



Final Report

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The Directorate for Food, Fisheries and Agro Business
under the Danish Ministry of Food, Agriculture and Fisheries

1. Research program

Research in organic farming 2000-2005 (DARCOF II)

2. Project title and number

FØJOII-29: Nature Quality in Organic Farming

3. Head of project

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Slutrapporten sendes elektronisk til Forskningscenter for Økologisk Jordbrug
foejo@agrsci.dk senest 3 måneder efter projektets afslutning.

Slutrapporten vedlægges et dansk resumé.

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6. Project period (month, year)

| | |
|-------------------|------|
| Start of project: | 2001 |
| End of project: | 2005 |

7. Final report

A. Project summary

The work was organised in five work packages (WP 1-5, Table A1). Since the start in July 2001 the following work has been accomplished:

- **WP 1. Project management and interactions.**

Starting up seminar and the annual seminars served as a successful platform for project planning and cross-cutting activities. The general project co-ordination and planning of field work and selection of case study areas has been stimulated both at these meetings and in separate meetings with the WP responsible. The first cross-cutting (CC₄) has been accomplished in close co-operation with WP 5 and all project scientists. An annual seminar was held in 2004 and the rest of the planned cross-cuttings were presented/discussed. Lack of data compatibility has made cross-cutting CC₅ impossible to achieve. A homepage for the project is available.

- **WP 2. Localisation, diversification and extensification in organic farming.**

Eleven case areas with high concentration of organic farmers have been selected and 347 - app. 10% of the organic farmers - have been interviewed. A database holding this information has been constructed. Analysis of density and management of landscape elements show a relationship to farm characteristics – especially size - as well as physio-geographic context of farms. The PhD study, which is expected to be defended in August supported these results, and completed the picture with comparisons to conventional farming, showing that organic farming had a specific impact due to the land use and management, especially related to a landscape structure with smaller fields. The third part of the farm study revealed that a majority of organic farms increased their farm area from 1997 to 2004, but that this was related to an increase in livestock numbers for the dairy farms. A sociological study in the regions with highest density of organic farms showed that re-conversion to conventional farming was related to the development perspectives for the farm as well as to bureaucratic procedures (paper work) An In-depth study of two neighbouring regions with high and low density of organic farms revealed interesting results related to interactions on farms with production type, as well as the role of advisors.

- **WP 3. Biological diversity and organic farming.**

Inventory data from 24 organic farms in two case areas with information on vegetation composition and arthropods has been analysed. New species for Denmark was found and arthropod indicators showed a good correlation to nature quality. Colonisation experiments showed that moss diversity is favoured by grazing and reduced by fertilisation. There was significantly higher plant diversity in hedges and field boundaries on organic farms than on traditional farms. This effect is evident after only 3-4 years of Organic Farming Period and further increased after 7 years.

- **WP 4. Ecosystem diversity and function of the fields in organic farming.**

By aid of stepwise multiple regression of Shannon-Wiener diversity index, mite abundance, number of springtail species and springtail abundance in relation to a wide range of agro-technical parameters a model that could predict the Shannon-Wiener diversity index, mite abundance and springtail abundance based on four parameters was established. Furthermore, the data was used in a machine learning model to develop a decision tree which can be used to assess the microarthorod biodiversity, and abundance. Thus, if the microarthorod abun-

dance and diversity are regarded measures of soil nature quality, two methods to assess this measure have been developed. In experiments with manure and undersown crops no effect of treatments were found on the abundance and biodiversity of microarthropods, carabid beetles and spiders. In stead correlations between the community of beneficial insects, spiders and Carabid beetles, and certain species of microarthropods were discovered. In a field experiment in winter wheat testing the responses of the groundliving fauna to 9 mulching/fertilising treatments significant effects were recorded at three trophic levels: fungi, fungivores and predators. In modelling of the effect of organic farming on a landscape level it was found that indicated that organic farming was beneficial for all species considered. However, the impact varied depending upon the crops grown. It was found that organic dairy farming had increased the biological diversity of field boundary vegetation and insect fauna (represented by flies) when compared to conventional dairy farming, and if increasing organic farming duration affected the diversity.

- **WP 5. Organic Farming and Landscape Quality – Perceptions and Practices.**

Results from the first project workshop (CC₄) in 2002 on indicators for esthetical qualities show that a more professional use of the esthetical experience is difficult for many natural scientists. Serious illness did postpone work in 2003, but the work in 2004 has given good progress. The combination of researchers with a natural scientific approach and farmer attitude towards nature quality show some interesting differences in approach and it is a challenge to bridge this gap with good meaningful indicators.

Table A.1: Work package list (from application)

| No. | Work package title | Participants* | Budget (1.000 DKK) | Start | End | Deliverable no(s): |
|-----|--|---|--------------------|-------|------|--------------------|
| 1 | Project management and interactions | <u>Jesper Fredshavn</u> , Knud Tybirk | 600 | 2000 | 2005 | D1-12 |
| 2 | Localisation, diversification and extensification in organic farming | <u>Pia Frederiksen</u> , Vibeke Langer; Pernille Kaltoft, Gregor Levin | 1.700 | 2000 | 2005 | D13-22 |
| 3 | Biological diversity and organic farming | <u>Rasmus Ejrnæs</u> , Knud Tybirk, Erik Aude, Thomas Secher, Peter Gjelstrup | 2.000 | 2000 | 2005 | D23-30 |
| 4 | Ecosystem diversity and function of the fields in organic farming | <u>Jørgen A. Axelsen</u> , Paul Henning Krogh, Marianne B. Pedersen, Peter Odderskær, Chris J. Topping, Søren Toft, Gabor Löwei | 3.000 | 2000 | 2004 | D31-39 |
| 5 | Organic Farming and Landscape Quality – Perceptions and Practices | <u>Kathrine Højring</u> , Egon Noe Lene Hansen | 1.700 | 2000 | 2005 | D40-48 |

* Responsible participants are underlined

B. Objectives and expected achievements

The overall aim of the project was to identify the key components that ensure a continuous development of organic farming towards a closer integration of nature quality with food production. To accomplish this, the project aimed to develop a common platform of understanding of how the localisation, diversity and intensity of organic farms influence landscape and nature quality (Driving forces and Pressure indicators) (WP 2). This platform will qualify and give perspective to the discussion of how the three major components (State-Impact indicators) of nature quality as identified recently (Tybirk & Alrøe 2001) can be combined locally and regionally:

- biological diversity (WP 3)
- ecosystem functioning (WP 4)
- esthetical landscape perception (WP 5)

The project will develop relevant definitions and simple indicators to identify each aspect separately. However, the multi-disciplinarity of this project gives us an opportunity to bring the separate analysis together and investigate how these potentially conflicting considerations can be integrated (WP 1) and suggest future pathways for the development of organic farming. The project will focus on identifying relationships between the three aspects separately and in combination, and scenarios will be used to show the consequences of organic farming practices for selected nature quality aspects.

The project is expected to achieve detailed information on the historic development of localisation of organic farms and the conditions that influence this. The organic farmers, their farming practices, their intentions and actual ability to conserve and promote biological and ecological as well as esthetical qualities will be characterised in details with the aim of identifying barriers and possible solutions for the development of organic farming. The project will be able to characterise organic farmed landscapes and their biological attributes and develop tools for communication of different conceptions of nature.

Relevant indicators will be developed to enable farmers, the public and the administrative bodies to set goals for an integration of nature quality considerations in the future development of a sustainable organic farming on the habitat, the farm and the landscape level. These indicators will also be appropriate to measure whether organic farming is actually approaching these goals.

C. Progress and results

C.1 Description (summary) of main results and conclusions

Localisation, diversification and extensification in organic farming

A study on localisation has shown regional concentrations of organic farms. These concentrations are to some extent related to the regional specialisation of organic farms, which are similar to the general agricultural specialisation in Denmark. Other factors are regionally favourable conditions like county support, advisory services focussing on organic farming and access to structural fund support, as well as possible metropolitan area effects. At the local level it was found that 658 or one third of the Danish parishes consistently stay without organic farms. At this level intra-regional variations in concentration is strong, suggesting that local aspects contribute to the conversion process. Historical analysis of localisation showed that the localisation pattern in 1994 and 1997 continued in 2001, indicating that a local diffusion and concentration process is still active. There is no strong indication of a spatial rationalisation (re-conversion in periphery).

Two qualitative studies have been carried out. The case study in Southern Jutland focussed on explanations for reconversion among organic farmers. Problems of marketing and lack of expansion possibilities for dairy producers was important and to a lesser degree the length of contract period, bureaucracy, problems with weeds, and original drivers of organic farming. Most farmers did not perceive a large difference between organic and conventional farming and they did not relate their way of production with anything else in their daily life (no organic consumption, no meeting activity or social circle). However, none of the reconverters wished to start using pesticides again and most of them considered organic farming to be a rewarding and professional challenge.

