A10. Keywords

Max. 5 keywords to describe the project activity.

Pollinators, carbon sequestration, cheese quality, marketing, resource economics

A11. Short project description/summary on objectives, activities, and expected results, both in Danish and English language (max 1500 characters, incl. spaces for both languages)

Multifunktionalitet med positive effekter på natur og samfund er et centralt element i økologisk jordbrug, og høj biodiversitet er afgørende herfor. Græsmarker har det største potentiale for at yde denne service, men økologiske græsmarker er store og biodiversiteten på dyrkningsfladen er lav. Formålet med dette projekt er at øge plantebiodiversiteten i græsmarken og markant forbedre økosystem funktioner og services i kæden natur-landmand-forbruger og for samfundet, og herigennem også øge markedsværdien af økologiske produkter. Vi vil: 1) designe og demonstrere produktive og biodiverse græsmarker med felter af blomstrende planter, 2) forbedre bier og andre bestøveres vilkår vha. blomstrende marker til hø eller ensilage, 3) øge kulstoflagring vha. øget plantebiodiversitet og græs af længere varighed, 3) producere oste af høj kvalitet baseret på hø med mange arter, 4) undersøge sammenhænge mellem biodiversitet og ostekvalitet samt formidle indtrykket og historien til den gastronomiske verden og forbrugeren, 5) udvikle markedsføringskoncepter for økologiske produkter med multifunktionalitet og 6) beskrive økonomiske og miljømæssige perspektiver for multifunktionalitet i græsmarker på bedrift og regionalt niveau vha. systemanalyse, økonomisk modellering og livscyklusanalyse. I forhold til Grøn Vækst bidrager projektet til øget biodiversitet, mere sammenhængende natur og øget økologisk areal.

Multifunctionality with positive effects on nature and society is a central element of organic agriculture, and a high biodiversity is essential for this. Grassland has the greatest potential for providing this service, but the organic fields are large and biodiversity is low. The purpose of this project is to increase plant biodiversity in grassland and significantly improve ecosystem functions and services in the nature-farmer-consumer chain and for society, and thus also increase the market value of organic products. We will: 1) design and demonstrate productive and biodiverse grassland with squares of flowering plants, 2) improve conditions for bees and other pollinators using flowering grasslands for hay or silage, 3) increase carbon sequestration via increased plant biodiversity, and grasslands of longer duration, 3) produce high quality cheeses based on species-rich hay, 4) examine relationships between biodiversity and cheese quality, and convey the perception and the product history to the gastronomic world and to the consumer, 5) develop marketing concepts for organic products with multifunctionality and 6) describe the economic and environmental perspectives for

multifunctionality in grassland at farm and regional level using systems analysis, economic modeling and life cycle assessment. In relation to Green Growth the project contributes to increased biodiversity, more connected nature and an increased organic farming area.

A12. Project description

(All parts of A12 must be filled out. Use "Garamond" as font, and font size 12, single spaced)

A12.1 The project objectives (2-3 lines).

To investigate and demonstrate ecosystem functions and services of increased plant biodiversity in productive and climate friendly organic grasslands for nature and environmental protection, product quality, marketing, resource utilisation and economic return at farm and regional level.

A12.2 The background and idea (hypotheses) incl. the national and international "state of art" and incl. references relevant for the section (max. ¾ page).

