

## Curriculum vitae - Anne-Kristin Løes

Norwegian Centre for Organic Agriculture (NORSØK), Gunnars veg 6, N-6630 Tingvoll, Norway.

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### General information:

Date of birth: January 10th, 1961

Nationality: Norwegian

Spoken languages: Norwegian, English, German

### Main education:

M.Sc. in soil sciences at the Agricultural University of Norway, Ås, 1986.

Doctor Scientiarum in plant nutrition and soil chemistry at the Norwegian University of Life Sciences, NMBU (formerly the Agricultural University of Norway), Ås, 2004. Title of Dr.Sc. thesis: Studies of the availability of soil phosphorus (P) and potassium (K) in organic farming systems, and of plant adaptations to low P- and K-availability. Doctor Scientiarum Thesis 2003:29, NMBU. ISSN: 0802-3220 ISBN: 82-575-0569-2, 117 p.

### Current and former employment:

2016 - : Senior researcher in Norwegian Centre for Organic Agriculture (NORSØK), Tingvoll.

2006-2015: Senior researcher in Bioforsk Norwegian Institute of Agricultural and Environmental Research, Organic Food and Farming division.

1988-2005: Researcher in Norwegian Centre for Ecological Agriculture (NORSØK). This Centre was part of Bioforsk during 2006-2015.

1998-2000: Editor of Herba, the Norwegian journal on biodynamic farming (part-time position).

1987-1988: Teacher in mathematics and biology grade 9-11, Waldorf School in Moss, Norway.

1986-1987: Research assistant on the project "Acid rain research, terrestrial ecosystems.

### Completed and ongoing projects coordinated by AK Løes:

2020-2021: *Seaweed fibre for increased soil organic matter*. Funded by the Regional Research Fund (RFF) of Møre and Romsdal.

2019-2020: *Organic potatoes in Mid-Norway – the potential of early cultivars and good agronomy*. Funded by the RFF of Mid-Norway (RFF Midt) and the county governor's agricultural departments in Trøndelag and Møre og Romsdal.

2017-2020: *Marine rest raw materials for fertilizers to organic agriculture*. Funded by Møre and Romsdal county council.

2016-2018: *Quality grains for food – the potential of non-commercialized Norwegian varietal material*. Funded by the Norwegian Agriculture Agency (NAA), and the county governor's agricultural departments in Oppland and Trøndelag.

2016-17: *Reduced nitrogen emissions from digestate with application of marble*. Funded by RFF Midt.

2012-14: *Documentation of energy production and GHG emissions in a farm level biogas plant digesting animal manure and various types of fish waste (Biogasdok)*. Funded by the Agricultural Agreement Fund (AAF).

2011: *Farm-based biogas plants in Mid-Norway, qualification project to reveal knowledge gaps (Biogasskunnskap)*. Funded by RFF Midt.

2010-2014: *Effects of anaerobically digested manure on soil fertility - establishment of a long-term study under Norwegian conditions (SoilEffects)*. Funded by the Research Council of Norway (RCN) and AAF.

2007-10: *innovative Public Organic food Procurement for Youth (iPOPY)*. Funded by RCN and the CORE Organic I Funding Body Network (ERA-net).

2007-08: *Reasons for opting out of certified organic production in Norway*. Funded by RCN and AAF.

2003-04: *Combined nutrient supply and weed regulation in organic vegetable production by grass mulch*. Funded by NAA.

1993-96: *Agronomy and economy in organic farming – whole farm case studies*. Funded by AAF.

1988-1992: *The “Thirty farm-project”*. Funded by AAF.

Completed and ongoing projects where I have been/am a WP leader:

2021-2024: Sustainable utilization of MARine resources to foster GREEN plant production in Europe – MARIGREEN. Blue Bio ERA-net project, funded by RCN and others. Leader of WP 3: Valorization of blue biomass by appropriate treatment technologies.

2019-2023: *Farmers and the city: enhancing added value and sustainability through optimized use of urban and peri-urban farm resources*. Research project funded by RCN. Leader of WP4: Maintaining soil health in urban areas.