The other study focussed on two neighbouring areas with high and low density of organic farming respectively. It was found that the social environment at the time of conversion provides the springboard for whether local diffusion may take place or not, as such situations open up the possibility of pioneers turning into champions and/or determine whether encouraging advisors have farmers to encourage. Secondly, converters with similar or co-operating production types versus converters of differing or even niche production types induce different diffusion processes. Neighbour effect is thus not only dependent on the physical distance between the farms, but maybe even more importantly on the kind of production method. Also it seems that the decision process is prolonged when farmers do not receive the necessary advice and thus have to be their own knowledge agents. Finally, high land prices may act as a restriction on conversion and/or expansion of organic farms.

In 11 case-areas with relative high-density organic farming, 347 organic farmers have been interviewed on land use, field management and the presence and management of small biotopes as well as non-farm and off-farm activities. The 347 farmers represent approximately 10% of all Danish organic farmers in 2001, and this information has been combined with registry information on land use in 2001. Based on these interviews analyses of land use and landscape in relation to nature quality was carried out, and related to farm characteristics. Moreover the variation in livelihoods in terms of off-farm activities and non-agricultural farm activities were explored.

Analyses of 596 permanent grasslands show that almost half of the permanent grassland fields on organic farms are more than 40 years old. The management is generally very extensive with only 7% of the fields being fertilised. Almost all fertilisation takes place on the young grasslands less than 40 years old.

Based on the interviews analysis of density and management of landscape elements (hedgerows, ponds and wildlife habitats as well as permanent grassland) have been carried out. The landscape elements were related to different aspects of the farm and farm household. The hedgerow density was related to farm management parameters like farm type, size and topography, while ponds were related to farm type and size as well as region and time used for agrarian purposes. Wildlife habitats did not respond as much to the parameters explored but was related to topography and farm size. The single most important parameter for all elements was farm size.

Having identified farm size as an important parameter, the structural development of organic farms were followed on 66 farms converted in or before 1999 as well as on 236 farms converted 1997, both groups still organic in 2004. On average half of the farms increased in size during the period, with large farms enlarging more frequently. In a smaller sample of 33 organic dairy farms, area enlargement was linked to increased herd size and increased fodder area. On a short term, increases in farm size did not necessarily lead to increased field size and resulting decreases in linear landscape elements. Comparisons with size changes in conventional farms indicated, that the rate of change in the organic sector is similar to that of the conventional.

The PhD study investigated relationships between organic farming and landscape composition in Denmark. Investigations of national agricultural register point to significant increases in crop diversity and to decreasing field sizes following the conversion to organic farming. Investigations based on aerial photo interpretation for 40 organic and 71 conventional located in three case areas point to few relationships between densities of uncultivated landscape elements and organic farming. These relationships are however a consequence of differences in biophysical conditions and farm sizes between organic and conventional farms rather than organic farming as such.

The three latter studies were used in common for exploring the relationship between farm size, field size and hedgerow density. It revealed a close relationship between farm size and field size during the last decade, but as large farms are very active in both removal and planting of hedgerows, structural development may not pose a major threat against hedgerow density.

Eventually a study of human resource use, diversity and contributions to rural development was performed, showing that only half of the organic farms were managed on a full-time basis, that spouses were dominantly employed outside the farm, and that Other Farm-based Activities existed on half of the farms with short marketing chains like farm-based shops and direct sale was the most frequent activities while farm-based tourism was far less frequent than for instance in a comparative British study.

Nature quality in organically cultivated soil

Soil fauna diversity, as well as total mite and springtail numbers was correlated with soil type, tillage intensity and fertiliser use as well as crop and grazing history and duration of the current state of the field. The 430 samples taken in 2002 on a wide range of organically farmed fields also showed that soil type interacted with crop type and grazing intensity. A higher number of mites and springtails were found in crops that included clover, almost independently of soil type. Higher numbers of mites were found at high grazing intensity compared to low grazing intensity on the same soil type.

In 2003, microarthropods were collected in spring, summer and autumn in Southern Jutland, Mid-Jutland and Sealand. In each region both cereal and vegetable fields were sampled to broaden the knowledge on the influence on agricultural practice on soil microarthropods.

The data were analysed by different statistical tools and the best results were obtained by aid of stepwise multiple regression of Shannon-Wiener diversity index, mite abundance, number of springtail species and springtail abundance in relation to a wide range of agro-technical parameters. By this technique a model that could predict the Shannon-Wiener diversity index, mite abundance and springtail abundance based on four parameters were developed, and by using the model parameters from 2003 it was possible to produce predictions of the data from 2002 that correlated significantly with the observed data. These models for Shannon-Wiener diversity, mite abundance, and springtail abundance can be used as a soil fauna nature quality index.

Furthermore, the data collected in 2002 and 2003 were used in the EU-project ECOGEN where they made part of a data set (including data from conventional farms) that were used to develop a model that can be used to predict biodiversity, mite abundance and springtail abundance based on agro-technical actions. Using this model, that is a decision tree, it is possible to assess the microarthropod diversity and abundance.

Thus, if the microarthropod abundance and diversity are regarded measures of soil nature quality, two methods to assess this measure have been developed within this project. It was not possible

to demonstrate a consistent correlation between yield and the microarthropod diversity and abundance.

Nature quality on organically farmed fields

In crop rotation experiments on Foulum and Flakkebjerg research stations the effect of manure and catch crop were analysed. Flying as well as ground-active arthropods were collected in winter wheat, and soil micro fauna and fungal activity were recorded. Surprisingly, only weak effects of organic manure input and undersown catch crops were found in the neither the 2002 data nor the 2003 data. The collembola density was very high in all treatment with averages around 60,000 per m² in Foulum and 20,000 per m² in Flakkebjerg. No effects on aphid control were recorded at the two locations. In stead a correlation between the community of spiders and certain species of microarthropods were found in the data from both Foulum and Flakkebjerg, and a correlation between the community of Carabid beetles and other species of microarthropods were found in the data from Flakkebjerg.

A field experiment in winter wheat evaluated the responses of the groundliving fauna to 9 mulching/fertilising treatments of different nutrient input and ground covering characteristics. Significant effects were recorded at three trophic levels: fungi, fungivores and predators.

Modeling the effect of organic farming on a landscape level

A total of seven scenarios were constructed to model different aspects on the influence of organic farming practice in the Herning. The chosen scenarios aimed to describe different levels of organic farms present and different levels of crop management intensification on organic farms (mechanical weeding, density of live stock grazing, watering). Extensified conditions were a reduction of 50% in intensity compared to standard conditions. The effects of the scenarios were tested on: carabid beetle (*Agonum dorsale*), Linyphiid spider (*Erigone sp.*) and skylark as these species are expected to be the most sensitive species in relation to impacts following the agricultural changes described above.

Following main results were obtained:

- Organic scenarios indicated that organic farming was beneficial for all species considered. However, the impact varied depending upon the crops grown.
- The impact of the current organic farms on the landscape at large was measurable, but not large
- 100% organic farming led to a 9-120% increase in numbers depending on species.
- Extensification of management had clear beneficial impacts on spiders and skylarks, but not beetles.
- The 'nature' rotation ('nature optimised') was better for skylarks, but inferior to the standard rotations for beetles and spiders.

Nature quality on the uncultivated and permanently grassed areas

A large biodiversity was found on the uncultivated and permanently grassed areas. In 885 plots on 24 farms a total of 561 plant species were found. Most plots were dominated by the same common species of the agricultural landscape. All uncultivated and permanently grassed areas were sampled on the farms, thus giving a statistically valid picture of the vegetation composition in the sampled areas. Meadows and dry grasslands cover most area, but the many linear hedges and field boundaries constitute a larger part of the samples. Only a minor part of the plots are EU Habitat types or protected areas according to Danish Nature Protection Act.

On a gradient of nature quality 100 plots were selected for registration of arthropods and plant biomass. Three new cicada and one new spider species of Denmark were found in these plots. A

preliminary analysis shows that the arthropod species follow the same nature quality gradient found in the plant species. Thus, a natural area highly influenced by agricultural practice, poor in original plant species and dominated by common and opportunistic plant species is also poor in original arthropod species. And opposite, the rare and original plant and arthropod species are found on the same natural areas with only little intensive agricultural influence.

Natural Capital Index has been calculated for 10 selected farms. NCI includes a combination of the biological quality of the uncultivated farm biotopes ('probability of containing protected species' as a function of nutrient and humidity gradients). The preliminary calculations proved to be a good communicative tool across different research disciplines – and a promising concept to develop further.

Moss and plant species were recorded in an experimental study of the influence of grassing and fertilisation on plant colonisation in uncultivated areas. The moss data show that good conditions for mosses favours more species, as the number of species is strongly correlated to the total area of mosses. Moss colonisation is favoured by grazing and reduced by fertilisation.