Organic grasslands have long been recognized for their provision of ecosystem functions (quality feed, animal health, product quality, biomass for energy, soil fertility and foundation for arable cropping or farms with monogastric animals) and ecosystem services (environmental benefits, carbon storage and recreational value)(i). However, the fields on organic farms are often large and biodiversity on farmed land is low. We hypothesize that by increasing plant biodiversity and adapting management, organic grassland will in the future contribute significantly more to the various ecosystem functions and services: 1) Pollination is a crucial ecosystem service essential for maintaining crop quantity and quality, and insect pollinators play a key role for all insect-pollinated plants. However, pollinating insect populations are generally declining at local, national and global scales, and several wild pollinator species are extinct or endangered (ii). Almost half of the Danish bumblebee species are on the red list. Clearly, such declines present a critical threat to future agricultural production, but biodiversity of pollinating insects and insect-pollinated plants is also at risk. Organic grasslands with a high proportion of herbs may provide a significant better habitat for pollinating insects, and in particular, well-managed hay production, with many flowering species during the whole growing season. In the large fields of modern organic farming landscapes it may be advantageous to introduce squares of flowers. 2) Increased biodiversity through a mixture of traditional grassland species and herbs is expected to contribute positively to ruminant health and product quality (iii), both in general, but also in more specialized products such as cheese from cows on a hay diet. Milk from animals exclusively fed grass and hay creates an excellent environment for the development of a characteristic and balanced flavour during cheese ripening. Specific aroma compounds may also originate directly from the plants. The positive effects have to be set against the cost, both economic and in CO2 emissions for storage and drying of hay compared to silaging. 3) Carbon and nitrogen transformations in grassland influence the climate profile of organic farming via C storage and nitrous oxide emissions(iv). The potential for C storage in species-rich organic grasslands is higher due to deeper root growth and thus greater allocation of C at depth(v). 4) Future organic systems with longer term grassland and potential suboptimal nutrient supply do not resemble the conditions under which the traditional grass-clover swards with a few species have been developed. This may result in nutrient deficiency and production losses, which especially for legumes is unfortunate because of their role as the "engine" in crop rotations. Mixtures including deep-rooted species are expected to utilize soil nutrients reserves better. 5) Grassland plays a significant role in reducing the dependency of organic arable production on conventional livestock manure. In organic arable cropping it is important to design grasslands correctly to optimize nitrogen fixation, energy production and the utilization of the soil mineral resource. Furthermore, these grasslands are expected to be a key element of matrix farms e.g. by producing hay for milk and cheese production. 6) The ecosystem services of grasslands give the dairy products added value in terms of nature,

environment and climate friendliness, but efficient marketing and consumer awareness hereof is a huge challenge - a challenge that is shared with many other organic products.
(i) GrasslSciEur (2010) 15:639-648, (ii) CommunIntergrBiol (2009) 2:37-39, (iii) IntDairyJ (2002) 12:661-666, (iv) Nature (2010) 464:843-844, (v) GlobalChangeBiol (2008) 14:2937-2949

A12.3 The projects contribution to solving important challenges for the organic food, agriculture and aquaculture sectors and the general political goals regarding food, agribusiness and environment as expressed in the governments Green Growth programme. Including an explanation of the projects focus on respectively the entire product/value chain or selected parts here of (e.g. primary production, processing, trade and transport) – max. ½ page.

The project addresses the issues that a lack of biodiversity is creating for organic farming today: Decreasing nature value on large fields, lack of pollination of agricultural crops (estimated value of 100 mill. Euro per year) and extinction of endangered pollinators, stabilization and improvement of crop yields also on stockless farms with no access to conventional slurry and product quality of cheese. Addressed is also the growth of the organic market through the development and consumer testing of strategies for marketing products with added value.

In relation to the gowernment's Green Growth agreement the project contributes to increased biodiversity and more connected nature through the squares of flowering species in the agricultural landscape. Furthermore, it contributes to the goal of increasing the area under organic farming as inclusion and utilisation of grassland is a key element for both organic arable crop and dairy production.

The project adresses the whole chain from wildlife, farmed land, farming system, product, marketing to consumers and society. The results are linked by systems analysis, the eco-efficiency is evaluated by economic modelling of documented ecosystem services at farm and regional level and by life cycle assessment of products.

A12.4 The projects innovative value, relevance and effect including the specific barriers and development potential for the organic sector the project will solve and/or support (max. ½ page).

Previously, "nature" has been restricted to natural or seminatural habitats along the edges of the field. The introduction of biodiversity squares of "flowering plants" integrated in the farming landscape within the large fields is innovative and a whole new way of thinking. The relevance of this is enormous as the development in farm and field size is dramatic and leads to less connected nature. Many organic farmers are interested in developing and introducing more species (herbs), but there is limited knowledge about how the niche requirement of the single species can be met, so in reality herbs are a rarity on farmed fields. Also, development of marketing of added value products is new and innovative will have great relevance and can help to close the gab between the consumers and farmers.