2018-2022: *Organic-PLUS: Pathways to phase-out contentious inputs from organic agriculture in Europe*. RIA-EU project funded by Horizon 2020, coordinated by Coventry university, UK. Leader of WP5: Soil.

2013-2017: *Total utilization of raw materials in the supply chain for food with a bio-economical perspective (Cycle)*. Research project funded by RCN. Leader of WP3: Bio-processing of waste for feed, fertilizer and energy.

2014-2017: *Helhetlig bioØkonomisk utnyttelse av verpehØNE (HØNE) (Holistic bioEconomical utilisatioN of laying hens)*. Research project funded by RFF Midt. Leader of WP3: Utilization of laying hens as feed and fertilizer.

2013-16: *IMproved Phosphorus Resource efficiency in Organic agriculture Via recycling and Enhanced biological mobilization (Improve-P)*. CORE Organic II ERA-net project funded by RCN and others. Leader of WP4: Stakeholder perceptions about applicability of alternative P fertilizers in organic farming.

Other relevant experience and positions:

- Member of the board of ISO FAR, International Society for Organic Farming Research 2008- 2021. Vice president 2011-2017, treasurer 2018-2021.
- Associated editor of the scientific journal *Organic Agriculture* (Springer) 2014-
- Member of Tingvoll municipality council 2013-2019.
- Norwegian editor of the digital archive *Organic E-prints*, [www.orgprints.org](http://www.orgprints.org) 2005-2015.
- Leader of planning committee NJF seminar 461, “Organic farming systems as a driver for change”, Bredsten, Denmark August 21-23 2013.
- Member of planning committee NJF seminar 401, “Phosphorus management in Nordic-Baltic agriculture – reconciling productivity and environmental protection”, Uppsala, Sweden September 22-23, 2008.
- Leader of planning committee NJF seminar 369, “Organic farming for a new millennium – status and future challenges”, Alnarp, Sweden June 15-17, 2005.
- Member of assessment committee for Siri Pugesgaard, PhD; doctoral thesis: “Environmental effects of agricultural production of biomass for energy on arable land”. Institute for Agroecology, Faculty of Science and Technology, Aarhus University, Denmark. June 2014.
- Opponent for Tora Råberg, PhD, doctoral thesis: “Strategic nitrogen management in stockless organic cropping systems”. Faculty of Landscape Architecture, Horticulture and Crop Production Science, Dep. of Biosystems and Technology, Alnarp. Swedish University of Agricultural Sciences, Acta Universitatis agriculturae Sueciae 2012:2017. ISSN 1652-6880.
- Member of assessment committee for Annbjørg Øverli Kristoffersen, Dr.scientiarum; doctoral thesis: “Availability and utilization of soil and fertilizer phosphorous with focus on starter fertilization in spring cereals”, published by the Norwegian Crop Research Institute and NMBU, 2005.
- Lectures and censorship (4 M Sc theses) at NMBU
- Paper and proposal review, several journals and funding bodies

Scientific publications in English, papers published in peer-reviewed journals in bold:

Løes AK, Ahlin JP, Ahuja I, Krogstad T, Smevoll S, Waag, H. (submitted) Valorisation of Fish Bones: Effects of Preservation by Formic Acid on AL-extractable calcium, Phosphorus, Magnesium, and Potassium. Accepted for review by **Waste Biomass Valorization** doi 10.21203/rs.3.rs-1020245/v1

Dittrich C, Pecenka R, Løes AK, Cáceres R, Conroy J, Rayns F, Schmutz U, Kir A, Kruggel-Emden H 2021. Extrusion of different plants into fibre for peat replacement in growing media: adjustment of parameters to achieve satisfactory physical fibre-properties. **Agronomy** 11(6) 10.3390/agronomy11061185

Kir A, Løes AK, Cetinel B, Turan HS, Aydogdu E, Pecenka R, Dittrich C, Cáceres R, Lennartsson MT, Rayns F, Conroy J, Schmutz U 2021. Testing peat-free growing media based on olive wood residues for olive saplings. **ISHS Acta Horticulturae** 1317: II International Symposium on Growing Media, Soilless Cultivation, and Compost Utilization in Horticulture doi 10.17660/ActaHortic.2021.1317.4

