



MINISTERIET FOR
FAMILIE- OG
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Ministeriet for Fødevarer, Landbrug og Fiskeri
Direktoratet for FødevarerErhverv



Danish Research Centre for Organic Farming



Application

for research funding under the research programme:

Research in Organic Food and Farming

International Research Co-operation and Organic Integrity

(DARCOF III 2005-2011)

Funded by the Ministry of Food, Agriculture and Fisheries
under the Finance and Appropriation Act, Sections 24.33.02.10

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1. **Project title and acronym** (acronym max. 10 letters):
The role of Organic Farms as refugia for biodiversity

REFUGIA

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2. **Project manager** (name, title, address, telephone, fax and e-mail. For projects in which several institutes participate, one project manager must be appointed to head the project):

Liselotte Wesley Andersen (LWA), senior scientist, National Environmental Research Institute (**NERI**) Department of Wildlife Ecology and Biodiversity, Grenåvej 12, 8410 Rønne, Denmark.
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Please submit 2 hard copies and 1 electronic version to:

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DK-8830 Tjele

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3. **The project is within the following research project theme** (name of the project theme according to 'Invitation til projektansøgninger'. Include argumentation, max. 10 lines, if the project is only a part of a project theme):

3.5.2 Multifunktionelle goder i økologisk jordbrug.

The project will provide fundamental information on the nature content and quality that relates to the wildlife and nature aspects of the multifunctionality of organic farming in Denmark. There is little or no contemporary knowledge, or a total lack of information for these aspects. The knowledge that can be gained from this project is fundamental for the management of nature and environmental issues both in organic agriculture and for the international obligations to conserve biodiversity. It also supports one of the basic tenets that organic farming is marketed under. It is therefore an essential component.

4. **Participating institute(s)** (name, address, telephone, fax and e-mail):
National Environmental Research Institute (**NERI**) Department of Wildlife Ecology and Biodiversity, Grenåvej 12, 8410 Rønde, Denmark, phone: 89201713/1787 fax: 89201514, lwa@dmu.dk.

National Environmental Research Institute (**NERI**) Department of Terrestrial Ecology, Vejløvej 25, P.O. Box 314, DK- 8600 Silkeborg, Denmark, phone: 89201400, fax:89201414, mbp@dmu.dk, bst@dmu.dk

Natural History Museum, Aarhus, Wilhelm Meyers Allé 210, 8000 Aarhus C, Denmark: phone: 86129777, fax; 86130882, tsj@nathist.dk

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5. **Contact persons** (title, name, address, telephone, fax and e-mail of one contact person appointed to represent each participating institute):
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Tommy Dalgaard (TDA), Head of Research Unit, Danish Inst. of Agric. Sciences (DIAS), Dept. of Agroecology P.O. Box 50. DK-8830 Tjele, Denmark, tommy.dalgaard.agrsci.dk

6. Project staff (title, name, address, telephone, fax and e-mail):

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7. Project duration: 4 years From: 01.01.2009 To: 31.12.2010

8. **Main objective(s)** (maximum 10 lines):

Visionary objectives: To increase society's, decision-makers and consumers' knowledge about the multifunctional role of organic farming- especially focusing on the impact of organic farming on nature.

Immediate objectives: To investigate food chains, species diversity and genetic diversity and cohesion in the wild flora and fauna in organic farming related to conventional farming.

9. **Project summary in Danish** (approximately 1 page, suitable for publication):

Økologisk jordbrug anses generelt for at have en positiv effekt på biodiversitet og andre landskabelige værdier. Gennem de sidste ti år er der imidlertid sket betydelige ændringer indenfor økologisk jordbrug og økologiske avlere omfatter i dag såvel den traditionelle holistiske økolog som økologen, der driver gården efter økonomisk optimering. I samme tidsrum er der også sket forbedringer af afgrøder og driftsmetoder, der har resulteret i effektive økologiske driftsformer som ofte kan sidestilles med konventionel landbrugsdrift. Økologisk jordbrug i dagens Danmark rummer derfor stor variation. I nærværende projekt undersøges effekten af økologisk jordbrug med varierende driftsintensitet på naturen med henblik på at belyse i hvilket omfang økologisk jordbrug fungerer som refugium for biodiversitet.