The project aims to overcome several barriers in relation to the three main themes of the call:
Growth: Grasslands and especially functional biodiverse grasslands delivering a range of ecosystem functions and services are a main key to increasing considerably the hectarage of organically farmed land in both arable and dairy farming systems. Furthermore, the project will contribute to growth of the organic market by developing and communicating products with a history.
Robustness: Multispecies mixtures in grasslands will add robustness to several aspects of organic plant production ie. yield stabilisation in the arable crop rotation, less susceptibility to soil clover fatigue and improved pollination of agricultural crops.
Credibility: The introduction, documentation and demonstration of more coherent nature in grasslands and agricultural landscapes together with reduced carbon footprint and improved resource utilisation, e.g. to end the dependency on conventional manure, will maintain or increase the credibility of the organic sector and organic products.

A12.5 Description of activities, methods and expected results divided into work packages with clear denotion of which activity the applicant consider to be either Research, Development or Demonstration. The coherence between work packages must be clearly described and the relation between activities and the tables with milestones and deliverables must be logical and consistent. Moreover, the primary target groups should be clearly identified with a description of how these will be met by the project (max. 1 page per WP and max. 3 pages in total).

WP1 Biodiversity and cheese (Leader: Karen Søegaard AU-DJF)
Research: Activity 1, 2 and 3, Demonstration: Activity 4
Objectives: To develop productive and highly biodiverse grasslands with windows of flowering species for improved ecosystem services and production of milk for high-quality cheese production.
Activity 1: Biodiversity, plant competitive strength and extended flowering (AU, Naturmælk)
A multi-species grassland mixtures of app. 15 species with flowering plants are sown in plots at two organic dairy farms in 2011 and used for experiments in 2012 in WP1 and demonstration activities in WP4. Additional to plots with all species, plots are organised in different patterns with respect to niche conditions taken the competitive strength into account with the aim of increasing overall biodiversity (app. 10 combinations): Chicory, plantain and caraway are strong competitors with grass and white clover, salad burnet and bird's foot trefoil are medium and chervil, sainfoin and melilot are week competitors. Further new species for grasslands, e.g. scabious and milfoil, will be selected and included with the aim to meet the pollinators demands just as more traditional grassland species as lucerne and red clover. Registrations are made on biodiversity, species competition, and feeding value of herbage and of species not described earlier.
The plots with different species will further be established at Research Centre Foulum in 2011 and analysed in 2012 and 2013. Three different cutting frequency and time will be carried out with the aim of maintaining flowering grasslands during the whole growing season. Registrations are made on flowering, biodiversity, productivity. WP2 use these plots for experiments.
Activity 2: Feeding experiment with multi-species mixtures (AU, Naturmælk)
Large plots of two multi(8)-species mixtures are sown on two farms in 2011. One mixture with high proportion of lucerne and chicory and the other of red clover, caraway and plantain. The hay produced will be fed on farms during 14-days periods in autumn 2012 and Naturmælk will produce hard cheeses for activity 3 and 4. Production and quality of hay and milk will be measured as well as the additional feed components.
Activity 3: Cheese characterization (KU)
Cheese ripening and flavour formation will be characterized by analysis of e.g. amino acids and volatile components in. cheeses from milk of cows, sheep and goats on grass and hay. Cheeses will be obtained from Naturmælk and Knuthenlunds Gods. Influence on cheese ripening and flavour development of the biodiverse pastures, which are developed in this project with different mixtures of plants, will be investigated.
Activity 4: Focus on cheese quality for gastronomic professionals and consumers (Meyers Madhus)
We will organize demonstration of organic cheese and a cheese symposium. The main focus will be to secure and measure the influence of key differentiating parameters in the field and the farm on the taste and perception of selected cheeses. This requires communication and demonstration activities across the value chain from the field to the consumer. The different parties in the value chain will be brought together in tailormade formats - including a cheese symposium - to exchange perceptions of, and develop definitions of quality parameters. Also, these parameters will be tested, both isolated, and in a broad sense, i.e. organoleptic properties, as well as other influences on perceived quality.
Expected results: A new concept with windows of flowers taking niche requirements into account so species are maintained over time. Knowledge about the effect of grassland species on cheese ripening and flavour. Increased awareness of cheese quality and ralation to biodiversity from farmer to consumer.

