)	Strengthening the Multifunctional use of European Land: coping with marginalisation	marginalisation of mand use and multifunctional land use with a special focus on agriculture	Anna Martha Elgersma	2003-2006	ecology, landscape ecology, land use, forestry, soil science, agricultural-, resource-, and rural-economics, rural sociology and policy (including CAP)	The cold climate, along distance and sparsely populated areas and the agricultural policy in Norway makes Nordic Cooperation in the project interesting
Norway	Norwegian University of Life	The Department of Ecology and Natural	Enhancement of biodiversity and ecosystem development:	Ecology, restoration	Shivcharn Dhillion	2000-2002	The project did integrate different	

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
	Science	Resource Management (INA)	tests of management and restoration topics	ecology			biological disciplines, such as soil microbial biology, entomology, vegetation ecology, soil biogeochemical dynamics	
Norway	Norwegian University of Life Science	The Department of Ecology and Natural Resource Management (INA)	Urban woodland management in Norway	Urban woodland (skogbruk), Aesthetics and ecology in sivil culture	Vegard Gundersen	?-2006		
Norway	The Norwegian University of Science and Technology (NTNU)	Museum of Natural History and Archaeology, Section of Natural History	Coastal heathland in Central Norway; maintaining and restoring biological diversity	vegetation ecology, conservation biology, cultural landscape, sheep grazing	Asbjørn Moen	1997-2006?	cultural history, sheep grazing, archaeologists, zoologist, botany	Close collaboration with European scientists and management people through network, most important "European Heathland Workshop", and the national network
Norway	The Norwegian University of Science and Technology (NTNU)	Museum of Natural History and Archaeology, Section of Natural History	Species -rich fens and grasslands in boral outlying haylands: Long-term changes, dynamics and threats	Vegetation ecology, conservation biology, cultural landscape	Asbjørn Moen	1967-2010	vegetation ecology, phytogeography, conservation biology, taxonomy of species, mycological studies, zoological studies, mapping cultural history	Close collaboration with Swedish scientists on cultural landscapes in Trøndelag/Jämtland . In 2006 a common symposium on management (schyting and grazing) of upland grasslands (Røros kommune, Jämtlands län). In Norway based mainly on our studies at Sølendet nature reserve

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
Norway	The Norwegian University of Science and Technology (NTNU)	Museum of Natural History and Archaeology, Section of Natural History	Ponds in the cultural landscape	biodiversity, rare species, conservation	Dag Dolmen	2001-2007	zoology (+ in part botany)	
Norway	Norwegian Institute for Nature Research (NINA) and Norwegian Institue for Cultural Heritage Research (NIKU)		Tunstruktur og arealendring (Farmyard structure and spatial changes)	cultural landscapes, biodiversity, cultural heritage, farmyard buildings, landscape planning	Margrete Skår (NINA), Grete Swensen (NIKU)	2001-2005	geography, biology/botany, ethnology, archaeolgoy/GIS	Cooperation with Nordic researchers would be relevant in an interdisciplinary research project with adjoining perspectives which is under preparation
Norway	Norwegian Institue for Cultural Heritage Research (NIKU)		Redefining Rural Resources; Local capacity-building in sustainable management of cultural historic environments of summer mountain farming	summer farms, management, value creation, cultural heritage	Grete Swensen	2005-2007	Ethnology, geography, architecture/planning, archaeology	The project is aiming at building a network of researchers in other countries approaching related problems
Norway	Norwegian Institue for Cultural Heritage Research (NIKU)		Archaeological Sites and Valuable Cultural Landscapes	Archaeology	May-Liss Bøe Sollund	2004-2005	Archaeologists, biologists	
Norway	Norwegian Institue for Cultural Heritage Research (NIKU)		Threatened Landscapes - A study of the decision making, legitimacy and practices of cultural heritage management in local planning	cultural heritage, urbanisation, local planning, landscape planning	Grete Swensen	2001-2004	Ethnology, archaeology, architecture/planning and sociology	Several Swedish researchers working with relevant problems were invited to a workshop arranged by the project in 2002
Norway	Norwegian Institue for Cultural Heritage Research (NIKU)	Environmental monitoring group	Land-use and ecosystem function in Norwegian forest landscapes	Biodiversity, forest ecosystem functioning, human impact, forest history, archaeology	Mikael Ohlson (UMB)	2003-2004	ecology, palaeoecology, plant ecology, economics, environmental economics,	

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
							biology, nature conservation, climate, environmental history, forest vegetation ecology, archaeology, cultural historical landscape analysis, forest history	
Norway	Norwegian Institue for Cultural Heritage Research (NIKU)	Environmental monitoring group	DEMOTEC-Development of a Monitoring System for Cultural heritage through European Cooperation	Monitoring, cultural heritage	Birgitte Skar	2002-2006	cultural heritage, nature research (botany ++) conservation science, landscape planning, engineering, architecture, archaeology	
Norway	Norwegian Institute of Land Inventory (NIJOS)	Utmark	Husdyrbeite i utmark	Husdyrbeite i utmark	Yngve Rekdal	Kontinuerlig	biologi, husdyrnæring, bygdeutvikling, landskapskjøtsel, forvaltning	
Norway	Norwegian Institute of Land Inventory (NIJOS)		Landscape protection as a management tool – does it fulfil its aims?	Landscape change analysis, landscape management practices, socio-economics, landscape perception	Wendy Fjellstad	2006-2008	no	It would be interesting to compare results between Nordic countries to see whether differences in policies or in attitudes influence the success of landscape protection measures in different countries.
Norway	Norwegian Institute of Land Inventory	Landscape Section	3Q – Norwegian Monitoring Programme for Agricultural	Landscape change analysis,	Geir-Harald Strand	Ongoing monitoring	Yes – see research field	Being a national monitoring