Det overordnede spørgsmål besvares ved at undersøge:

- 1) Strukturen, diversiteten og intensiteten af økologiske brug og de tre faktorerers rolle for multifunktionaliteten i Danmark. I forbindelse med disse undersøgelser udvikles nye teknikker til ud fra fly- og satellitfotos at undersøge forskellen i biodiversiteten på økologiske og konventionelle marker, og dermed økologisk jordbrugs rolle som refugium for biodiversitet (WP 2).
- 2) Ukrudt-insekt fødekæder i to afgrøder i økologiske marker, der dyrkes hhv. ekstensivt og intensivt. Resultaterne sammenholdes med eksisterende data fra tilsvarende konventionelle afgrøder. Undersøgelsen vil vise om der er mere ukrudt og mere ukrudts-baseret føde tilgængelig for markens dyreliv i en økologisk dyrket afgrøde sammenlignet med en konventionel. (WP 3)
- 3) Mængden af ukrudtsfrø, der produceres i hegn og markkanter på hhv. økologiske og konventionelle brug. Data vil belyse, i hvilket omfang allerede dokumenterede forskelle i plantediversitet mellem hegn på økologiske og konventionelle brug afspejles i blomstringsperiodens længde og i de ukrudtsfrø, der er tilgængelige for dyrelivet. (WP 4)
- 4) Den genetiske diversitet og populationsstrukturen hos en række vilde arter i agerlandet på økologiske brug for derigennem at belyse betydningen af økologiske brug som refugium for arter og som genetisk ressource. Det antages at habitater i hegn, markkanter og økologiske marker fungerer som 'øer' og 'korridorer' for den vilde flora og fauna og at brugen af pesticider i konventionelt jordbrug forårsager hyppige og gentagne lokale episoder af uddøen og rekolonisering for ukrudt og insekter, hvorved fugle og små pattedyr, der lever af disse indirekte påvirkes. Effekten på den genetiske struktur varierer sandsynligvis afhængig af arten og dens spredningspotentiale. Projektet fokuserer på følgende tre arter: agerhøne (*Perdix perdix*), løbebillen (*Pterostichus spp.*) og markmus (*Microtus agrestis*), der varierer med hensyn til spredningspotentiale. (WP 5 og 6)
- 5) Indvirkningen af økologiske brug på indholdet af den vilde flora og fauna i landskabet ved at skabe et sæt model-landskabskonfigurationer. Dette udføres ved at benytte informationerne fra WP2 om graden af dyrknings-intensivitet i øko-brugene og deres fordeling samt fra WP3-6 om arternes økologi, genetiske mønstre og arts-diversitet. Modellering vil benyttes til at syntetisere denne information og skabe et sæt index, der beskriver de økologiske brugs evne til at understøtte en række arter i den vilde flora og fauna. Resultatet bliver et index for den vilde flora og fauna for landskabet (landscape wildlife index, LWI), der vil have potentialet til at kunne benyttes af interessegrupper til at bestemme, hvilke scenarier der vil give et optimalt vildtpotentiale set fra deres synsvinkel. Fra en faunistisk synsvinkel vil indexet også være en effektiv måde til at måle "naturkvalitet" ved at gøre det muligt at komme med et direkte estimat

for hvor meget økologiske brug bidrager til værdien af landskabet for en række agerlands-arter. På denne måde kan en økologisk landmand vurdere hvilken påvirkning han som individ har på biodiversiteten via de valg han tager med hensyn til intensiteten hvormed han driver sin bedrift (WP7).