In a master project the aim was to assess, whether organic dairy farming has increased the biological diversity of field boundary vegetation and insects fauna (represented by flies) when compared to conventional dairy farming, and if increasing organic farming duration affected diversity. The diversity of plant species in field boundaries was found to be higher under organic than under conventional farming. Analysis of community patterns revealed that Ruderal species and species with affinity to nutrient rich conditions were most common in conventional field borders, whereas Stress-tolerant species were more abundant around organic farming. These differences occurred only 3 – 4 years after conversion to organic farming. The diversity of flies was significantly higher within the organic field boundaries, but no differences could be related to the duration of the organic farming period. Overall abundance of flies was not affected by neither organic farming nor the organic farming period. Multivariate analyses indicated that families associated with grasses in general could be indicators of conventional farming, whereas flower-visiting flies were found in higher numbers within the organic farming system.

Cross-cutting 1 (CC1) showed up to be very difficult, as the biological differentiation of grassland vegetation does not follow the area units used in the farming legislation and databases. Therefore, it is not possible to relate data on farming practices to the biological information on the relevant areas. The intended functional interpretation of arthropod species composition to farming practices (CC5) was not possible due to incompatibility of data.

The farmer as manager of nature quality

The project showed that the organic farmer's conceptions of nature and nature values are distinctively different from the nature views guiding the natural scientists' investigations of nature quality. This is an important realisation, as the farmers and the natural scientists on the basis of their value conceptions aim at the creation of very different kinds of nature. The interviewed organic farmers are in general very little aware of organic farming's potential to contribute to nature quality. They consider the initiative to reduce pollution, particularly water pollution, as organic farming's most significant contribution to environment and to sustainability. The incoherence in conceptions creates a serious impediment to the implementation of communal nature management goals.

On the basis of theories and experience concerning the significance of an emotional and aesthetic relationship with nature the project has investigated the potential of using aesthetic perception of the surroundings to bridge the differences in values and conceptions between farmers and ex-

perts. In relation to the farmers the aesthetic approach to understanding landscape and nature represents an absolutely useful basis for a dialog on nature quality. The development of a varied and qualified dialog does, however, call for a process leaving time to reflect on and observe the surroundings and ones own actions and impact.

To the researchers with a natural scientific background the utilisation of aesthetic observation in a professional context is quite unfamiliar. It provokes the scientist's professional self-understanding. However, through the process the researcher end up suggesting nature quality indicators, which through further development in a dialog with the farmers may lead to the creation of simple indicators, based on immediate observation. These tools are not only useful to experts, but may be utilised by the organic farmers themselves to evaluate the development of nature quality on their farm.

The farmer is the primary decision-maker and manager of nature quality on his farm. In the end his understanding and priority of nature quality decides the actual management on the farm. The project shows that to give the organic farmer the possibility to integrate considerations for nature values in his decisions-making processes it is important to establish the subject on his agenda, to establish a dialog between himself and holders of other value conceptions to enrich and qualify his reflections to give the farmer access to the biological expertise on nature protection in a way, which is relevant and functional in relation to his knowledge, his experience and his everyday practice for all parties to understand that the different value conceptions represent different discourses, equally legitimate, but based on different perspectives, knowledge and experience.

C.2 Fulfilment of deliverables and milestones

| WP 1 Project management and interactions | Time schedule according to application | Deviations, if any* |
|---|---|---------------------------------|
| <i>Task</i> | | |
| 1. Project co-ordination | | OK |
| 2. Cross-cuttings | | OK |
| | | |
| <i>Deliverables</i> | | |
| 1. Starting-up seminar | 04.01 | OK (09.01) |
| 2. Annual co-ordination meeting | 01.02-04 | OK (06.02, 08.03, 06.04) |
| 3. Annual status report | 01.02-04 | OK (11.01, 09.02, 09.03, 09.04) |
| 4. CC ₁ Impact of farm localisation and character on biological diversity. | 03.02 and 6.04 | OK |
| 5. CC ₂ Farm management, ownership, collaboration, value conceptions and nature values. | 10.04 | OK |
| 6. CC ₃ Farmers conception of nature and actual biological quality of his farm. | 12.03 | 10.04* |
| 7. CC ₄ : Workshop on the aesthetic perception of biological quality. | 10.02 | OK (06.02) |
| 8. CC ₅ Functional interpretation of the response of arthropods to the organically farmed landscape. | 03.04 | Not possible* |
| 10. CC ₇ Landscape scenarios. | 03.04 | OK |
| 11. CC ₈ Workshop on identified correlations. | 05.04 | 10.04* |
| 12. CC ₉ : Workshop on Indicators. | 09.04 | 12.05* |

* Deviations are to be further discussed in D

| WP 2. Localisation, diversification and extensification in organic farming | Time schedule according to application | Deviations, if any* |
|--|---|-----------------------------|
| <i>Task</i> | | |
| 1. Regional analysis of organic farms in Denmark | | OK |
| 2. Selection of case areas | | OK |
| 3. Local social and cultural context | | OK |
| 4. Production, diversity and nature practice on existing farms | | OK |
| a. Descriptive analysis of management practises | | |
| b. Analysis of farm characteristics and nature practises | | |
| 5. Structural farm characteristics and nature practise | | OK |
| 6. Changes in farm diversity | | OK |
| 7. Landscape changes following conversion to organic farming | late start due to ph.d. vacancy | OK |
| 8. Forms and levels of organisation for management of nature quality | relict from earlier project description | deleted in approved project |
| <i>Deliverables</i> | | |
| 13. Regional localisation of organic farm – actual and historical development, regional specialisation(farm types) | 05.02 | OK |
| 14. Regional variation in Danish organic production (Various diversity measures and intensity in a regional context) | 04.04 | OK |
| 15. Social relations and spatial pattern: case area 1 | 03.03 | OK |
| 16. Social relations and spatial pattern: case area 2 and 3 | 12.03 | OK |

| | | |
|---|---|----------------------------------|
| 17. Integration of spatial and social processes in organic farming | 11.04 | |
| 18. Database fully available for cross-cuttings | 02.03 | OK |
| 19. Production, diversity and nature practise on existing organic farms in Denmark a. Farm management on organic farms b. Diversity and nature practises on organic farms | 12.03 | OK OK |
| 20. Changes in farm diversity and nature practise with conversion to organic farming | 05.04 | 02.05* |
| 21. The impact of organic farming on landscape structure and –change | 09.03 | thesis defended in October 2006* |
| 22. Potentials of among-farm collaboration for management of nature and landscape qualities | relict from earlier project description | deleted in approved project |
| <i>Milestones</i> | | |
| M1: National analysis of localisation and diversity completed | 06.02 | OK |
| M2: Landscape analysis completed | 06.03 | OK |
| M3: Historical analysis completed | 12.03 | OK |
| M4: Localisation of organic farms completed, two case areas selected | 09.01 | OK |
| M5: Additional case area(s) selected | 06.02 | OK |
| M6: Interviews with key persons, case area 1 and 2 | 03.02 | OK |
| M7: In depth interviews completed, case area 1 | 08.02 | OK |
| M8: In depth interviews completed, case area 2 and 3 | 09.03 | OK |
| M9: Farm information from central registers retrieved | 09.01 | OK |
| M10: Survey scheme designed and tested | 03.02 | OK |
| M11 Survey in case areas completed | 12.02 | OK |
| M12: Data analysis completed a. Descriptive analysis completed b. Analysis of farm characteristics and nature practises | 06.03 | OK OK* |
| M13: Conversion data from applications for autorisation processed | 03.03 | OK |
| M 14: Supplementary interviews completed | 06.03 | Cancelled |
| M15: Data analysis completed | 12.03 | OK |
| M16: Case area for pilot study selected | | OK |
| M17: Pilot study finished, method adjusted | | OK |
| M18: Selection of all case areas completed | | OK |
| M18A: GIS analysis of landscape structure completed | | OK |
| M19: In-depth interviews carried out | relict from earlier project description | deleted in approved project |

* Deviations are to be further discussed in D

| WP 3. Biological diversity and organic farming | Time schedule according to application | Deviations, if any* |
|---|---|----------------------------|
| <i>Task</i> | | |
| 1. Floristic inventory of organic farms | | OK |
| 2. Experimental test of colonisation limitation | | OK |
| 3. Gradient analysis and modelling of biological diversity | | OK |
| 4. Synthesis – models, indicators and principles | | OK |
| <i>Deliverables</i> | | |
| 23. The contribution of organic agriculture to biological diversity | 07.02 | OK |

| | | |
|---|---|-----------------------------|
| 24. Manuscript: The importance of colonisation limitation for the diversity of grassland and hedgerows on organic farms | 12.03 | Manuscript in revision |
| 25. Manuscript: Gradient analysis of plant and invertebrate communities in organic farms | relict from earlier project description | Deleted in approved project |
| 26. Manuscript: Predicting plant and invertebrate diversity in grassland habitats of organic farms | 03.04 | 12.04* |
| 27. Manuscript: Functional interpretation of the distribution of arthropods in the agricultural landscape | 05.04 | Not achievable* |
| 28. Indicators for habitat quality in organic agriculture | 09.04 | 03.05* |
| 29. Impact of farm localisation and land use on biological diversity | relict from earlier project description | Deleted in approved project |
| 30. Integration of biological conservation into organic agriculture | relict from earlier project description | Deleted in approved project |
| <i>Milestones</i> | | |
| M20: 30-50 farms selected | 06.01 | OK |
| M21: Field inventory completed | 09.01 | OK |
| M23: Statistical summary for area, farm, and species data | 03.02 | OK* |
| M24: Experiment established | 09.01 | OK |
| M25: Recording of first year establishment in experiment | 10.02 | OK |
| M26: Recording of second year survival in experiment | 10.03 | OK |
| M27: Statistical analysis of experiment completed | 12.03 | OK |
| M28: Selection of sample sites | 03.02 | OK |
| M29: Completed sampling of plants | 09.02 | OK |
| M30: Completed sampling of arthropods | 09.02 | OK* |
| M31: Completed identification of arthropods | 08.03 | OK* |
| M32: Completed sampling and analyses of environment | 10.03 | OK |
| M33: Gradient analyses and statistical models. | 12.03 | OK |
| M34: Tests for hypothesised relationships | 02.04 | 10.04* |
| M35: Completed analysis of indicators and models for prioritization. | 06.04 | 02.05* |