Løes AK, Ahuja I, deBoer A 2021. Harvesting our fertilisers from the sea - an approach to close the nutrient gaps in organic farming. Paper at Organic World Congress 2021 (OWC 2021), Science Forum: 6th ISOFAR Conference co-organised with INRA, FiBL, Agroecology Europe, TP Organics and ITAB, Rennes, France, 8-10 September 2021. [orgprints.org/42198](https://orgprints.org/42198)

Løes AK, Schmutz U, Katsoulas N, Cáceres R, de Cara MF, Cirvillieri G, Kir A, Knebl Lucas, Malinska K, Oudshoorn F, Raskin B, Rayns F, Valleix S, Conroy J 2021. Peat, plastic and fertilisers in organic growing across Europe - current use and future options. Paper at OWC 2021. [orgprints.org/42298](https://orgprints.org/42298)

Rittl T, Bakken I, Grønmyr F, Heltoft P, Stewart L, Husby A, Fløystad K, Løes AK 2021. Biochar coating potential to suppress storage diseases in carrots and potatoes (CHARCOAT). **NORSØK Report** Vol. 6 No. 12 2021, 44 p. [orgprints.org/40121](https://orgprints.org/40121)

Løes AK 2020. Feeding the reactors: potentials in re-cycled organic fertilisers. **Organic Agric.** doi 10.1007/s13165-020-00314-2

Løes AK, Khalil R, McKinnon K 2020. Exhaust Gas Concentrations and Elemental Losses from a Composting Drum Treating Horse Manure. **Compost Sci. Util.** 28: 36-48. doi: 10.1080/1065657X.2020.1749182

Løes AK, Frøseth RB, Dieseth, JA, Skaret J, Lindö C 2020. What should organic farmers grow: heritage or modern spring wheat cultivars? **Organic Agric.** 10: 93-108. doi 10.1007/s13165-020-00301-7

Ahuja I, Dauksas E, Remme JF, Richardsen R, Løes AK 2020. Fish and fish waste-based fertilizers in organic farming – With status in Norway: A review. **Waste Management** 115: 95–112. doi 10.1016/j.wasman.2020.07.025

Katsoulas N, Løes AK, Andrivon D, Cirvillieri G, de Cara MF, Kir, A, Knebl L, Malinska K, Oudshoorn FW, Willer H, Schmutz U 2020. Current use of copper, mineral oils and sulphur for plant protection in organic horticultural crops across 10 European countries. **Organic Agric.** 10:159-171. doi 10.1007/s13165-020-00330-2

Løes AK, Adler S 2019. Increased utilisation of renewable resources: dilemmas for organic agriculture. **Organic Agric.** 9:459–469 doi /10.1007/s13165-018-00242-2

Ahuja I, Løes AK 2019. Effect of fish bones and algae fibre as fertilisers for ryegrass. **NORSØK report** Vol.4 No. 7, 2019, 64 p. [orgprints.org/36439](https://orgprints.org/36439)

Rittl T, Krogstad T, Eikås S, Saltnes T, Sørensen G, Glestad HE, Løes AK 2019. Effects of struvite application on soil and plants: a short-term field study. **NORSØK report** Vol 4 No. 10, 2019, 38 p. [orgprints.org/36472](https://orgprints.org/36472)

Adler SA, Slizyte R, Honkapää K, Løes AK 2018. In vitro pepsin digestibility and amino acid composition in soluble and residual fractions of hydrolyzed chicken feathers. **Poult Sci.** 97(9):3343-3357. doi 10.3382/ps/pey175.

Cooper J, Reed EY, Hörtenhuber S, Lindenthal T, Løes AK, Mäder P, Magid J, Oberson A, Kolbe H, Möller K 2018. Phosphorus availability on many organically managed farms in Europe. **Nutrient Cycl. Agroecosyst.** doi 10.1007/s10705-017-9894-2.