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
	(NIJOS)		Landscapes	landscape ecology, biodiversity, cultural heritage, landscape perception		programme - no fixed end data. National data collection over 5-year cycles.		programme, there are clear links to similar programmes in other countries. Since the Nordic countries share similar landscape types and similar challenges there is particularly a need for cooperation between the Nordic countries. This has been addressed through the NordLaM project - see TemaNord 2001:523 - but there is still a need for further cooperation.
Norway	Norwegian Institute of Land Inventory (NIJOS)/Univerity of Bergen	Utmark/Department of Geography	Analysis of vegetation mapping methods	vegetation mapping and cultural landscape	Anders Bryn	5 years	vegetation, biology, social geography, human utilisation and development	
Norway	Sogn og Fjordane University College	Faculty of Engineering and Science, Department of landscape ecology	Structural and land-use changes in a W Norwegian cultural landscape and their impact on plant populations and plant species composition and richness.	Landscape ecology, vegetation ecology, population biology, GIS, cultural history	Liv Norunn Hamre	2002-(2006) 2007	Biology, GIS, cultural history	The results from the study have general transmission value.
Norway	Sogn og Fjordane University College	Faculty of engeneering and science. Department of landscape ecology	Vegkanten - ein artsrik biotop (The road verge - a species-rich habitat)	Vegetation ecology	Ingvild Austad	1997-1999		
Norway	Sogn og Fjordane University College	Faculty of engineering and	Tun + . Cluster farms, building	Planning, landscape	Ingvild Austad	2006-2008. Preliminary	Planning, vegetation	The model and approach using

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
		science/Department of Landscape ecology	tradition and cultural landscapes as a model to modern residential planning in Western Norway.	architecture, cultural heritage		project in2006.	ecology, cultural heritage, landscape architecture, architecture	information from the local cultural heritage and cultural landscape as planning instructions for new residential areas can be transformed to the rest of the Nordic countries
Norway	Sogn og Fjordane University College	Faculty of Engineering and Science, Department of landscape ecology	Establishment of species rich roadverges in Lærdal	Vegetation ecology, Restoration ecology	Knut Rydgren & Ingvild Austad	2003-2007		The results from the study have general transmission value.
Norway	Sogn og Fjordane University College	Faculty of Engineering and Science, Department of landscape ecology	Revegetation along penstocks	Vegetation ecology, Restoration ecology	Jørn-Frode Nordbakken & Knut Rydgren	2006		The results from the study have general transmission value.
Norway	Sogn og Fjordane University College	Faculty of engineering and science. Department of Landscape ecology	Structural Analyses of Features in Cultural Landscapes Based on Historical Cadastral Maps and GIS	Cultural landscape	Stein Tage Domaas	1996-2005	GIS, landscape history, vegetation history, vegetation ecology	
Norway	Sogn og Fjordane University College	Faculty of engineering and science. Department of Landscape ecology	Pollards and foliage as fodder. An overview.	Cultural history, vegetation science	Ingvild Austad and Leif Hauge	2005-200? (preliminary project in 2005-2006)	Different research fields will be included (history, husbandry, nutrition value, techniques, ecology, vegetation, vegetation history, management)	The use of foliage has been common in the Nordic countries as animal fodder though decades resulting in local semi-natural vegetation types due to different nature conditions. The techniques however may have a lot in common.
Norway	Sogn og Fjordane	Faculty of	The coast-goat. Grazing	Vegetation	Ingvild Austad	2004-2005	Animal husbandry,	The project is

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
	University College	engineering and science. Department of Landscape ecology	effects on vegetation and landscape.	ecology	and Brith Natlandsmyr		vegetation ecology,	connected to a specific type of goat (old Norwegian breed)
Norway	Sogn og Fjordane University College	Faculty of engineering and science. Department of Landscape ecology	The traditional West Norwegian farm as a biological and cultural system	Cultural landscape	Ingvild Austad	1995-2001	Vegetation history, archaeology, history, ethnology, vegetation ecology, GIS,	In general
Norway	Sogn og Fjordane University College	Faculty of engineering and science. Department of Landscape ecology	The wooded hay meadow, a sustainable production system?	Agriculture	Ingvild Austad	1998- 2001	Agriculture, history and vegetation ecology	In general
Norway	Sogn og Fjordane University College	Faculty of engineering and science. Department of Landscape ecology	Foliage as a resource using new techniques	Agriculture, animal husbandry, vegetation ecology, cultural heritage	Ingvild Austad	1999 – 2003	Agriculture, animal husbandry, vegetation ecology, cultural heritage, GIS, management	In general
Norway	Sogn og Fjordane University College	Faculty of engineering and science. Department of Landscape ecology	Changes in biological diversity due to changes in land-use and management	Vegetation ecology, ethnology	Ingvild Austad	1993- 1998		In general
Norway	Sogn og Fjordane University College	Faculty of engineering and science. Department of Landscape ecology	Skjøtselsboka. Management of the cultural landscape and semi-natural vegetation types	Vegetation ecology, cultural history	Ann Norderhaug (co-editors: Ingvild Austad, Leif Hauge & Mons Kvamme)	1996-1999	Vegetation ecology, cultural heritage	In general
Norway	Sogn og Fjordane University College	Faculty of engineering and science. Department of Landscape ecology	The cultural landscape in Sogn og Fjordane, utilization and protection	Cultural landscape	Ingvild Austad	1988 – 1993	Cultural heritage, vegetation ecology	In general
Norway	Sogn og Fjordane	Faculty of	Mite communities in	Zoology.	Torstein	2000-2006	Zoology, ecology,	This is the first