10. Budget:

Budget for the entire project—broken down by calendar year							
Budget item		From Ministry of Food, Agriculture and Fisheries		From place of work		From other sources	
		Person months	DKK	Person months	DKK	Person months	DKK
1st calendar year 2007	Salaries/academic staff	14,9	637.138				
	Salaries/techn.-adm. staff	24,66	752.315				
	Equipment		16.000				
	Operational expenses		333.000				
	Others (please specify below)						
Total direct costs			1.738.453				
Overhead (20 % of direct costs)			347.690		1.074.019		
Total			2.086.143		1.074.019		
2nd calendar year 2008	Salaries/academic staff	30,75	1.376.474				
	Salaries/techn.-adm. staff	22,05	693.095				
	Equipment						
	Operational expenses		148.287				
	Others (please specify below)						
Total direct costs			2.217.796				
Overhead (20 % of direct costs)			443.559		1.561.354		
Total			2.661.355		1.561.354		
3rd calendar year 2009	Salaries/academic staff	12	575.181				
	Salaries/techn.-adm. staff	2,32	73.844				
	Equipment						
	Operational expenses		74.800				
	Others (please specify below)						
Total direct costs			723.825				
Overhead (20 % of direct costs)			144.765		522.387		
Total			868.590		522.387		
4th calendar year 2010	Salaries/academic staff	21,99	1.084.403				
	Salaries/techn.-adm. staff	0,25	7.950				
	Equipment						
	Operational expenses		64.000				
	Others (please specify below)						
Total direct costs			1.156.353				
Overhead (20 % of direct costs)			231.270		936.136		
Total			1.387.623		936.136		
Total for the 4 years	Salaries/academic staff	80	3.659.509				
	Salaries/techn.-adm. staff	49,28	1.527.144				
	Equipment		16.000				
	Operational expenses		620.087				
	Others (please specify below)						
Total direct costs			5.822.740				
Overhead (20 % of direct costs)			1.164.546		4.093.896		
Total			6.987.286		4.093.896		
Total for the 5 years			6.987.286				


Budget for each participating institution — Name of institution: NERI, Dept of Wildlife Ecology and Biodiversity						
Budget item	From Ministry of Food, Agriculture and Fisheries		From place of work		From other sources	
	Person months	DKK	Person months	DKK	Person months	DKK
1st calendar year 2007	Salaries/academic staff	2,5	105.943			
	Salaries/techn.-adm. staff	0,4	13.287			
	Equipment					
	Operational expenses		142.000			
	Others (please specify below)					
Total direct costs		261.230				
Overhead (20 % of direct costs)		52.246		250.780		
Total		313.476		250.780		
2nd calendar year 2008	Salaries/academic staff	15,5	668.976			
	Salaries/techn.-adm. staff	0,4	13.687			
	Equipment					
	Operational expenses		81.287			
	Others (please specify below)					
Total direct costs		763.950				
Overhead (20 % of direct costs)		152.790		733.392		
Total		916.740		733.392		
3rd calendar year 2009	Salaries/academic staff	4,5	208.703			
	Salaries/techn.-adm. staff					
	Equipment					
	Operational expenses		20.000			
	Others (please specify below)					
Total direct costs		228.703				
Overhead (20 % of direct costs)		45.741		219.554		
Total		274.444		219.544		
4th calendar year 2010	Salaries/academic staff	13,2	627.046			
	Salaries/techn.-adm. staff					
	Equipment					
	Operational expenses		20.000			
	Others (please specify below)					
Total direct costs		647.046				
Overhead (20 % of direct costs)		129.409		621.164		
Total		776.455		621.164		
5th calendar year 2011	Salaries/academic staff					
	Salaries/techn.-adm. staff					
	Equipment					
	Operational expenses					
	Others (please specify below)					
Total direct costs						
Overhead (20 % of direct costs)						
Total						
Total for the 5 years		2.281.114		1.824.890		

Budget for each participating institution — Name of institution: NERI. Dept. Terrestrial Ecology						
Budget item	From Ministry of Food, Agriculture and Fisheries		From place of work		From other sources	
	Person months	DKK	Person months	DKK	Person months	DKK
1st calendar year 2007	Salaries/academic staff	3,4	151.995			
	Salaries/techn.-adm. staff	21	642.900			
	Equipment					
	Operational expenses		23.000			
	Others (please specify below)					
Total direct costs		817.895				
Overhead (20 % of direct costs)		163.579		785.179		
Total		981.474		785.179		
2nd calendar year 2008	Salaries/academic staff	3,5	161.161			
	Salaries/techn.-adm. staff	19	600.203			
	Equipment					
	Operational expenses		20.000			
	Others (please specify below)					
Total direct costs		781.364				
Overhead (20 % of direct costs)		156.273		750.109		
Total		937.637		750.109		
3rd calendar year 2009	Salaries/academic staff	4,0	189.708			
	Salaries/techn.-adm. staff	2	63.844			
	Equipment					
	Operational expenses		17.000			
	Others (please specify below)					
Total direct costs		270.552				
Overhead (20 % of direct costs)		54.110		259.730		
Total		324.662		259.730		
4th calendar year 2010	Salaries/academic staff	5,65	276.001			
	Salaries/techn.-adm. staff					
	Equipment					
	Operational expenses		14.000			
	Others (please specify below)					
Total direct costs		290.001				
Overhead (20 % of direct costs)		58.000		278.401		
Total		348.001		278.401		
5th calendar year 2011	Salaries/academic staff					
	Salaries/techn.-adm. staff					
	Equipment					
	Operational expenses					
	Others (please specify below)					
Total direct costs						
Overhead (20 % of direct costs)						
Total						
Total for the 5 years		2.591.774		2.073.419		