Möller K, Oberson A, Bünemann EK, Cooper J, Friedel JK, Glæsner N, Hörtenhuber S, Løes AK, Mäder P, Meyer G, Müller T, Symanczik S, Weissengruber L, Wollmann I, Magid J. Improved phosphorus recycling in organic farming: navigating between constraints. **Advances in Agronomy** 147: 159-237. doi: 10.1016/bs.agron.2017.10.004

Løes AK 2017. Laying hens for soil fertilization. NORSØK Report Vol. 2 No. 13, 31 p. [orgprints.org/32518](http://orgprints.org/32518)

Løes AK, Ebbesvik ME 2017. Phosphorus deficits by long-term organic dairy farming? In: Rahmann, G. et al. (2017) Proceedings of the Scientific Track "Innovative Research for Organic Agriculture 3.0", Organic World Congress 2017 in New Delhi, India, November 9-11, 2017, p. 530-533.

Løes AK, Sandquist J, Meyer G 2017. Elemental composition and phosphorous availability in hydrochars from seaweed and organic waste digestate. **Acta Agric. Scand. Sect. B PI Soil Sci**, doi 10.1080/09064710.2017.1363909

Pommeresche R, Løes AK, Torp T 2017. Effects of animal manure application on springtails (Collembola) in perennial ley. **Applied Soil Ecology** 1001: 137-145.

Rahmann G, Ardakani MR, Barberi P, Boehm H, Canali S, Chander M, David W, Dengel L, Erismann JW, Galvis-Martinez AC, Hamm U, Kahl J, Koepke U, Kuhne S, Lee SB, Løes AK, Moos JH, Neuhofer D, Nuutila JT, Olwe V, Oppermann R, Rembalkowska E, Riddle J, Rasmussen IA, Shade J, Sohn SM, Tadesse M, Tashi S, Thatcher A, Uddin N, Fragstein P, Wibe A, Wivstad M, Wenliang W, Zanolli R. 2017. Organic agriculture 3.0 is innovation with research. **Organic Agric.** 7 (3): 169-197.

Løes AK, Pommeresche R, Khalil R 2017. Effects of marble application to manure and anaerobic digestates. NORSØK report Vol. 2 No. 5 2017, 29 p. [orgprints.org/32037](http://orgprints.org/32037)

Løes AK, Bünemann E, Cooper J, Hörtenhuber S, Magid J, Oberson A, Möller K 2016. Nutrient supply to organic agriculture as governed by EU regulations and standards in six European countries. **Organic Agric.** 7: 395-418, doi 10.1007/s13165-016-0165-3

Løes AK 2016. What does the organic sector think about different P fertilizers? NORSØK report Vol.1 No.3, 2016, 40 p. [orgprints.org/30368](http://orgprints.org/30368)

Risku-Norja H, Løes AK 2016. Organic food in food policy and in public catering: lessons learned from Finland. **Organic Agric.** 7(2): 111-124. doi 10.1007/s13165-016-0148-4

#### Papers published in peer-reviewed journals before 2016:

Johansen TJ, Thomsen MG, Løes AK, Riley H 2015. Root Development in Potato and Carrot Crops – Influences of Soil Compaction. **Acta Agric. Scand. Sect. B PI Soil Sci** 65 (2): 182-192.

Pommeresche R, Løes AK 2014. Diversity and density of Collembola in a grass-clover ley in Northwestern Norway. **Norw. J. Entomol.** 61: 165-179.

Koesling, M., Løes, A.-K., Flaten, O., Kristensen, N.H. & Weinreich, M. 2012. Farmers' reasons for deregistering from organic farming. **Organic Agric.** 2: 103-116.

Løes, AK, Eltun R, Sjursen H, Henriksen TM 2011. Repeated use of green manure catch crops in organic cereal production – grain yields and nitrogen supply. **Acta Agric. Scand. Sect. B PI Soil Sci.** 61: 164-175.

Ward A, Løes AK 2011. The potential of fish and fish oil waste for bioenergy generation: Norway and beyond. **Biofuels** 2(4): 375-387.

Løes AK, Nölting B 2011. Increasing organic consumption by school meals – lessons learned in the iPOP project. **Organic Agric.** 1: 91-110.