* Deviations are to be further discussed in D

| WP 4 Ecosystem diversity and function of the fields in organic farming | Time schedule according to application | Deviations, if any* |
|---|---|-----------------------------|
| <i>Task</i> | | |
| 1. Development of indicators of nature quality on organic fields. | | OK |
| 2. A test of the hypothesis that increased biodiversity enhances the beneficial ecological mechanisms | | OK |
| 3. Modelling of consequences of crop rotations, tillage and landscape structures on mobile organism | | OK |
| <i>Deliverables</i> | | |
| 31. Suggestion to indicator system | 09.04 | OK |
| 32. Scientific paper on indicator system | 12.04 | OK + Draft available* |
| 33. Suggestions for changes in management practice to promote desirable species in organic fields | 12.03 | OK |
| 34. Scientific paper on crop rotations and polyphageous predators | relict from earlier projectdescription | deleted in approved project |
| 35. Scientific paper on the connection between soil fauna and polyphageous predators | 12.03 | OK* |
| 36. Scientific paper on the relation between biodiversity and aphid control | 12.03 | OK* |
| 37. Entry at the Danish Plant Protection Conference | Every March | Not accomplished |

| | | |
|---|---|-----------------------------|
| 38. Scientific paper on the impacts of various organic farm practices on the mobile organisms | 09.03 | Not accomplished* |
| 39. Scientific paper on the impacts of farm location on the mobile organisms | relict from earlier project description | deleted in approved project |
| Scientific paper on "Effects of organic farming on field boundary vegetation in Denmark" | Not in appl. | OK |
| <i>Milestones</i> | | |
| M36: Plan for low intensity sampling ready | 03.02 | OK |
| M37: Low intensity sampling finished | 06.02 | OK |
| M38: Low intensity data treatment finished | 12.02 | OK |
| M39: Tentative indicator system designed | 03.03 | OK |
| M40: High intensity sampling plan ready | 03.03 | OK |
| M41: High intensity sampling finished | 09.03 | OK |
| M43: High intensity data treatment finished | 03.04 | OK |
| M44: Detailed research plan for the year is developed | 03.02-04 | OK |
| M45: Additional extractors manufactured | 06.01 | OK |
| M46: The years experiments finished | 03.02-04 | OK |
| M47: Digitisation of new model landscape (revised title) | 08.02 | OK* |

* Deviations are to be further discussed in D

| WP 5. Organic Farming and Landscape Quality – Perceptions and Practices | Time schedule according to application | Deviations, if any* |
|---|---|-----------------------------|
| <i>Task</i> | | |
| 1. Landscape analysis | | OK |
| 2. Analysis of the farmer's role in the production and maintenance of nature and landscape quality | | OK |
| 3. Development of methods for communication about nature and landscape quality | | OK |
| <i>Deliverables</i> | | |
| 40. The aesthetic perception of biological quality | 06.02 | OK |
| 41. The aesthetic perception of biological quality | 12.02 | OK |
| 42. The aesthetic quality of organically farmed landscapes | 02.04 | OK |
| 43. Nature and landscape quality – organic farmers value conceptions | 12.03 | OK |
| 44. Value conceptions, farm maintenance and biological quality | 08.04 | OK |
| 45. The contribution of farming practice to aesthetic quality | 08.04 | OK |
| 46. Local participation in nature and landscape quality assessment | 11.04 | deleted* |
| 47. Operational indicators in communication and decision-making processes | relict from earlier project description | deleted in approved project |
| 48. Indicators for nature and landscape quality as instruments in awareness raising and decision-making | 12.04 | OK |
| <i>Milestones</i> | | |
| M48: Selection and description of study areas | 12.01 | OK |
| M49: Landscape analysis | 06.02 | OK |
| M50: Basic interviews | 06.02 | OK |
| M51: Selection of production data from wp2 | 12.02 | OK |
| M52: Selection of biological data from wp3 and 4 | 09.02 | OK |
| M 53: Analysis and description of aesthetic landscape quality | 03.04 | OK |
| M55: Data collection – individual interviews | 07.02 | OK |
| M56: Data analysis – individual interviews | 03.03 | OK |

| | | |
|---|-------------------------|----|
| M57: Data collection – focus group interviews | 12.02-06.03-12.03-06.04 | OK |
| M58: Data analysis – focus group interviews | 11.04 | OK |
| M59: Development of indicators | 06.04 | OK |
| M60: Interviews with key persons, case area 1 and 2 | 11.04 | OK |
| M61: Synthesis of objectives | 11.04 | OK |

* Deviations are to be further discussed in D

D. Description of deviations and subsequent adjustments of plans

WP 1. Project management and interactions

Specific deviations from the original plan in this WP are:

- Most Cross-Cuttings were achieved, but in CC₅ it was not possible due to incompatibility and lack of data (Deliverable 8).
- Delays in various WP's caused a postponement of the two workshops CC₈ and CC₉ till October 2004 and December 2005 respectively in order to integrate the delayed and late parts of the project in the final conclusions.

WP 2. Localisation, diversification and extensification in organic farming

Specific deviations from the original plan in this WP are:

- Through the data analysis of the interviews, considerable additional empirical material has been produced, and the part linked to diversity of income sources and human resource use is being published in a paper based on former conference participation.
- The first case study in southern Jutland grew to a study in itself and was subsequently published in a conference paper, which has been reworked to a book-contribution. The second case study was subsequently published on its own, as well as forming the basis for a master thesis.
- The finalisation of the PhD thesis has been delayed due to long term disease, but was defended in October 2006 (Deliverable 21).
- Milestone 14 was cancelled as the analysis was based solely on register data.

WP 3. Biological diversity and organic farming

This WP has contributed to numerous international papers closely related to the WP aims. More emphasis has been put on the impact of organic farming on vegetation and arthropods in hedges – a topic of high interest from farmers.

Specific deviations from the original plan in this WP are:

- As the WP-responsible took a sabbatical leave from NERI the indicator development in this deliverable has been based on expert judgement rather than statistical data analysis – which will be sufficient for the aim of the project (Deliverable 27).
- The manuscript was submitted in Sept. 2002, but first published May 2003 (Deliverable 28).
- Statistical summary of farm inventory was slightly delayed, but served as a basis for selection of farms and plots for arthropod sampling (Milestone 23).
- Arthropod sampling in 2002 produced very high quality samples and the second sampling was omitted (Milestone 30 and 31).
- Natural Capital Index has been proposed in a very preliminar form in 2004 and this has been further developed during project finalisation and contributes to the overall goals of the project.

WP 4. Ecosystem diversity and function of the fields in organic farming

Specific deviations from the original plan in this WP are:

- As a consequence of the delay in identification and counting of microarthropods, the establishment of a nature quality index for microarthropods has also been postponed (Deliverable 31).
- Two papers: one published and one available as a draft (Deliverable 32).
- Manuscript is under preparation – a draft version is available (Deliverable 35).
- Data on aphid control not strong enough for a scientific publication due to a bad year for aphids, and therefore, the title was changed to “Composition and diversity of spring-active carabid beetle assemblages in relation to soil management in organic wheat fields in Denmark” (Deliverable 36).
- The yearly Plant Protection Conference has terminated and the planned presentations will be considered in other fora (Deliverable 37).
- A detailed report of the scenario results has substituted a scientific manuscript (Deliverable 38).
- Identification and counting of microarthropods sampled in 2003 was delayed, and hence data analysis was postponed, but is now finished.
- Digitising the model landscape has been more time consuming than first expected, and caused delays in scenario building. However, results from the scenarios are now available (Milestone 47).

WP 5. Organic Farming and Landscape Quality – Perceptions and Practices

Specific deviations from the original plan in this WP are:

- Due to lack of participation from the interviewed organic farmers in the participatory process this deliverable was unfortunately impossible to carry out (Deliverable 46). Thus the development of indicators had to be carried out in a different target group, than originally planned. The process was instead carried out in connection with M57.

E. Project publications and other products

1. Products from Organic Eprints archive

This list was generated on Fri Oct 13 06:38:56 CEST 2006. Number of eprints: 65.