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
	University College	engineering and science. Department of Landscape ecology	traditional agricultural landscape. En studie av mosemidd-samfunn utviklet på tradisjonell kulturmark i vestnorsk kulturlandsap/gårdsdrift.	Ecology.	Solhøy Ingvild Austad Knut Rydgren		vegetation ecology, management	research on the soil Acari at traditional used semi-natural habitats in extensive agriculture landscape in Scandinavia. Ours results provides important information on soil mite populations in agricultural natural soils in extensive, old cultural landscape. Our studies on mite communities in semi-natural traditional agriculture represent useful reference data for evaluation of soil degradation in landscape with intensive agricultures.
Norway	University of Bergen	De naturhistoriske samlinger Ecological and Environmental Change Research Group (EECRG; http://www.uib.no/bot/qeprg/)	Ancient gardens EU-project Cultural landscapes of the past:recovering crop fields and gardens in archaeological parks of Europe. No EU-CLT-CA12 200597/001-001 "CULTURE 2000"	Garden history/cultural landscape	Dagfinn Moe	June 2005-July 2006	Osteology, archaeology, botany incl. quaternary geological techniques	Ancient gardens within Norway: The renaissance. (The only partner within the Nordic countries.)
Norway	University of Bergen	De naturhistoriske samlinger Ecological and Environmental	Habitation and human disturbances within the Val Febbraro, Central Italian Alps	Archaeology, vegetation history, geology, palaeoclimatolog	Francesco Fedele	1995-2008	YES!	Highly relevant for high arctic and alpine research in Sweden & Norway

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
		Change Research Group (EECRG; http://www.uib.no/bot/qeprg/)		y, zoology				
Norway	University of Bergen	De naturhistoriske samlinger Ecological and Environmental Change Research Group (EECRG; http://www.uib.no/bot/qeprg/)	The sanddune area in west Lithuania as a part of a former heathland and culture landscape.		Dagfinn Moe	Ended 2005	Archaeological and geological support	Former heathland landscape
Norway	University of Bergen	De naturhistoriske samlinger Ecological and Environmental Change Research Group (EECRG; http://www.uib.no/bot/qeprg/)	Vegetation and cultural history of Røst, Lofoten, North Norway	Joint archaeology and botany	Dagfinn Moe	2002-2007	Archaeology and vegetation history	Yes- coastal habitation studies
Norway	UIB	Bergen Muesum Ecological and Environmental Change Research Group (EECRG; http://www.uib.no/bot/qeprg/)	Archaeological excavation at Kvitevoll, Halsnøy Island, Sunnhordaland, Western Norway, 2004. Results from the oribatid mite analysis	Archaeoecology, Ecology	Ørjan Engeland, Heidi Handeland, Kari K. Kristoffersen Med bidrag av Lene Halvorsen, Kari Hjelle og Arguitxu de la Riva-Caballero	2005 - 2006	Archeology, palaeoecology	
Norway	University of Bergen	Department of Biology Ecological and Environmental Change Research	Regeneration niche of five conifers	Vegetation Ecology, Biological invasions, plant regeneration ecology, climate	H. John B. Birks (leader) Vigdis Vandvik (deputy leader)	May 2006 – May 2009	Vegetation Ecology, Germination Ecology, Vegetation History	Encroachment of native vegetation, such as heathlands.

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
		Group (EECRG; http://www.uib.no/bot/qeprg/)		modelling				
Norway	University of Bergen	Department of Biology Ecological and Environmental Change Research Group (EECRG; http://www.uib.no/bot/qeprg/)	The Effects of Traditional Heathland Management and its Discontinuation on Vegetation at Lygra, Western Norway	Ecology	H. John B. Birks (leader) Vigdis Vandvik (deputy leader)	2005 - 2009	Plant Ecology, Vegetation history, Agricultiural history, Agriculture	
Norway	University of Bergen	Department of Biology Ecological and Environmental Change Research Group (EECRG; http://www.uib.no/bot/qeprg/)	Bekjemping av einstape i vestnorske kystlyngheier - effekter av slått, knekking og sprøytemidlene gratil og asulam.	Ecology	H. John B. Birks (leader) Vigdis Vandvik (deputy leader)	1997 - 2005	Ecology, agriculture	
Norway	University of Bergen	Department of Biology Ecological and Environmental Change Research Group (EECRG; http://www.uib.no/bot/qeprg/)	Vegetasjonsendringer i vestnorsk kystlynghei – effekter av skjøtselsformene brann og sauebeite på rehabilitering av gammel lynghei på Lurekalven i Hordaland.	Ecology	H. John B. Birks (leader) Vigdis Vandvik (deputy leader)	1993 – ongoing.	Ecology, agriculture	
Norway	University of Bergen	Department of Biology Ecological and Environmental Change Research Group (EECRG; http://www.uib.no/bot/qeprg/)	The effects of changes in the land-use regime on the population dynamics of trees colonising *Calluna* heathlands.	Ecology, Agricultural history	H. John B. Birks (leader) Vigdis Vandvik (deputy leader)	1992 - 1993	Population ecology, Agricultural history	
Norway	University of Bergen	Department of Biology Ecological and	Response of the vegetation and flora of mountain summer farms to recent	Plant ecology, Experimental ecology,	H. John B. Birks (leader) Vigdis Vandvik	1997–2002	Vegetation Ecology, Germination	Similar land-uses and land-use changes have also