WP2 Biodiversity and pollinators (Leader: Beate Strandberg AU-NERI)
Research: All activities

Objectives: To investigate the potential improvements for wild pollinators by establishment of organic grasslands with a large proportion of selected herbs beneficial for pollinators.
Activity (AU-NERI, AU-Biology): We will estimate the availability of food resources, i.e. nectar and pollen, for flower-visiting insects, in addition to diversity and abundance of wild pollinators including bumble bees, solitary bees and butterflies in organic grasslands. Study systems will include (1) WP1 experimental field trial at Foulumgård and (2) a number of old organic hayfields. The field trial gives the opportunity to investigate different combinations of plant species and time of cutting, to find an optimum for the diversity and abundance of flower-visiting insects. In the field, optimal flowering and establishment of pollinating insects will take some years, and furthermore is dependent on the landscape surrounding the grassland. Thus, monitoring of pollinators and flowering in old organic hayfields in different agricultural landscapes is important to characterize the long-term potentials for improvements for pollinating insects. Sampling in old hayfields will be done in 2011 whereas monitoring within the field trial will be performed in 2012 in order to allow establishment of both plants and pollinator populations. In each treatment in the field, food resources and diversity/abundance of flower-visiting insects will be monitored within four 1 x 1m sampling plots 5 times during the flowering season. Furthermore, we will measure nectar production, sugar content in the nectar, nectar sugar composition and pollen production for the most important plant species in order to quantify the resources available for the pollinators. The number of individuals and species of flower-visiting insects (bees and butterflies) will be monitored, and species which cannot be identified in the field will be collected for identification by taxonomic experts.
Expected results: Important results on pollinators and food resources for pollinators in organic grasslands and especially hayfields. Recommendations on species composition and cutting regimes for organic hayfields in order to improve the ecological services with special focus on pollination.

WP3 Carbon sequestration in multi-species grasslands (Leader: Jørgen Eriksen, AU-DJF)
Research: All activities
Objectives: To increase long-term carbon sequestration through increased functional plant biodiversity and grasslands of longer duration
Activity 1. Carbon sequestration in multi-species grasslands: Carbon storage is investigated in two experiments with focus on species and management effects. 1) An organic 3-yr-old pasture experiment with 5 herb and 4 legume species in pure stands, in mixtures and with increasing contents of ryegrass/white clover in 2-4 replicates. 2) The organic dairy crop rotation at Foulum (organic since 1987) including permanent and 1 to 4-yr-old pastures with combinations of management (±slurry and ±grazing). In both experiments carbon sequestration is estimated through soil sampling in combination with measurements of above- and below-ground standing biomass.
Expected results: Quantification of the possibility of biodiverse organic grasslands to increase carbon sequestration in organic farming.

WP4 Marketing and demonstration of ecosystem functions and services (Leader: Cathrine Esmann, Dept. of Organic Food Development)
Development: Activity 1, Demonstration: Activity 2
Objectives: To develop concepts for marketing of ecosystem services and to demonstrate multifunctionallity
Activity 1. Marketing (Dept. of Organic Food Development)
Market and consumer analysis will investigate what are the paramount values of greater biodiversity and ecocystem services among consumers using investigation of and analysis on results from WP1, WP2, WP3 and WP5 and additional development of analytical material. This is followed by development of a communication strategy for closing the gap between consumers and farmers with strategic planning of the communication and media planning. Next is developed a communication concept: How can we form the messages and how do they look? This step includes designing and copywriting. This is followed by further events: Food dating and hands-on-experiences, exploring alternative ways of connecting consumers with farmers, ways of showing (not telling) consumers the values of biodiversity.