Peer-reviewed and accepted

English

Aude, Erik and Ejrnæs, Rasmus (2005): [Bryophyte colonisation and persistense in experimental grassland dominated by vascular plants](#). *Oikos* 109(2): 323-330.

Aude, Erik; Tybirk, Knud; Michelsen, Anders; Ejrnæs, Rasmus; Hald, Anna Bodil and Mark, Susanne (2004): [Conservation value of the herbaceous vegetation in hedgerows - does organic farming make a difference?](#). *Biological Conservation* 118(4): 467-478. ** (D24)

Aude, Erik; Tybirk, Knud and Pedersen, Marianne Bruus (2003) [Vegetation diversity of conventional and organic hedgerows in Denmark](#). *Agriculture, Ecosystems and Environment*; pp. 1-13. ** (D 23)

Demsar, D; Dzeroski, S; Larsen, T; Struyf, J; Axelsen, J; Bruus-Pedersen, M and Krogh, PH (2006) [Using multi-objective classification to model communities of soil microarthropods](#). *Ecological Modelling* 191; pp. 131-143.*

Frederiksen, Pia and Langer, Vibeke (2005) [Density, structure and management of landscape elements on Danish organic farms](#). Published in *NJF report* 1(1), page pp. 157-160. NJF reports 1. Nordic Association of Agricultural Scientists (NJF).

Frederiksen, Pia and Langer, Vibeke (2004) [LOCALISATION AND CONCENTRATION OF ORGANIC FARMING IN THE 1990'S - THE DANISH CASE](#). *Tijdschrift voor Economische en Sociale Geographie* 95(5):pp. 539-549.

Frederiksen, Pia and Langer, Vibeke (2004) [Nature Management and livelihood strategies on Danish organic farms](#). Published in Cristovão, Artur, Eds. *Proceedings of the Sixths European IFSA Symposium, European Farming and Society in Search of a New Social Contract - Learning to Manage Change* 1, page pp. 361-374. UTAD; Portugal.

Hansen, Lene; Noe, Egon, and Højring, Katrine, (2006) Nature and Nature Values in Organic agriculture an analysis of contested concepts and values among different actors in organic farming. *Journal of Agricultural and Environmental ethics* 19:147-168.

Kaltoft, Pernille and Risgaard, Marie-Louise (2005) [Has organic farming modernized itself out of business? - Reverting to conventional methods in Denmark](#), in Reed, M. and Holt, G., Eds. *Organic Agriculture: A Sociological Perspectives of Organic Agriculture: From Pioneer to Policy*, chapter 8, pp. 336. CABI.*

Levin, Gregor (2004) [Studying the effect of organic farming on rural landscapes: Issues of methodology and scale](#). Published in Cristovão, Artur, Eds. *Proceedings of the Sixth European IFSA Symposium, European Farming and Society In Search of a New Social Contract - Learning to Manage Change* 2, page pp. 325-334. UTAD, Portugal.*

Tybirk, Knud; Alrøe, Hugo Fjelsted and Frederiksen, Pia (2004) [Nature quality in organic farming: A conceptual analysis of considerations and criteria in a European context](#). *Journal of Agricultural and Environmental Ethics* 17(3):pp. 249-274.

Submitted for peer-review but not yet accepted

English

Ejrnæs, Rasmus; Liira, Jaan and Poulsen, Roar (2003) [Discrimination of semi-natural plant communities from abandoned fields by ordination and neural networks](#). *Applied Vegetation Science*.**

Frederiksen, Pia and Langer, Vibeke (2006) [Patterns of resource use on Danish organic farms - aspects of farm based rural development](#). *International Journal of Agricultural Resources, Governance and Ecology*.

Petersen, S.; Axelsen, J.A.; Tybirk, K.; Aude, E. and Vestergaard, P. (2004) [Effects of duration of Organic farming practice on vegetation in Danish field boundaries](#). [preprint]*

Risgaard, Marie-Louise; Kaltoft, Pernille and Frederiksen, Pia (resubmitted) Socio-cultural processes behind local distribution of organic farming in Denmark. *Agriculture and Human Values*.

Stidsen, A.N. and Tybirk, K. (2004) [Dispersal and habitat quality as constraining factors for herbaceous forest species in an ancient hedgerow network](#). [preprint]**

Tybirk, K.; Primdahl, J.; Olsen, H.K. and Holbeck, H.B. (2004) [The Fire-fighter's Law: a conceptual tool to include nature conservation in on-farm planning](#). [preprint]**

Tybirk, Knud; Alrøe, Hugo Fjelsted and Frederiksen, Pia (2002) [Nature quality in organic farming in Europe. Concepts, considerations and indicator development.](#) [preprint]

Not peer-reviewed

English

Aude, E. (2004). Habitat quality and recruitment limitations in the agricultural landscape. Ph.D-Thesis.

Tybirk, K., Aude, E. & Bruus Pedersen, M. (2003): Naturindholdet i hegn på økologiske og konventionelle bedrifter = Plants and arthropods in organic and conventional hedges. I: Danmarks JordbrugsForskning: 20. Danske Planteværnskonference. Korn, kartofler, skadedyr, miljø og postere. Danmarks JordbrugsForskning. - DJF rapport - Markbrug 89: 213-226.

Axelsen, J; Bruus-Pedersen, M; Larsen, T and Krogh, PH (2006) [An indicator system of nature quality on organic fields.](#) *An indicator system of nature quality on organic fields. (In prep).*

Axelsen, J; Toft, S and Lövei, G (2006) [Correlation between microarthropods and the polyphagous predator fauna in agricultural fields.](#) *Correlation between microarthropods and the polyphagous predator fauna in agricultural fields (In prep).*

Frederiksen, Pia and Langer, Vibeke (2004) [Spatial variation in the localization of Danish organic farms.](#) *DARCOFenews(2)*. Online at <<http://www.darcof.dk/enews/june04/index.html>>

Fredshavn, Jesper; Tybirk, Knud and et al., (2003) [FØJOII-29: Nature Quality in Organic Farming. Midterm Status Report 2003.](#) Report, Dept. Wildlife Ecology and Biodiversity, National Environmental Research Institute.

Hansen, L.; Noe, E. and Højring, K. (2004) [Landscape and nature quality in the development and profiling of organic farming.](#) *DARCOFenews* 4. Online at <<http://www.darcof.dk/enews/dec04/nature.html>>

Højring, K.; Hansen, L. and Noe, E. (2004) [Organic Farming - Nature Conceptions, Management and Cross Compliance.](#) *DARCOFenews(2)*. Online at <<http://www.darcof.dk/enews/june04/nature.html>>

Kaltoft, Pernille and Risgaard, Marie-Louise (2005) [Has organic farming modernized itself out of business? - Reverting to conventional methods in Denmark,](#) in Reed, M. and Holt, G., Eds. *Sociological Perspectives of Organic Agriculture: From Pioneer to Policy*, chapter 8, pp. 336. CABI.*

Levin, Gregor (2006) [Relationships between Danish organic farming and landscape composition.](#) Ph.D. Thesis. [preprint]*

Noe, Egon (2003) [Farm management, knowledge and multidimensional farming - some reflections from the perspective of farm enterprises as heterogeneous self-organising systems.](#) Paper presented at XXth ESRS Congress: Working group 1.5, Labour skills and training for multidimensional agricultures, Sligo, Ireland, 18-22 August 2003, page pp. 1-8.*

Petersen, Sune (2003) [Vegetation in Danish field boundaries: A comparative study related to effects of agricultural practise.](#) M.Sc thesis [preprint]*

Petersen, Sune (2003) [Effects of organic farming on flies in Danish field boundaries.](#) [preprint]*

Topping, CJ and Odderskær, P (2006): [Landscape scenarios to evaluate the impact of organic farming on selected animal species.](#) Report.

Deutsch - German

Levin, M.Sc. Gregor and Frederiksen, Senior researcher Pia (2003) [Beschreibung und Differenzierung der dänischen Agrarlandschaft anhand von räumlichen Strukturindexen](#). [Description and differentiation of the Danish rural landscape with the use of spatial indices.]. Poster presented at IALE Struktur Workshop Landschaftsstruktur Analysieren, Verstehen, Modellieren, Salzburg, Austria, 16-17 April 2003.

Dansk - Danish

Frederiksen, Pia; Ejrnæs, Rasmus and Tybirk, Knud (2004) [Afrapportering af Crosscutting 1: koblinger mellem drift af vedvarende græs \(wp2\) og biologisk naturkvalitet \(wp3\)](#). Working Paper, Afd. for systemanalyse og Afd. f. Vildtbiologi og Biodiversitet, Danmarks Miljøundersøgelser.

Frederiksen, Pia and Langer, Vibeke (2004) [Lokalisering af økologiske jordbrug sker ikke jævnt hen over landet](#) [Localization of organic farms show spatial variation Denmark]. *FØJOenyt*(3). Online at <<http://www.foejo.dk/enyt2/enyt/juni04/index.html>>

Fredshavn, Jesper (2002) [Naturkvalitet i økologisk jordbrug](#) [Nature Quality in organic farming]. Poster presented at Økologi-Kongres 2002.