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
		Environmental Change Research Group (EECRG; http://www.uib.no/bot/qeprg/)	changes in land-use in western Norway.	Biodiversity, Germination ecology, Biostatistics, Land-use history,	(deputy leader)		Ecology, Biostatistics, Land-use history, Agricultural history,	been going on in other nordic countries; no nordic project has yet compared the dynamics of these landscapes across the broad-scale gradients of climate, history, and biogeography found in the nordic countires
Norway	University of Bergen	Department of Biology Ecological and Environmental Change Research Group (EECRG; http://www.uib.no/bot/qeprg/)	Grazing and Upland Birds (GRUB)	Effects of grazing on upland grassland biota	Peter Dennis, Macaulay Institute, Aberdeen	2002-2005, writing ongoing	Botany, ornithology, entomology, analytical chemistry	Effects of grazing pressure are highly relevant to management of cultural landscapes, also in Nordic countries.
Norway	University of Bergen	Bergen Museum Ecological and Environmental Change Research Group (EECRG; http://www.uib.no/bot/qeprg/)	Restoring grassland using seed-mixtures and transplants originating from an old species-rich hay meadow	Quatitative ecology	Losvik, Mary H.	1998-2007	No	Yes
Norway	University of Bergen	Bergen Museum Ecological and Environmental Change Research Group (EECRG; http://www.uib.no/bot/qeprg/)	Mosses as a threat to hay meadow diversity.	Quantitative ecology	Losvik, Mary H.	2003-2006.	No	Yes, in the future
Norway	University of Bergen	Department of Biology Ecological and Environmental	Demography and performance of the declining *Arnica montana* related to population size and land-use.	Ecology	H. John B. Birks (leader) Vigdis Vandvik (deputy	1,5 year (masterthesis) 2005 – 2007	Population ecology, agricultural history, land-use	*Arnica montana* is a declining species, characteristic of the traditional cultural

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		Change Research Group (EECRG; http://www.uib.no/bot/qeprg/)			leader)		history	landscapes of Scandinavia and North-west europe.
Norway	University of Bergen	The Natural History Collections, Bergen Museum/Department of Biology	*Alnus glutinosa* woodlands in Western Norway	Biology / ecology	Brith Natlandsmyr	4 years	geography	
Norway	University of Bergen	The Natural History Collections, Bergen Museum	Pollen productivity estimates of trees from western Norway	Palaeoecology / pollen analysis	Kari Loe Hjelle	2004-2007	Ecology, palynology, geography.	The project is a result of the NordForsk network program "Pollandcal", financed 2001-2005. Further co-operation on a Nordic basis is of particular importance.
Norway	University of Bergen	The Natural History Collections, Bergen Museum	The effect of land-use on pollen composition and water nutrient status	Ecology, pollen, diatom	Kari Loe Hjelle	2005-2007	Biology, chemistry	Comparable investigations have been carried out in Denmark. To be able to understand the effect of different land-use practices on lakes and vegetation in different geographical areas, Nordic cooperation is essential.
Sweden	SLU, Swedish Agricultural University	The Swedish Biodiversity Centre	Management of seminatural pastures- Economy and biodiversity	To find the best solutions for different types of meadows and seminatural grasslands where we may *conserve and	Urban Emanuelsson	2001-2008	Ecology, economy, animal husbandry, history, social sciences, international questions,	• Comparisons of seminatural pastures in different countries (area, development etc.) • Subsidy systems • Management recommendations

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
				increase the biodiversity together with other values *show respect and consideration for the local land-use history *reach stability by means of an ecologically sound management of the grasslands *reach a sustainability by means of profitable production- and business models *show respect and consideration for the farmer's experience and needs				
Sweden	Swedish Life Science University	Dept. of Landscape Planning	The Pastoral Landscapes-perspectives for landscape planning, landscape management and grazing	Landscape management in floristic, faunistic and cost-benefit context, landscape planning and economic models as implementation	Roland Gustvsson	1995-2005	economic production values with biodiversity, aesthetic and historical values in a landscape context	contact with other Nordic universities

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
				instruments, landscape values				
Sweden	Linköping University	Dept. of physics, chemistry and biology	Evaluation of preservation status of nature reserves and impact of management schemes	ecology, statistics	Per Milberg	2003-2008	The project is part of a transdisciplinary programe. ENGO	
Sweden	Swedish University of agricultural science (SLU)	Dept. of Crop production ecology; short rotation forestry	energiskogodling på åkermark - möjligheter för biologisk mångfald och kulturmiljö e ett landskapsperspektiv		Martin Weih	2004-2006	ecology, economy, agri-forestry	
Sweden	Lund University	Department of Archaeology and Ancient History	Naturvård och kulturmiljövård - hur förbättra samarbetet	Archeaology, historical (paleo-) ecology	Eva Svensson	2005-2007	Linked to transdisciplinary research programme Naturvårdskjedan	
Sweden	Lund University	Dept of ecology	Pastures in landscape perspective - consequences for biodiversity of birds and day-flying butterflies	ecology	Henrik G. Smith	2001-2005	Part of transdisciplinary research programme Naturvårdskjedan	
Sweden	Swedish University of agricultural science (SLU)	Dept of economy	Policy measures for biodiversity and other public goods of the agricultural landscape	(Environmental) economics	Knut Per Hasund	2001-2006	Part of transdisciplinary research programme Naturvårdskjedan	
Sweden		Two additional research projects regarding the cultural landscape are linked to Naturvårdskjedan. These projects are not financed by SEPA						
Sweden		Department of Human end Economic Geography	The general public and seminatural pastures		Marie Stenseke	2004-2008	Human geography, landscape architecture	Yes