Activity 2. Demonstration of multispecies grass swards in primary production (Organic Denmark)
During the course of the project we will organize farm and field days at the host farms with organic and conventional farmers and interested consumers as the target group. Furthermore, we will disseminate results and conclusion from other work packages through the Organic Denmark web site and journal.
Expected results: Identify further ways of closing the gap between consumers and farmers by insight based definition of target groups, markets and messages, an effective communication plan involving the identified markets, messages and target groups and a clear campaign concept. Dissimination of knowledge concerning ecosystem services of multispecies grasslands.

WP5 Systems analysis, economic modelling and Life Cycle Assessment (Leader: Troels Kristensen, AU-DJF)
Research: All activities
Objective: To document the future perspectives of increased use of multifunctionality in organic grasslands.
Activity 1 (KU and AU): Productivity and economic results at farm level – dairy farmer and areble farmer – of different scenarios for introduction of multi criteria grassland. Existing annual farm data from seven farms participating in ORMILKQUAL will be used as standard scenario and the farm-specific effect of different scenarios for increased use of multi criteria grassland will be calculated. The model Ø-PLAN developed in ORGGRASS will be extended to include multi critiria grassland and used to calculate the economic perspectives for using multifunctional grassland as part of the crop production on arable organic farms coorperating with organic dairy farmers. The expected economic benefit at regional level on plant productivity due increased pollination from the multi species grass land at the organic farms will also be estimated based on data from WP2.
Activity 2 (AU): GHG emissions in a life cycle perspective from production of cheese based on milk from herds with production and feeding of hay. Data will be obtained from an ongoing project at FØL supplemented with data from the farms participating in WP1 primarily on the use of machinery in crop production and energy for haymaking together with information from Naturmælk on the energy used in milk processing. The life cycle assessment for the functional unit 1 kg cheese will include development of allocation methods to include the effect of increased productivity due to inriched pollination at reginal level.
Expected results: Quantify the economic and environmental effects of introducing multi-species grasslands with ecosystem services on dairy and arable farm level and regional level.

WP6 Project management (Leader: Jørgen Eriksen)
Objectives: Securing project progress through coordination of activities and securing communication of results. See A12.9 for details.

A12.6 Description of how it will be ensured that the project results can be implemented in practice and perhaps commercialized (max. ½ page).
The results are easily implemented in practice as much emphasis has been put on this in the choice of experimental sites and partners. The experimental units are mainly organic farms, local advisors are involved for advice and demonstration to a broader audience, private companies are involved in cheese production, testing and marketing. Systems analysis ensures also that the partial results from different work packages are used in a realistic and optimised production and economic entirety making it easy to communicate to and be implemented by the end users.

A12.7 Description of possibilities for a general utilisation of the results (max. ½ page).
The results from any of the work packages in this project may be utilised by all organic farmers as grasslands are expected to play a key role on any future organic farm/matrix. Furthermore, the principles of this research may easily be adopted by conventional dairy farmers. The ideas and concepts developed for marketing of products with added value from the ecosystem services may be utilised by many other organic products.

A12.8 Description of the coherence between the research, development and demonstration activities in the project, including involvement of relevant users of the results (max. ½ page).
The core of this project is research but demonstration and development is an integrated and prioritized part. The demonstration and development address the whole chain 'nature-farmer-consumer'. "Organic Denmark" focus on food producers by organising demonstrations on the farms where research is being carried out, involving also the research partners and results from the project. "Meyers Madhus" is focussed on food users by organizing demonstrations for the gastronomic world, also involving the research partners. "Organic Food Development" will develop concepts for marketing of products with ecosystem services based on results from the project and make farmers-consumers events.

The participants in demonstration and development all serve a double purpose: "Organic Denmark" demonstrates research to farmers and the public, but also help in the coordination of on-farm research as agricultural advisors hired by the farmer. "Meyers Madhus" demonstrates research results to gastronomic experts and the public, but also contribute to the evaluation of the cheese from the research part. Finally, "Organic Food Development" will develop concepts for general purpose use, but also concepts directed towards the dairy company that co-finance this part. This will enable Naturmælk to use the results immediately in their commercial business.