Hansen, L.; Noe, E. and Højring, K. (2004) [Økologisk jordbrug kan profilere sig gennem landskabs- og naturkvalitet](#). *FØJOenyt*(4). Online at <<http://www.foejo.dk/enyt2/enyt/aug04/naturkvalitet.html>>

Hansen, L.; Noe, E.; Langer, V.; Ejrnæs, R.; Tybirk, K. and Bruus Pedersen, M. (2004) [Landmænds opfattelser af natur og aktuel naturkvalitet på bedriften. Cross cutting rapport for CC3](#). Working Paper.

Højring, K. (2004) [Æstetisk sansning og naturvidenskabelig naturforståelse - et eksplorativt eksperiment](#) [Aesthetic sensation and nature understanding in the natural sciences - an explorative experiment]. Arbejdsrapport Skov & Landskab no. nr. 4-2004, publiceret, Urban and Rural Studies, Danish Centre for Forest, Landscape & Planning.

Højring, K.; Hansen, L. and Noe, E. (2004) [Økologisk Jordbrug - Naturoplevelser, natursyn og Cross-compliance](#). *FØJOenyt*. Online at <<http://www.foejo.dk/enyt2/enyt/juni04/natursyn.html>>

Kaltoft, Pernille and Risgaard, Marie-Louise (July 2004) [Notat til Det Økologiske Fødevareråd om økologiske landmænds tilbagelægning til konventionelt landbrug](#). Policy Analysis, National Environmental Research Institute.

Kaltoft, Pernille and Risgaard, Marie-Louise (2004) Hvorfor tilbage til konventionelt landbrug? [Why back to conventional farming?] *Økologisk Planteavlseretning 2004*. Økologisk Rådgivning, Jyderup.

Noe, Egon (2002) [Folks oplevelser af naturen og ønsker til biodiversitet?](#) [Peoples experiences with nature and desires of biodiversity]. [oral] Presentation at *Status konference: Biodiversitet i det dyrkede land og dets omgivelser*, Nyborg Strand, Denmark, 6. marts 2002.

- Noe, Egon (2002) [Natur- og miljøforvaltning baseret på frivillige aftaler](#). Published in Bjørnsen, Peter Koefoed; Frich, Povl and Johansen, Pia, Eds. *Natur og Miljøforskningskonference - Resumé af foredrag og posters H.C. Ørstedinstituttet, den 22.-23. august 2002*. Miljøministeriet - Danmarks Miljøundersøgelser.*
- Risgaard, Marie-Louise; Kaltoft, Pernille and Frederiksen, Pia (2005) Drivkræfter bag landmænds til- og fravalg af økologisk drift. [Driving forces behind conversion or reversion in Danish organic agriculture] *FØJO-e-nyt – Nyhedsbrev fra Forskningscenter for Økologisk Jordbrug*, december 2005, nr. 6. Online at <http://www.foejo.dk/enyt2/dec05/landmand.html>
- Risgaard, Marie-Louise; Langer, Vibeke and Frederiksen, Pia (2006) [Økologisk jordbrug - struktur, produktion og naturforvaltning](#) [Organic Farming - structure, production and nature management]. Report, Den Kgl. Veterinær- og Landbohøjskole, Danmarks Miljøundersøgelser.*
- Risgaard, Marie-Louise; Langer, Vibeke and Frederiksen, Pia (2006) [Organic Farming - structure, production and nature management](#). Report, The Royal Veterinary and Agricultural University, KVL; National Environmental Research Institute, DMU.*
- Risgaard, Marie-Louise (2005) [Drivkræfter bag til- og fravalg af økologisk drift i Danmark - resultater fra casestudier](#) [Driving Forces Behind Farmers' Choice of Organic or Conventional Farming in Denmark – Results From Case Studies]. Master thesis, Institut for Jordbrugsvidenskab, Den Kgl. Veterinær- og Landbohøjskole, KVL.*
- Risgaard, Marie-Louise (2006) Landmænds til- og fravalg af økologi. *Bovilogisk*, februar 2006, årgang 20, s. 42-43. Dansk Agrar Forlag A/S.
- Risgaard, Marie-Louise (2006) Økologiske mælkeproducenter har lyst til udvikling. *Ny KvægForskning*, april 2006, 4. årgang, nr. 2. Online at <http://www.kfc-foulum.dk>
- Stidsen, A.N. and Tybirk, K. (2004) [Gamle hegn bevarer skovbundsarter](#). In *Skoven* 36(11): 482-483.**
- Tybirk, K.; Ejrnæs, R.; Elmegaard, N.; Langer, V. and Holmstrup, M. (2003) [Naturkvalitet og biodiversitet](#), in Holmstrup, M., Eds. *Gør økologisk jordbrug en forskel?*, chapter 3, page pp. 33-41. Miljøbiblioteket 1. Gads Forlag.
- Tybirk, K.; Fredshavn, J.; Aude, E. and Petersen, S. (2003) [Naturen er bedre i økologiske hegn og skel](#). *FØJO-e-nyt - Nyhedsbrev fra Forskningscenter for Økologisk Jordbrug* 5. Online at <http://www.foejo.dk/enyt2/enyt/okt03/hegn.html>
- Tybirk, K.; Hald, A.B.; Pedersen, M.B. and Sønderkov, M. (2004) [Ukrudt i et kulturlandskab](#), in Madsen, K.H., Eds. *Ukrudtsbekæmpelse i landbruget*, chapter 12. DJF.**
- Tybirk, Knud; Aude, Erik and Bruus Pedersen, Marianne (2003) [Mere natur i økologiske hegn](#) [More nature in organic hedges]. In *Vand og Jord*, September, Volume 10, No 3, page pp. 93-96.**
- Tybirk, Knud and Fredshavn, Jesper (2003) [Naturkvalitet i økologisk jordbrug – koncept og foreløbige resultater](#). [Nature Quality in organic farming - concept and preliminary results]. Published in *DJF rapport* 89, page pp. 189-198. Danmarks JordbrugsForskning.

2. Other products (oral presentations, public meetings, field days, etc.)

- Frederiksen, Pia (2004) [Forvaltning af natur og landskab i økologisk jordbrug](#) [Management of nature and landscape in organic farming]. [oral] Presentation at *Facetter af landskabsforskningen*, Da-

nish Landscape Ecological Association, National Environmental Research Institute, 16. september 2004.

Frederiksen, Pia (2004) [Lokalisering af økologiske bedrifter - regional specialisering og koncentration?](#) [Localisation of organic farms - regional specialisation and koncentration?]. [oral] Presentation at *Facetter af landskabsforskningen*, *Danish Landscape Ecological Association*, National Environmental Research Institute, 16. september 2004.

Frederiksen, Pia and Langer, Vibeke (2003) [Diversity measures in Danish organic farming](#). Paper presented at 6th Symposium on Farming and Rural Systems Research and Extension, Vila real, Portugal, 3-4 April 2004.

Frederiksen, Pia and Langer, Vibeke (September 2004) [Hvordan udvikler det økologiske jordbrug sig regionalt?](#) [How does the organic farming develop in a regional perspective?]. Paper fremlagt til Økologisk Landsforenings generalforsamling 2004. Department of Policy Analysis, National Environmental Research Institute.

Frederiksen, Pia and Langer, Vibeke (2004) [Nature Management and livelihood strategies on Danish organic farms](#). [oral] Presentation at *NJF international conference, No 357, Current status, and developments of part-time farming*, Billund, Denmark., 22-24 april, 2004

Frederiksen, Pia and Langer, Vibeke (2004) [Nature Management and livelihood strategies on Danish organic farms](#). Paper presented at Sixth European IFSA Symposium, Vila Real, Portugal.

Frederiksen, Pia and Langer, Vibeke (2005) [Density, structure and management of landscape elements on Danish organic farms](#). Paper presented at NJF seminar 369: Organic farming for a new millennium, status and challenges, Alnarp, 15-17 June, 2005.

Frederiksen, Pia and Langer, Vibeke (2005) [LIVELIHOOD STRATEGIES ON DANISH ORGANIC FARMS AND THEIR CONTRIBUTION TO FARM BASED RURAL DEVELOPMENT](#). Paper presented at XXI Congress European Society for Rural Sociology, Keszthely, Hungary, 22-27 August 2005.

Højring, Katrine, and Noe, Egon (2006): A communicative approach to involving farmers in protecting aesthetic and ecological landscape values. Presented in draft version on the XI World Congress of Rural Sociology. Trondheim-Norway 25-30 July, 2004.

Kaltoft, Pernille and Risgaard, Marie-Louise (2004) [Has organic farming modernized itself out of business? An analysis of reverting organic farmers](#). Paper presented at IRSA XI World Congress of Rural Sociology, Trondheim, Norway, July 25-30, 2004.

Langer, Vibeke and Frederiksen, Pia (2005) [The development of farm size on Danish organic farms - a comment to the conventionalisation debate](#). Paper presented at International Scientific Conference on Organic Agriculture: Researching Sustainable Systems, ISOFAR, Adelaide, Australia, Sept. 20-23, 2005.