Budget for each participating institution — Name of institution: Natural History Museum, Aarhus						
Budget item	From Ministry of Food, Agriculture and Fisheries		From place of work		From other sources	
	Person months	DKK	Person months	DKK	Person months	DKK
1st calendar year 2007	Salaries/academic staff	8	328.250			
	Salaries/techn.-adm. staff	2	56.628			
	Equipment					
	Operational expenses		148.000			
	Others (please specify below)					
Total direct costs		532.878				
Overhead (20 % of direct costs)		106.575				
Total		639.453				
2nd calendar year 2008	Salaries/academic staff	8	334.825			
	Salaries/techn.-adm. staff	1,5	43.320			
	Equipment					
	Operational expenses		22.000			
	Others (please specify below)					
Total direct costs		400.145				
Overhead (20 % of direct costs)		80.029				
Total		480.174				
3rd calendar year 2009	Salaries/academic staff	1,5	66.370			
	Salaries/techn.-adm. staff					
	Equipment					
	Operational expenses		15.000			
	Others (please specify below)					
Total direct costs		81.370				
Overhead (20 % of direct costs)		16.274				
Total		97.644				
4th calendar year 2010	Salaries/academic staff	2,0	92.806			
	Salaries/techn.-adm. staff					
	Equipment					
	Operational expenses					
	Others (please specify below)		5.000			
Total direct costs		97.806				
Overhead (20 % of direct costs)		19.561				
Total		117.367				
5th calendar year 2011	Salaries/academic staff					
	Salaries/techn.-adm. staff					
	Equipment					
	Operational expenses					
	Others (please specify below)					
Total direct costs						
Overhead (20 % of direct costs)						
Total		0				
Total for the 5 years		1.334.638				

Budget for each participating institution — Name of institution: Danish Institute of Agricultural Sciences						
Budget item	From Ministry of Food, Agriculture and Fisheries		From place of work		From other sources	
	Person months	DKK	Person months	DKK	Person months	DKK
1st calendar year 2007	Salaries/academic staff	1	50.950			
	Salaries/techn.-adm. staff	1,26	39.500			
	Equipment		16.000			
	Operational expenses		20.000			
	Others (please specify below)					
Total direct costs		126.450				
Overhead (20 % of direct costs)		25.290		38.060		
Total		151.740		38.060		
2nd calendar year 2008	,5	3,75	197.825			
		1,15	35.825			
			25.000			
Total direct costs		258.650				
Overhead (20 % of direct costs)		51.730		77.853		
Total		310.380		77.853		
3rd calendar year 2009	Salaries/academic staff	2	110.400			
	Salaries/techn.-adm. staff	0,32	10.000			
	Equipment					
	Operational expenses		22.800			
	Others (please specify below)					
Total direct costs		143.200				
Overhead (20 % of direct costs)		28.640		43.103		
Total		171.840		43.103		
4th calendar year 2010	Salaries/academic staff	1,5	88.550			
	Salaries/techn.-adm. staff	0,25	7.950			
	Equipment					
	Operational expenses		25.000			
	Others (please specify below)					
Total direct costs		121.500				
Overhead (20 % of direct costs)		24.300		36.571		
Total		145.800		36.571		
5th calendar year 2011	Salaries/academic staff					
	Salaries/techn.-adm. staff					
	Equipment					
	Operational expenses					
	Others (please specify below)					
Total direct costs						
Overhead (20 % of direct costs)						
Total						
Total for the 5 years		779.760		195.587		

11. Signatures:

Name	Institute	Date	Signature
Project manager:			
Institute management:	Danish Institute of Agricultural Sciences. Dept. Agroecology.	Dec 8, 2006	
Institute management:			
Institute management:			
Institute management:			
Institute management:			