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Sweden		Department of Human end Economic Geography	The process of implementation		Marie Stenseke	2004-2008	Human geography and economics	Yes
Sweden		Department of Human end Economic Geography	Local community participation and learning for enhanced biodiversity	Human geography, nature conservation	Marie Stenseke	4 years	No, but cooperating transdisciplinary within conservation chain (CMB)	
Sweden	Swedish University of agricultural science (SLU)	Department of Economics/History of Agriculture	Project Krusenberg	History of Agriculture	Janken Myrdal/ Clas Tollin	2002-2006 (2008)	biology/botany, history of agriculture, human geography, economics	
Sweden			Visualization Tools for Public Participation in Managing Landscape Change		Å Ode	2003-2005		
Sweden			The rural spatial development perspective in an urban region		E Bucht/O Reiter	2002-2005	Spatial planning, rural development, landscape planning, agriculture, tourism	No Nordic connections
Sweden			Instruments of control as related to biological diversity in the agricultural landscape	Biology, landscape planning	E Skärbäck/A Larsson	2002-2005		No Nordic connections
Sweden			Ecological farming as creator of multifunctional structures in the landscape	Agriculture, landscape planning	C Axelsson Lindgren	1999-2002		No Nordic connections
Denmark	Danmarks JordbruksForskning	Afd. For Jordbruksproduktion og Miljø	Management and regulation related to multifunctional agriculture		Egon Noe	2003-2003		
Denmark	Danmarks JordbruksForskning	Afd. For Jordbruksproduktio	Multidisciplinary development .... In rural		Egon Noe	2002-2006	Agronomy, botanic,	

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		n og Miljø	areas (DYNAMO)				agricultural sociology	
Denmark	Danmarks JordbruksForskning	Afd. For Jordbruksproduktion og Miljø	Naturkvalitet i økologisk foredling	biological diversity, ecosystem functioning, esthetical landscape perspectives	Jesper Fredskan/Egon Noe	200-2005	Biology, agronomy, anthropology, sociology, policy	
Denmark	Danmarks JordbruksForskning	Afd. For Jordbruksproduktion og Miljø	REFUGIA	organic farming, multifunctional land use, agriculture	Tommy Dalgaard	2006-2009	Env. Science, agroecology, zoology, geography	Danish study areas included
Denmark/EU	Danmarks JordbruksForskning	Afd. For Jordbruksproduktion og Miljø	MEA-scope	Multifunctional land use and agriculture	Tommy Dalgaard	2004-2007	Agroecology, economy, sociology, agronomy, envi. Sci.	Danish study areas included
Denmark/EU	Danmarks JordbruksForskning	Afd. For Jordbruksproduktion og Miljø	SENSOR	Impact assesments of EU policies	Tommy Dalgaard	2005-2008	Economy, sociology, planning, agroecology, env. Science3, geography	Collaboration Swedish (Univ Lund) and Finnish researchers (IFRI)
Denmark	Danmarks JordbruksForskning	Afd. For Jordbruksproduktion og Miljø	AGWAPLAN		Uffe Jørgensen	2005-2008/09	Agroecology, agronomy, rural sociology, geology	Danish study areas
Denmark	Roskilde University	Dept. of Geography and International Developments Studies	Landskapskarakterkorløgning /Udvikling af det åbne land		Ole Hjorth Jørgensen/Jesper Brandt			
Finland	Kokkola University Consortium (University of Jyväskylä)	Chydenius Institute - Social science	Rural as a cultural product	sociology, geography	Kari Ilmonen	2006-2011	Sociology, geography, economics	Cooperation with Swedish partners
Finland	Kokkola University Consortium (University of	Chydenius Institute - Social science	Economic valuation of the Countryside	Economics, rural studies	Jouni Kaipainen	2003-2007		Comparing the values from different studies.

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
	Jyväskylä)							What total value for countryside/multifunctional agriculture? How conceptualized?
Finland	MTT Agrifood Research Finland	MTT Economic research	Contract-based provision of public benefits in agriculture	public goods, voluntary agreements, information economics, principal-agent	Aakkula Jyrki	2000-2002		Unofficial cooperation
Finland	MTT Agrifood Research Finland	MTT Plant production (former Environmental Management)	Integrated management of rural-based environmental education - relations of environment, food chain and sustainable development	sustainable development, environmental education, food chain	Smeds Pia	2002-10 - 2005-09		Unofficial cooperation with Norway (Ås)
Finland	MTT Agrifood Research Finland	MTT Plant production (former Environmental Management)	ERNIE - European Rivers Network: Integrated Environments	environmental management, GIS, local potential, rural development, indicators, regional policy and strategies, eco-entrepreneurship, eco-tourism, local and regional actors, river Kokemäenjoki catchment area, interregional co-operation, EU-RECITE II programme	Kurppa Sirpa	1999 - 2002	See keywords	Two partners in the project from Sweden: Kallmar and Kalix
Finland	MTT Agrifood Research Finland	MTT Economic research	The Agri-Environmental Footprint: Development of a common generic methodology for evaluating the effectiveness of	agri-environmental schemes, footprint index, effectiveness,	Peltola Jukka	2005-04 - 2007		**Other Organizations:** The University of Reading, UK (Reading), Teagasc,

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			European agri-environmental schemes	AFI				Ireland (Teagasc), University College Dublin, Ireland (UCD), Institute for Rural Development Research, Wolfgang Goethe University, Germany (IfLS), **The Royal Veterinary and Agricultural University, Denmark (KVL),** Szent Istvan University, Hungary (SIU), Agricultural University of Athens, Greece (AUA)
Finland	MTT Agrifood Research Finland	MTT Economic Research	Development of green identity and consumer's attitude to a new technologies in organic food production and trade	consume identity, organic food, technology, consumer marketing	Kupiainen Terri	2003-03 - 2006	Slightly	Unofficial
Finland	MTT Agrifood Research Finland	MTT Agricultural Engineering	Farm center design as a functional landscape challenge	Farm buildings, functional design, functional profiling, landscape analysis, scenery simulation, fotomontash, green design	Kivinen Tapani	2002-04 - 2005		
Finland	MTT Agrifood Research Finland	MTT Plant production (former Lapland Research Station)	Landscape management in tourist destinations. Case Levi	landscape management, tourist destinations, landscape impacts, interactive	Uusitalo Marja	2003-01 - 2007-12	See keywords	Nordic Lapland cooperation