Levin, Gregor (2003) [A holistic framework for the analysis of landscape changes following organic farming](#). Department for Policay Analysis, National Environmental Research Institute.*

Levin, Gregor (2003) [A methodological framework for analysing landscape dynamics in relation to organic farming](#). [oral] Presentation at *Crossing the boundary between natural and social sciences*., University of Copenhagen, Department of Geography, August 18-20, 2003.*

Levin, Gregor (2003) [The effects of organic farming on the landscape: Reflections on a Ph.D. project in the context of values and ideologies](#). Department of Policy Analysis, National Environmental Research Institute.*

Levin, Gregor (2004) [Studying the effect of organic farming on rural landscapes: Issues of methodology and scale](#). Paper presented at Sixth International Farming Systems Association (IFSA) European Symposium., Villa Real, Portugal, April 4-7, 2004.*

Noe, Egon (2002) [Folks oplevelser af naturen og ønsker til biodiversitet?](#) [Peoples experiences with nature and desires of biodiversity]. [oral] Presentation at *Status konference: Biodiversitet i det dyrkede land og dets omgivelser*, Nyborg Strand, Danmark, 6. marts 2002.

Noe, Egon (2002) [Natur- og miljøforvaltning baseret på frivillige aftaler](#). Paper presented at Natur- og Miljøforskningskonference, København, 22. - 23. august 2002;

Noe, Egon (2003) [Farm management, knowledge and multidimensional farming - some reflections from the perspective of farm enterprises as heterogeneous self-organising systems](#). Paper presented at XXth ESRS Congress: Working group 1.5, Labour skills and training for multidimensional agricultures, Sligo, Ireland, 18-22 August 2003, page pp. 1-8.*

Tybirk, Knud and Fredshavn, Jesper (2003) [Naturkvalitet i økologisk jordbrug – koncept og foreløbige resultater](#). [Nature Quality in organic farming - concept and preliminary results]. Paper presented at Dansk Planteværnskonference, Nyborg Strand, March 2003; Published in *DJF rapport 89*, page pp. 189-198. Danmarks JordbrugsForskning.

F. Scientific education

Ph.d. studies:

Aude, E. (University of Copenhagen). Habitat quality and recruitment limitations in the agricultural landscape. Thesis defended March 2004. Partly financed by DARCOF.

Gregor Levin: Dynamics of Danish Agricultural Landscapes and the Role of Organic Farming. Thesis defended October 2006.

MSc. projects:

Petersen, Sune 2003: Impact of Organic Farming Period on Flies and Vegetation of Field Borders M.Sc thesis (University of Copenhagen).

Møller, Lene 2003.. The Effect of Different Types of Mulch Layers on Soil Fauna and Polyphagous Predators. M.Sc thesis (University of Aarhus).

Stidsen, Anders N., 2004. Fordelingen af urter i et østjysk hegnsnetværk. M.Sc thesis (University of Aarhus).

Risgaard, Marie Louise (Royal Veterinary and Agricultural University): Processes of Conversion and Re-Conversion.

Risgaard, Marie-Louise 2005: Driving Forces Behind Farmers' Choice of Organic or Conventional Farming in Denmark – Results From Case Studies. M.Sc. Thesis (The Royal Veterinary and Agricultural University, Copenhagen)

Ackermann. H. Ø. 2003. Organic farmers' landscape management. Masters Thesis (University of Copenhagen, Dept. of Geography).

G. National and international cooperation

WP 2: Vibeke Langer, RVAU was a guest researcher at Lincoln University, New Zealand Nov 2002 March 03. Through V. Langers development and implementation of the recent SOAR PhD course, contacts have been made to a British research project with similar objectives and methods. Common activities will be explored.

WP 3: Collaboration with Jacques Baudry's group from INRA-SAD Armorique, Ecobio lab of CNRS/Rennes University on social and biological values of hedges in the organic and conventional landscapes.

WP 4: Co-operation with the EU funded project www.ECOGEN.dk involving decision support experts: Sašo Džeroski, Damjan Demšar, Marko Bohanec, Jožef Stefan Institute, Department of Intelligent Systems, Slovenia.

H. Critical reflection on the project

New and interesting results in the project have brought attention to research areas not originally anticipated in the application. Delays in some of the work packages implicates a postponement of the two workshops CC₈ and CC₉ in order to have a full overview of ideas and results in the final identification of correlation's of nature quality and recommendations for the future work.

- Statistical information on organic farming in Denmark has given rise to new questions on the localisation and conversion of farms. Why are more than 1/3 of the Danish parishes without organic farms and why do farmers re-convert to conventional agriculture? The local socio-cultural context and dynamics may contribute to further understanding of these questions.
- Research in nature quality on the non-cultivated areas was reduced significantly in the final approval of the project. However, remarkable results on the interaction between these areas and the cultivated areas have shown that organic farming has a strong impact on the vegetation and the arthropods of field borders and hedges. Three to five years after conversion the differences are significant, and the impact is increasing after 10 -15 years. This indeed challenges the established theories on colonisation limitations in the farming landscape and will give rise to new speculations on the role of organic farming as a mean to protect nature in the agricultural landscape.
- From a nature conservation point of view the small uncultivated biotopes of the farming landscape are very important. From a quantitative point of view the large areas of cultivated land represents important nature quality. Both areas contribute to nature quality in the farmed landscape, and it is important to continue developing both aspects in the future organic agriculture. The Dutch Natural Capital Index combining quality and quantity on a farm unit has proven to be an interesting approach to the future indicator development.
- The delays in WP 2 and WP4 will be recovered in the last period of the project. A postponement of the two planned workshops (CC₈ and CC₉) till October '04 and May '05 allow us to have a full overview of results and ideas to identify correlation's and indicators.

Some of the intended cross-disciplinary data-treatments in the Cross-cuttings had to be modified

or changed rather drastically during the project (CC1 and CC5). In CC₁, the biological data collections were sampled on areas not covered by the statistical information in the national databases. This situation was first evident after thorough investigations on the national database. On the other hand, the scientific acknowledgement of the differences in approach from two disciplines has given rise to new possible research questions. In CC5 better coordination of sampling techniques and analysis would have reduced the delays.

8. Budget

A. Account for any change in budgets

Under each institutional budget, minor changes are described and the requests for each change are summarised into the budget for the whole project in 8.B.

In general some delays in specific activities interact on other activities and consequently budgetary adjustments have been necessary.

B. Budget for the whole project (1.000 DKK)

| Year: | Original budget | Consumption before 2004 | Consumption 2004 | Consumption 2005 | Total |
|----------------------|-----------------|-------------------------|------------------|------------------|-------|
| Man-months | | | | | |
| Scientific personnel | | 74 | 43 | 5 | 121 |
| Technical personnel | | 42 | 5 | 0 | 47 |

| Year: | Original budget | Consumption before 2004 | Consumption 2004 | Consumption 2005 | Total |
|---|-----------------|-------------------------|------------------|------------------|-------|
| Salaries | | | | | |
| Scientific personnel | | 3466 | 1656 | 189 | 5311 |
| Technical personnel | | 1085 | 268 | 17 | 1370 |
| Other operational costs | | 456 | 234 | 79 | 769 |
| Equipment | | 38 | 12 | 0 | 50 |
| Others (please specify) | | | | | |
| Direct costs | | 5045 | 2170 | 285 | 7499 |
| Indirect costs (20% of direct costs) | | 1009 | 434 | 57 | 1500 |
| Total | | 6054 | 2604 | 341 | 8999 |

Comments:

The project has accomplished with most of the deliverables but as described in the mid-term status report, the postponement of the final workshop and a few other activities described below (Wp 2, 3 and 5), a modest transfer to finalisation of the project in 2005 is requested.

9. Signatures and stamps

| Name | Institute | Date | Signature |
|-----------------|-----------|------|-----------|
| Head of project | | | |

Appendix I. Detailed budget

A. Budget for each participating institute (1.000 DKr)

Name of Institute: NERI- Dept. of Wildlife Ecology and Biodiversity

| Year: | Original budget | Consumption before 2004 | Consumption 2004 | Consumption 2005 | Total |
|----------------------|-----------------|-------------------------|------------------|------------------|-------|
| Man-months | | | | | |
| Scientific personnel | | 24 | 10 | 2 | 36 |
| Technical personnel | | 7,5 | | | 7,5 |

| Year: | Original budget | Consumption before 2004 | Consumption 2004 | Consumption 2005 | Total |
|---|-----------------|-------------------------|------------------|------------------|-------|
| Salaries | | | | | |
| Scientific personnel | | 1307 | 418 | 87 | 1812 |
| Technical personnel | | 225 | | | 225 |
| Other operational costs | | 187 | 100 | 50 | 337 |
| Equipment | | | | | |
| Others (please specify) | | | | | |
| Direct costs | | 1719 | 518 | 137 | 2374 |
| Indirect costs (20% of direct costs) | | 344 | 104 | 27 | 475 |
| Total | | 2062 | 622 | 164 | 2848 |

Comments: A total transfer of 164 kkr from 2004 to 2005 was used for planning and holding workshop 2005.