A12.9 Project organisation, management and administration (max. ½ page).
The project is organized in five work packages with research, development and demonstration and one with the single task of project management. The work package leaders and the project leader is the core management group being in very regular contact. To coordinate research activities two annual meetings are held with project partners, in Feb-Mar prior to the start of fieldwork and in Aug-Sep prior to finalizing the annual report. An Internet website will be established and regularly updated (accessible via ICROFS) for internal communication in the project and to attract popular attention via pictures, video-clips etc. Links will be made to the publications available over time. The project will host meetings with farmers specifically involved through on-farm experiments and maintain close contact to farmer Frode Lehmann, chairman of the board of Naturmælk.

A12.10. The technical competences of the partners and their contribution to the project including how they complement each other (max. 5 lines per partner).
The project addresses all aspects of the whole chain nature-farmer-consumer and this is fully expressed in the complementing competence of the partners each making an indispensable contribution to the overall project objective.

Dept. of Agroecology and Environment, AU-DJF focuses its research on interactions between soil, crop production and environment, and has considerable experience with grassland performance and climate change mitigation and with a strong tradition for experimentation in farmers fields, whole farm studies and systems analysis. The department has long-term experiments of relevance including the Research Platform for Organic Dairy Farming. The group involved in this project has been heavily involved in the previous Darcof programs.

Department of Biology, AU-Biology, focus on basic research in the areas of botany, zoology, marine biology, genetics, evolution, microbiology, zoophysiology, ecophysiology, population ecology, ecotoxicology and bioinformatics. In relation to this projekt we do taxonomic work on pollinators and examine their living conditions.

The AU-NERI partner has a strong and well documented expertise in assessment of plant-insect interactions and biodiversity effects of different aspects of cultivation practice. The group has been involved in several

projects on pollinators, is partner and WP-leader in the FP7 project STEP (Status and Trends of European Pollinators) and the ICROFS-project REFUGIA. The institution facilities are adequate for the experiments planned within the present project.

Department of Food Science (KU) has a practical and industrial technological approach to food. We provide a knowledge foundation for the production of food of high sensory and nutritional quality. We have methods for the evaluation of cheese ripening, characterisation of cheese varieties, and influences of cheese milk treatment on cheese.

Institute of Food and Resource Economics (KU) focus on research into the area where food and natural resources is linked to the production and consumption of food and non-food products from agricultural, horticultural and fishing sectors. We conduct research-based concultancy assignments for the public sector concerning economic issues with regard to food, agriculture, fisheries and the environment. We have developed the Ø-PLAN model, which will be used in the project.

Økologisk Landsforening/Organic Denmark is an association of farmers, companies and consumers that are assembled to create new ways for more organic food and sustainable change. We are advisors for the group of farmers, where the experiments will be placed. We inform about organic production and food to a variety of target groups through media, events, web, magazine, newspaper, etc.

Økologisk Fødevarerådgivning/Dept. of Organic Food Development. Our goal is to increase supply and promote sales of organic foods. Our main focus is to develop the market by helping individual farmers and producers to strengthen all steps in the process from farm to fork.

Meyers Madhus is a food communication company dedicated to raising the gastronomic level in Denmark through courses for children, adult amateurs and professionals and through our communication activities, tasting, symposia and seminars we want to set new and relevant agendas. Meyers Madhus links food enthusiasts with fine cooks and make events in general.

Naturmælk is a smaller organic dairy. One of the visions is to develop gourmet products. Five of the suppliers feed their cows with hay only and no silage. Naturmælk has developed a prize-winning hard cheese from this milk and has the technique to transport and make cheese of small quantities of milk.

A12.11. Expected collaboration with other research institutions/companies nationally and internationally (max. ½ page).

The concept of this project is unique and we are not aware of similar constructions elsewere. However, in specific workpackages we will consult the expertise at other institutions through our networks including members in 20 countries of the COST action 852 "Quality Legume-Based Forage Systems for Contrasting Environments". We will keep in close contact with the JENA experiment, Leipzig (contact Alexandra Weigelt) and the recently initiated EU-project MULTISWARD (contact: Jean-Louis Peyraud).