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
				planning, landscape management, landscape analyze, transformation of the tourist destination, virtual landscape, landscape iconography				
Finland	MTT Agrifood Research Finland	MTT Economic research (former Environmental Management)	Developing environmental and landscape care in rural areas	rural environment, biodiversity, water protection, GIS, Loimijoki programme, sustainable agriculture	Luostarinen Matti	1994 - 1998	Yes, see research field	
Finland	MTT Agrifood Research Finland	MTT Economic research	Multifunctional agriculture and policy measures	multifunctional agriculture, nutrient runoffs, biodiversity, landscape diversity, policy design, supply, demand, cost-benefit analysis, externalities, public goods, transaction costs, income transfer efficiency	Lankoski Jussi	2003-04 - 2005-12	multifunctional	
Finland	MTT Agrifood Research Finland	MTT Plant production (former Environmental	Adding environmental values to rural products	added values to rural products ronment, ethics,	Kurppa Sirpa	1999 - 2005		

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
		Management)		aesthetics, brand products, agri-environmental indicators, quality- and environmental systems, interaction between the rural and urban cultures, environmental education				
Finland	MTT Agrifood Research Finland	MTT Economic research	Multifunctional agriculture: supply, demand and policy design	multifunctional agriculture, nutrient runoffs, biodiversity, landscape diversity, policy design, supply, demand, cost-benefit analysis, externalities, public goods	Lankoski Jussi	2001-03 - 2003-03	multifunctionality	Not known
Finland	University of Oulu	Department of Geography, Department of Architecture and Unit of Sociology, Women Studies and Environmental Education	Northern Villages in the European Context (NOVILE): Local knowledge as a resource for endogenous rural activity and planning	Geography, community planning (architecture), sociology	Toivo Muilu	01.01.2006 - 31.12.2010	The project is transdisciplinary, research fields are geography (Muilu and two PhD students), community planning/architecture (Mäntysalo and one PhD student) and sociology (Renikainen and one PhD student)	Two of the PhD students have partners from Sweden and Norway. The Nordic cooperation is organized through Norwegian Institute for Urban and Regional Research (NIBR), in which our contact person is project manager Eva Irene Falleth. Our other partners are

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
								from France, Hungary, Ireland, Poland and Switzerland.
Finland	MTT Agrifood Research Finland	MTT Plant production (former Environmental Management)	From the conservation of the native breeds to the social welfare and rural entrepreneurship	native breeds, commodification	Kurppa Sirpa	2004-2006	slightly	Not known
Finland	Turku University	Satakunta Env. Res. Institute	Farmer's silent knowledge in maintaining agricultural landscape	Agroenvironmental research	Mirja Kortesharju	2006-2007	Cultural and sociological sciences	Development of multifunctional agriculture in Scandinavia
Finland	MTT Agrifood Research Finland	MTT Plant production (former Lapland Research Station)	Tourist Destinations as Landscape Laboratories	nature-based tourism, landscape, environmental impacts, landscape impacts, indicators, impact monitoring, land-use managementsustainability	Uusitalo Marja	2004-09 - 2007-08	See the field,	
Finland	University of Turku	Geography	Landscape Change Trajectory Analysis in the assessment of ecosystem space-time sustainability	Geography, landscape ecology	Niina Käyhkö	2006-07	Mainly geographical, links to biology (ecology) and history	Collaboration with the Department of Physical Geography and Quaternary Geology, Stockholm University, Sweden. The unit for Ecological Geography is a Swedish competence centre in for biodiversity studies on biotope and landscape level. The main contact in

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
								Sweden will be Dr Helle Skånes
Finland	Finnish Environment Institute	Research Programme for Biodiversity	Monitoring the effects of the Finnish agri-environmental support scheme (MYTVAS2)	Agricultural biodiversity	Mikko Kuussaari	2000-2003-2006	Transdisciplinary through the area of biodiversity from landscape to habitat and species, and linked to BD policy approach.	
Finland	University of Helsinki	Department of Applied Biology	Agricultural environments in rural-urban fringes their diversity and social values for the inhabitants in rural-urban societies	agroecology	Hietala-Koivu, Reija	10.1.2005 - 31.12.2007.	it is multidisciplinary, the level of transdisciplinarity is at reach	all projects in the Nordic context (in Finland)
Finland	MTT Agrifood Research Finland	MTT Economic research	Multifunctional agriculture and policy measures	multifunctional agriculture, nutrient runoffs, biodiversity, landscape diversity, policy design, supply, demand, cost-benefit analysis, externalities, public goods, transaction costs, income transfer efficiency	Lankoski Jussi	2003-04 - 2005-12	multifunctional	
Finland	University of Turku	Geography	Landscape Change Trajectory Analysis in the assessment of ecosystem space-time sustainability	Geography, landscape ecology	Niina Käyhkö	2006-07	Mainly geographical, links to biology (ecology) and history	Collaboration with the Department of Physical Geography and Quaternary Geology, Stockholm University, Sweden. The unit for Ecological