Name of Institute and department: NERI, Department of Policy Analysis

| Year: | Original budget | Consumption before 2004 | Consumption 2004 | Consumption 2005 | Total |
|----------------------|-----------------|-------------------------|------------------|------------------|-------|
| Man-months | | | | | |
| Scientific personnel | | 9,5 | 10,1 | 2,5 | 22 |
| Technical personnel | | 1 | 1 | | 2 |

| Year: | Original budget | Consumption before 2004 | Consumption 2004 | Consumption 2005 | Total |
|---|-----------------|-------------------------|------------------|------------------|-------|
| Salaries | | | | | |
| Scientific personnel | | 742 | 412 | 90 | 1244 |
| Technical personnel | | | 26 | 0 | 26 |
| Other operational costs | | 64 | 20 | 24 | 108 |
| Equipment | | 38 | | | 38 |
| Others (please specify) | | | | | |
| Direct costs | | 844 | 458 | 114 | 1416 |
| Indirect costs (20% of direct costs) | | 169 | 92 | 23 | 283 |
| Total | | 1013 | 550 | 137 | 1,699 |

Comments: NERI, Dept. Policy analysis was allowed to move 7.000 kr from other operational costs to salary for 2005.

Name of Institute and department: Natural History Museum, Århus

| Year: | Original budget | Consumption before 2004 | Consumption 2004 | Consumption 2005 | Total |
|----------------------|------------------------|--------------------------------|-------------------------|-------------------------|--------------|
| Man-months | | | | | |
| Scientific personnel | | | | | |
| Technical personnel | | 7 | 1 | 0 | 8 |

| Year: | Original budget | Consumption before 2004 | Consumption 2004 | Consumption 2005 | Total |
|---|------------------------|--------------------------------|-------------------------|-------------------------|--------------|
| Salaries | | | | | |
| Scientific personnel | | 222 | | | 222 |
| Technical personnel | | | | | |
| Other operational costs | | 18 | | | 18 |
| Equipment | | | | | |
| Others (please specify) | | | | | |
| Direct costs | | 240 | | | 240 |
| Indirect costs (20% of direct costs) | | 48 | | | 48 |
| Total | | 288 | | | 288 |

Comments:

Name of Institute and department: NERI, Department of Terrestrial Ecology

| Year: | Original budget | Consumption before 2004 | Consumption 2004 | Consumption 2005 | Total |
|----------------------|------------------------|--------------------------------|-------------------------|-------------------------|--------------|
| Man-months | | | | | |
| Scientific personnel | | 12 | 4 | 0 | 16 |
| Technical personnel | | 10 | 2 | 0 | 12 |

| Year: | Original budget | Consumption before 2004 | Consumption 2004 | Consumption 2005 | Total |
|---|------------------------|--------------------------------|-------------------------|-------------------------|--------------|
| Salaries | | | | | |
| Scientific personnel | 556 | 417 | 168 | | 585 |
| Technical personnel | 401 | 233 | 150 | | 383 |
| Other operational costs | 65 | 61 | 10 | | 71 |
| Equipment | | | | | |
| Others (please specify) | | | | | |
| Direct costs | 1022 | 711 | 328 | | 1039 |
| Indirect costs (20% of direct costs) | 204 | 142 | 66 | | 208 |
| Total | 1226 | 853 | 394 | | 1247 |

Comments:

Name of Institute and department: Aarhus University, Institute of Biology, Dept. of Zoology

| Year: | Original budget | Consumption before 2004 | Consumption 2004 | Consumption 2005 | Total |
|----------------------|------------------------|--------------------------------|-------------------------|-------------------------|--------------|
| Man-months | | | | | |
| Scientific personnel | | 12,50 | | | 12,50 |
| Technical personnel | | 5 | 0 | | 5,00 |

| Year: | Original budget | Consumption before 2004 | Consumption 2004 | Consumption 2005 | Total |
|---|------------------------|--------------------------------|-------------------------|-------------------------|--------------|
| Salaries | | | | | |
| Scientific personnel | | 380 | | | 380 |
| Technical personnel | | 120 | | | 120 |
| Other operational costs | | 52 | | | 52 |
| Equipment | | | | | 0 |
| Others (please specify) | | | | | |
| Direct costs | | 552 | | | 552 |
| Indirect costs (20% of direct costs) | | 110 | | | 110 |
| Total | | 662 | | | 662 |

Comments:

Name of Institute and department: DIAS, Danish Institute of Agricultural Science, Dept. of Plant Protection, Flakkebjerg

| Year: | Original budget | Consumption before 2004 | Consumption 2004 | Consumption 2005 | Total |
|----------------------|------------------------|--------------------------------|-------------------------|-------------------------|--------------|
| Man-months | | | | | |
| Scientific personnel | | 6 | | | 6 |
| Technical personnel | | 8 | | | 8 |

| Year: | Original budget | Consumption before 2004 | Consumption 2004 | Consumption 2005 | Total |
|---|------------------------|--------------------------------|-------------------------|-------------------------|--------------|
| Salaries | | | | | |
| Scientific personnel | | 215 | | | 215 |
| Technical personnel | | 229 | | | 229 |
| Other operational costs | | 35 | | | 35 |
| Equipment | | | | | |
| Others (please specify) | | | | | |
| Direct costs | | 479 | | | 479 |
| Indirect costs (20% of direct costs) | | 96 | | | 96 |
| Total | | 575 | | | 575 |

Comments:

Name of Institute: Forest & Landscape, Denmark: Danish Centre for Forest, Landscape & Planning, KVL, Hørsholm.

| Year: | Original budget | Consumption before 2004 | Consumption 2004 | Consumption 2005 | Total |
|----------------------|-----------------|-------------------------|------------------|------------------|-------|
| Man-months | | | | | |
| Scientific personnel | | 5,5 | 11 | 1 | 17,5 |
| Technical personnel | | | 0,25 | 0,25 | 0,5 |

| Year: | Original budget | Consumption before 2004 | Consumption 2004 | Consumption 2005 | Total |
|---|-----------------|-------------------------|------------------|------------------|-------|
| Salaries | | | | | |
| Scientific personnel | | 220 | 438 | 40 | 698 |
| Technical personnel | | | 9 | 9 | 18 |
| Other operational costs | | 13 | 50 | 3 | 66 |
| Equipment | | | | | |
| Others (please specify) | | | | | |
| Direct costs | | 233 | 497 | 52 | 782 |
| Indirect costs (20% of direct costs) | | 47 | 99 | 10 | 156 |
| Total | | 280 | 596 | 62 | 938 |

Comments: Forest and Landscape transferred 62 kkr. to 2005 to finish publications and prepare for final project conference.

Name of Institute: DIAS, Danish Institute of Agricultural Science, Dept. of Agricultural Systems, Foulum

| Year: | Original budget | Consumption before 2004 | Consumption 2004 | Consumption 2005 | Total |
|----------------------|------------------------|--------------------------------|-------------------------|-------------------------|--------------|
| Man-months | | | | | |
| Scientific personnel | | 4,25 | 8 | 0 | 12 |
| Technical personnel | | 1,75 | 1,5 | 0 | 3 |

| Year: | Original budget | Consumption before 2004 | Consumption 2004 | Consumption 2005 | Total |
|---|------------------------|--------------------------------|-------------------------|-------------------------|--------------|
| Salaries | | | | | |
| Scientific personnel | | 184,75 | 309 | | 494 |
| Technical personnel | | 44 | 56 | | 100 |
| Other operational costs | | 26 | 15 | | 41 |
| Equipment | | | | | |
| Others (please specify) | | | | | |
| Direct costs | | 255,75 | 380 | | 635 |
| Indirect costs (20% of direct costs) | | 50,35 | 76 | | 127 |
| Total | | 306,10 | 456 | | 762 |

C. Budget for co-financing from each participating institute (1.000 DKK)

Name of Institute: WP2 "Interdisciplinær forskning og undervisning i økologisk jordbrug – læring i et tværfagligt og målorienteret miljø" with RVAU, Dept. of Organic Agriculture.

| Year: | Original budget | Consumption before 2004 | Consumption 2004 | Consumption 2005 | Total |
|----------------------|-----------------|-------------------------|------------------|------------------|-------|
| Man-months | | | | | |
| Scientific personnel | | 14 | 4 | | 18 |
| Technical personnel | | | | | |

| Year: | Original budget | Consumption before 2004 | Consumption 2004 | Consumption 2005 | Total |
|---|-----------------|-------------------------|------------------|------------------|-------|
| Salaries | | | | | |
| Scientific personnel | | 560 | 160 | | 720 |
| Technical personnel | | | | | |
| Other operational costs | | 250 | 90 | | 360 |
| Equipment | | | | | |
| Others (please specify) | | | | | |
| Direct costs | | 830 | 250 | | 1080 |
| Indirect costs (20% of direct costs) | | 166 | 50 | | 216 |
| Total | | 996 | 300 | | 1296 |