AU-NERI has two subcontractors, Isabel Calabuig, Dr., Copenhagen University, Faculty of Science, National History Museum of Denmark; and Henning Bang Madsen, Research Technician, Copenhagen University, Faculty of Science, Dept. of Biology. They complement the AU-NERI expertise with entomological expertise in general and especially on ecology and biodiversity of bumblebees and solitary bees. Sampling/collecting and monitoring bees and other insects. Identification of solitary bees and bumblebees.

A12.12. The relation to previous projects within the projects focus areas (if any) including references to these (max. ½ page).

Considerable knowledge has been obtained in the DARCOF III projects Orggrass, Ecovit, OrMilkQual and Cropsys in relation to grassland production and utilisation hereof. Knowledge, which is fully implemented in the foundation of this project and without which it would be impossible to obtain the goals of this

interdisciplinary and cross-cutting project. Without any overlap this project will complement the four projects mentioned and also integrate their findings, which was not attempted in DARCOF III.

A13. Tables with milestones and deliverables with information as requested in the table in A16.
See A16 and A17

A14. List of deliverables from the project (also fill out the table in A17)
See A17. The effective working time for each deliverable is based on the total number of labour month (scientific plus technical) from total budgets including applied from DFIA, own and co-financing

A15. List of appendices
B. Budget form
D. Participation form
CV for key participants

A16. Milestones and time schedule for the entire project

wp no.	Milestone no.	Title/activity	Responsible project participant	Date/year	Other participants
1	1.1	Selecting seed mixtures, planning and establishing plot experiments	Karen Søegaard	4/2011	Jørgen Eriksen, Beate Strandberg
	1.2	End of plot experiment on farms	Karen Søegaard	7/2012	
	1.3	Collection of cheese	Ylva Ardö	10/2012	
	1.4	Feeding experiments and milk produktion for cheese completed	Karen Søegaard	1/2013	Troels Kristensen, Leif Friis Jørgensen
	1.5	Initial cheese characterization completed	Ylva Ardö	3/2013	
	1.6	Cheese production completed	Leif Friis Jørgensen	6/2013	
	1.7	Cheese symposium	Claus Meyer	10/2013	
	1.8	End of plot experiments on farms	Karen Søegaard	10/2013	
	1.9	Cheese Characterization completed	Ylva Ardö	11/2013	
2	2.1	Selection of old organic hayfields	Beate Strandberg	3/2011	Yoko Dupont, subcontractors A12.11
	2.2	Selection of herbs for experiments - input to WP1	Beate Strandberg	3/2011	Yoko Dupont, subcontractors A12.11
	2.3	Sampling of food resources and pollinators within old hayfields finished	Beate Strandberg	10/2011	
	2.4	Identification of all pollinators in old hayfields finished	Beate Strandberg	4/2012	Subcontractors A12.11
	2.5	Quantification of available food resources in old hayfields finished	Beate Strandberg	4/2012	
	2.6	Planning of sampling of food resources and pollinators in the Foulumgaard experiment finished	Beate Strandberg	4/2012	Yoko Dupont
	2.7	Sampling food resources and pollinators at Foulumgaard finished	Beate Strandberg	10/2012	Yoko Dupont
	2.8	Identification of all pollinators at Foulumgaard finished	Beate Strandberg	4/2013	
	2.9	Quantification of available food resources at Foulumgaard finished	Beate Strandberg	4/2013	Yoko Dupont, subcontractors A12.11
3	3.1	Determination of root biomass and production completed	Jørgen Eriksen	12/2012	
4	4.1	Followup on farms	Kirstine Lauridsen	10/2012	
	4.2	Definition of target groups, markets and messages	Cathrine Esmann	2/2013	
	4.3	Communication plan completed	Cathrine Esmann	5/2013	
	4.4	Plan for campaign concept	Cathrine Esmann	6/2013	

	4.5	Followup on farms	Kirstine Lauridsen	10/2013	
5	5.1	Extended version of Ø-plan	Niels Tvedegaard	12/2011	Troels Kristensen
	5.2	Life Cycle Assessment database completed	Troels Kristensen	12/2012	Jørgen Eriksen, Karen Søegaard
6	6.1	Fulfilment of overall project objectives	Jørgen Eriksen	12/2013	Project group

A17. List over deliverables (D=deliverables) for the entire project, stating whether the deliverable belongs to the research part of the project (R); the development part (D); and/or demonstration (Dm).