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
								Geography is a Swedish competence centre in for biodiversity studies on biotope and landscape level. The main contact in Sweden will be Dr Helle Skånes
Finland	University of Helsinki	Department of Applied Biology	Measures for the nationally valuable landscapes in Finland (VAMMI)	agroecology	Helenius, Juha	1.1.2003 - 31.12.2005.	it is multidisciplinary, the level of transdisciplinarity is at reach	all projects in the Nordic context (in Finland)
Finland	University of Helsinki	Department of Applied Biology	Monitoring visual landscapes in Finland	agroecology	Helenius, Juha	1.6.1996 - 31.12.2006.	it is multidisciplinary, the level of transdisciplinarity is at reach	all projects in the Nordic context (in Finland)
Finland	University of Helsinki	Department of Applied Biology	Indicators of biodiversity in agricultural environment	agroecology	Helenius, Juha	14.4.2003 - 31.12.2004.	it is multidisciplinary, the level of transdisciplinarity is at reach	all projects in the Nordic context (in Finland)
Finland	MTT Agrifood Research Finland	MTT Animal Breeding	Genetic diversity of North European cattle breeds	cattle, breed, genetic diversity, Y chromosome, mitochondrio	Kantanen Juha	2000 - 2006	Also links with landscape and landscape change	Co-operation with Nordic Gene Bank
Finland	MTT Agrifood Research Finland	MTT Plant production	Jokioinen Estates plant inventory	genetic resources, cultural history, inventory, plant database, open-air museum	Sahramaa Mia	2005-04 - 2006-12		Nordic Gene Bank
Finland	MTT Agrifood Research Finland	MTT Plant production (former Environmental Management)	Monitoring the visual agricultural landscape	Landscape research Key words: Finnish Agri-	Hietala-Koivu Reija	1996 - 2002	Yes; physical landscape, mental preference	Unofficial cooperation

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
				Environmental Programme (FAEP), visual change, monitoring the landscape, agricultural landscape, preference of the landscape, digital editing of the photos				
Finland	MTT Agrifood Research Finland	MTT Plant production	Clone selection of woody ornamentals	landscape gardening, overwintering, woody ornamentals	Juhanoja Sirkka	1989 - 2003		Nordic Gene Bank
Finland	University of Helsinki	Department of Applied Biology	Agricultural environments in rural-urban fringes their diversity and social values for the inhabitants in rural-urban societies	agroecology	Hietala-Koivu, Reija	10.1.2005 - 31.12.2007.	it is multidisciplinary, the level of transdisciplinarity is at reach	all projects in the Nordic context (in Finland)
Finland	Finnish Environment Institute	Research Programme for Biodiversity	Monitoring the effects of the Finnish agri-environmental support scheme (MYTVAS2)	Agricultural biodiversity	Mikko Kuussaari	2000-2003-2006	Transdisciplinary through the area of biodiversity from landscape to habitat and species, and linked to BD policy approach.	
Finland	MTT Agrifood Research Finland	MTT Plant production	Added value of increased biodiversity in crop production - new prospects for environment, farmer and consumer	new crops, special crops, alternative crops, biological characteristics, pH, nutrient content, allocation of nutrients, rhizosphere	Keskitalo Marjo	2003-01 - 2007-12	See keywords	Unofficial Nordic cooperation among the partners and researcher from other Nordic countries.

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
				microbes, biomass, flowering, pollinators, phenols, weeds, biodiversity of field, interaction, expenses, profitability, economy, farmer, consumer, landscape, acceptance, GIS				
Finland	Association for traditional rural landscapes in SW Finland		ManTra	Traditional rural biotopes	Iiro Ikonen	-31.12.2007	Traditional rural biotopes	Pages in English. Nordic- Baltic aspect. Creation of common strategy for traditional rural biotopes, networking
Finland	Southwest Finland Regional Environment Centre	Nature protection department	Reed strategy	Coastal meadows, economical and ecological solutions	Iiro Ikonen	-31.12.2007	Coastal meadows, reed products, utilisation of coastal areas, management of traditional landscapes	Far too common Common Reed (Phragimites australis)
Finland	MTT Agrifood Research Finland	MTT Plant production (former Environmental Management)	From the conservation of the native breeds to the social welfare and rural entrepreneurship	native breeds, commodification	Kurppa Sirpa	2004-2006	slightly	Not known
Finland	MTT Agrifood Research Finland	MTT Economic research (former Environmental Management)	Sustainable development in agriculture; indicators, administrative programmes and demonstrations	sustainability, indicators	Luostarinen Matti	1997 - 2000-04	Yes: sustainable agriculture, sustainable development, landscape, indicators, organic production,	

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
							environmental protection, life cycle assessment, environmental subsidies, Loimijoki-project	
Finland	University of Turku	Satakunta Environmental Research Institute	"Markets for Ecosystem Services: The Case of Natural Values Trading in SW Finland	Environmental Economics	Juha Hiedanpää	2004 – 2007	Institutional economics, policy sciences, administrative sciences, planning theory, sociology	Market-oriented Biodiversity protection in Scandinavia
Finland	MTT Agrifood Research Finland	MTT Agricultural Engineering	Farm center design as a functional lanscpae challenge	Farm buildings, functional design, functional profiling, landscpae analysis, scenery simulation, fotomontash, green desingn	Kivinen Tapani	2002-04 - 2005		
Finland	Seinäjoki Polytechnic	School of Agriculture and Forestry	Logistics in bio energy acquiring and delivery	Comparing the logistic bottlenecks in bio energy production chain using the best available quality and quantity information. Using simulation programs such as "Stella" or "Simulink"	Antti Pasila	1.6.2006-31.12.2007	Yes; Agriculture, Environmental technology and Technical sciences	The synergy in high quality Nordic environmental care. The set aside field areas. Bio energy production on Northern latitudes.
Finland	Seinäjoki Polytechnic	School of Agriculture and Forestry	Rural networks using local and indoor positioning	GPS- and WLAN positioning as a tool in carrying out agribusiness inside rural and	Antti Pasila	1.6.2006-31.12.2007	Yes; Agriculture, ICT and Food technology	The synergy of high quality Nordic hygiene in local and rural networks: Synergy of ICT and

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
				local information networks				agriculture
Finland	University of Turku	School of Cultural Production and Landscape Studies	Culture and welfare of the rural women in Satakunta	Landscape studies	Päivi Granö	2007-2010	Cultural studies and landscape studies	
Finland	Finnish Environment Institute	Research Programme for Environmental Policy	Agri-environmental management and hybrid forms of governance. A case study on the implementation of agri-environmental policy at the local level.	Environmental social science	Minna Kaljonen	2000-2007	The research has been conducted as part of the multi-disciplinary projects. The research fields included have been: environmental science (esp. hydrology), economics, policy science, futures studies	Nordic comparison on the agri-environmental policies would be highly interesting.
Finland	MTT Agrifood Research Finland	MTT Economic research	Agri-environmental policy design	agri-environmental policy, policy instruments, multifunctionality, nutrient runoffs, biodiversity, landscape diversity	Lankoski Jussi	1999-01 - 2002	See keywords	Unofficial cooperation
Finland	MTT Agrifood Research Finland	MTT Economic research (former Environmental Management)	Biodiversity implications of agricultural policies: an integrated approach (BIAPIA)	: biodiversity, agri-environmental policy, DREMFIA model, visualisation, GIS, Geographical	Laurila Ilkka P.	2000 - 2005	Yes: see above	

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
				Information Systems, landscape, mental map, policy measures, local community				
Iceland	Univ. Iceland	Geography	Tourism: effect on vegetation, soil erosinon and landscape views	Geography	Gudrun Gisladottir	Ongoing		
Iceland	Univ. Iceland	Geography	Land use, vegetation cover and soil erosion	Geography	Gudrun Gisladottir	Ongoing		
Iceland	Univ. Iceland	Geography	The history of land use and vegetation change by Reykholt, W-Iceland	Geography	Gudrun Gisladottir	Ongoing	Par of a research program in co-op with 5 Universities in U. K. archaeology	
Iceland	Univ. Iceland	Geography	Location of summer farms in W-Iceland	Geography	Gudrun Gisladottir	Ongoing		
Iceland	Univ. Iceland	Biology	Primary succession on a glacier outwash plane in S-Iceland	Ecology	Thora Ellen Thorhallsdottir	Ongoing		
Iceland	Univ. Iceland	Biology	How do Icelanders evaluate landscape?	Ecology/Sociology	Thora Ellen Thorhallsdottir	2004-2006	Biology, Sociology	
Iceland	Univ. Iceland	Biology	Analysing landscape patterns in Reykjanes Recreation Area	Ecology/Sociology	Thora Ellen Thorhallsdottir	2005-2007		
Iceland	Univ. Iceland	Biology	Landscape for sale? Reflections from Icelandic postcard images	Ecology/Sociology	Thora Ellen Thorhallsdottir	2004-2006		
Iceland	Agr. Univ. Iceland	Environment	Soil erosion assessment in Iceland	Soil Science	Olafur Arnalds			
Iceland	Agr. Univ. Iceland	Environment	Digital Farmland Database	Geography	Olafur Arnalds			
Iceland	Agr. Univ. Iceland	Environment	Cultural landscape in Selardalur; sustainable past and future development, W-Iceland	Landscape architecture	Audur Sveinsdottir, Ragnhildur Sigurðardottir	2003-3005	Landscape architecture, history	
Iceland	Agr. Univ. Iceland	Environment	Landscape analysis comparison between the	Landscape architecture	Audur Sveinsdottir			

Country	Institution	Name of Department	Title of the project	Research Field	Name of the group leader	Time frame	Transdisciplinary	Nordic aspects
			municipality of Herand in Norway and Thistilfjordur in Iceland					
Iceland	Agr. Univ. Iceland	Environment	Present vegetation and past land use: livestock census from 1702 to present in relation to todays vegetation composition	Range Science	Anna Gudrun Thorhallsdottir	2002-2006	Botany, ecology, agronomy, history	
Iceland	Agr. Univ. Iceland	Environment	Horse grazing: grazing pressure and sward development and grazing behaviour	Range Science	Anna Gudrun Thorhallsdottir	1999 - ongoing		
Iceland	Agr. Univ. Iceland	Environment	Rotational grarzing with sheep and horses in a lowland pasture: liveweight gains and sward development	Range Science	Anna Gudrun Thorhallsdotir	2000- ongoing		
Iceland	Agr. Univ. Iceland	Environment	The effect of time and amount of clipping/grazing on the regrowth of *Eriophorum angustifolium, Carex nigra and C. panicea*	Botany	Bjorn Thorsteinsson, Anna Gudrun Thorhallsdottir	Ongoning		
Iceland	Agr. Univ. Iceland	Environment	Land use and distribution of free roaming icelandic sheep and old leader sheep breed on an extensive summer range	Range Science	Anna Gudrun Thorhallsdottir	2006-2008	Botany, etholgy	
Iceland	Icelandic Institute of Natural History	-	Vegetation mapping and habitat type mapping		Borgthor Magnusson	Ongoing	Plant ecology and	
Iceland	Icelandic Institute of Natural History	-	Monitoring of biodiversity of rangeland in Iceland		Borgthor Magnusson	ongoing	Plant and animal ecology	
Iceland	Icelandic Institute of Natural History	-	Distribution of plants and animals in Iceland		Guðmundur Guðmundsson and others	Ongoing	Plant and animal ecology	
Iceland	Holar University College	-	Holar: history and land use		Ragnheidur Traustadottir	2002-2010	History, archaeology, botany, entomology	