D. no.	Deliverable	Responsible project participant	Date/year	R, D, or Dm Effective working time, months [1]	Type of deliverable*
1.1	Herbs in a new grassland design	Karen Søegaard	10/2012	R-4	P2
1.2	Species for increasing biodiversity	Karen Søegaard	10/2012	R-4	P1
1.3	Design of multi-species grasslands	Karen Søegaard	6/2013	R-4	P1
1.4	Species composition in multispecies grasslands	Karen Søegaard	10/2013	R-6	S4
1.5	Production of hay-based cheese	Leif Friis Jørgensen	10/2013	Dm-6	P2
1.6	Cheese with a story	Claus Meyer	10/2013	Dm-6	P2
1.7	Flowering during the whole growing season	Karen Søegaard	10/2013	R-4	P1
1.8	Maintaining flowering during the growing season	Karen Søegaard	12/2013	R-5	S1
1.9	Grassland biodiversity and cheese characteristics	Ylva Ardö	12/2013	R-4	S1
1.10	Grassland biodiversity and cheese characteristics	Ylva Ardö	12/2013	R-4	P1
2.1	Food resources and pollinators in old organic hayfields	Beate Strandberg	6/2013	R-3	S1
2.2	Food resources and pollinators in old organic hayfields	Beate Strandberg	6/2013	R-2	S4
2.3	Relationship between hayfield species composition and cutting regimes and food resources for pollinators	Beate Strandberg	11/2013	R-3	S1
2.4	Relationship between hayfield species composition and cutting regimes and food resources for pollinators	Beate Strandberg	11/2013	R-2	S4
2.5	Organic hayfields with selected herbs as ressources for pollinators	Beate Strandberg	12/2013	R-3	S1
2.6	Organic hayfields with selected herbs as ressources for pollinators	Beate Strandberg	12/2013	R-2	S4
2.7	Organic hayfields with selected herbs as ressources for pollinators	Beate Strandberg	12/2013	R-3	P2
3.1	Effects of grassland composition, age and management on belowground biomass and carbon storage	Jørgen Eriksen	10/2013	R-4	S1
3.2	Effects of grassland composition, age and management on belowground biomass and carbon storage	Jørgen Eriksen	10/2013	R-2	S4
3.3	Effects of grassland composition, age and management on belowground biomass and carbon storage	Jørgen Eriksen	10/2013	R-2	P2
4.1	Design of multispecies grasslands	Kirstine Lauridsen	6/2012	Dm-3	P2
4.2	Ecosystem services	Kirstine Lauridsen	8/2013	Dm-3	P1
4.3	Reaching target groups with the defined messages	Cathrine Esmann	2/2013	D-1	P1

[1] The total amount of months must be consistent with the total number of months in the budgets, and will therefore show the relative working effort per work package.

4.4	**Alternative ways of connecting consumers with farmers**	**Cathrine Esmann**	**5/2013**	**D-1**	**P2**
5.1	**Economic evaluation of the increased pollination**	**Niels Tvedegaard**	**12/2013**	**R-4**	**S4**
5.2	**LCA of cheese based on milk from organic cows fed hay from multi criteria grassland**	**Troels Kristensen**	**12/2013**	**R-5**	**S1**
6.1-6.3	**Annual reports**	**Jørgen Eriksen**	**10/2011-13**	**R-1**	**P1**
6.4	**Project website**	**Jørgen Eriksen**	**5/2011**	**R, Dm-1**	**C6**
6.5	**Final report**	**Jørgen Eriksen**	**4/2014**	**R-1**	**P1**

* Fill in the type of deliverable. Use the List of type of deliverables on the last page in Annex 3 “Instructions for filling in the application form”.