Flaten O, Lien G, Koesling M, Løes AK 2010. Norwegian farmers ceasing certified organic production: Characteristics and reasons. **J. Environ. Man.** 91: 2717-2726.

Pommeresche R, Løes AK 2009. Relations between Agronomic Practice and Earthworms in Norwegian Arable Soils. **Dynamic Soil Dynamic Plants (Special Issue 2)**, p. 129-142.

Løes AK, Gahoonia TS 2004. Genetic variation in specific root length in Scandinavian wheat and barley accessions. **Euphytica** 137: 243-249.

Riley H, Løes AK, Hansen S, Dragland S. 2003. Yield responses and nutrient utilization with the use of chopped grass and clover material as surface mulches in an organic vegetable growing system. *Biol. Agric. Hort.* 21: 63-90.

Løes AK, Øgaard 2003. Concentrations of soil potassium after long-term organic dairy production. *Int. J. Sust. Agric.* 1: 14-29.

Øgaard AF, Krogstad T, Løes AK 2002. Potassium uptake by grass from a clay and a silt soil in relation to soil tests. *Acta Agric. Scand. Sect. B, Soil Pl Sci* 51: 97-105.

Watson CA, Bengtsson H, Ebbesvik M, Løes AK, Myrbeck Å, Salomon E, Schroder J, Stockdale EA 2002. A review of farm-scale nutrient budgets for organic farms as a tool for management of soil fertility. *Soil Use Manag* 18 supplement, Soil fertility in organically managed soils, p. 264-273.

Løes AK, Øgaard AF 2001. Long-term changes in extractable soil phosphorus (P) in organic dairy farming systems. *Plant and Soil* 237: 321-332.

Løes AK, Øgaard AF 1997. Changes in the nutrient content of agricultural soil by conversion to ecological farming, compared to clay content and farm nutrient budgets. *Acta Agric. Scand. Sect. B, Soil Pl Sci* 47: 201-214.

#### Selected publications in Norwegian since 2016:

Løes AK, Morken J 2021. Fjølfe gjødsel i Norge. Håndtering og gassutslipp ved lagring. *NORSØK rapport Vol. 6 Nr. 3, 2021, 34 s.* [orgprints.org/id/eprint/39572/](https://orgprints.org/id/eprint/39572/)

McKinnon K, Løes AK, Almvik M 2021. Gjødsel med rester av herbicid: Effekt av klopuralid på oppalsplanter. *NORSØK rapport Vol. 6 Nr. 6, 2021, 44 s.* [orgprints.org/id/eprint/40065/](https://orgprints.org/id/eprint/40065/)

McKinnon K, Løes AK, Killian K 2021. Insektmøkk som gjødsel - en test på Undeland gård. *Gartneryrket* 119 (5) s 30-35. [orgprints.org/id/eprint/40068/](https://orgprints.org/id/eprint/40068/)

Wibe A, Rittl T, Løes AK, Bakken I, Karlsen B 2021. Ozonholdig vann mot tørråte i potet. *NORSØK rapport vol. 6 Nr. 5, 2021, 28 s.* [orgprints.org/id/eprint/39980/](https://orgprints.org/id/eprint/39980/)

Løes AK, Bach O, Bakken I, Grønmyr F, Møllerhagen PJ, Aarak K 2020. Ny giv for midtnorsk øko-potet med tidlige sorter og god agronomi? *NORSØK rapport Vol. 5 Nr. 13, 2020, 49 s.*

Løes AK, Bergslid IK, Hareide NR, Kjerstad M, Midtbø LK, Friis Pedersen S, Sæter L 2020, Restråstoff i blå og grønne verdikjeder i Møre og Romsdal – status og mulige bruksområder innen mat, fôr og gjødsel. *NORSØK rapport Vol. 5 Nr. 12, 2020, 97 s.*

Løes AK, Almås A, Bernhoft A 2020. Stor satsing på tare – men hva med restene? Innlegg i *Nationen* 16.7.2020, s 18. [orgprints.org/id/eprint/39154/](https://orgprints.org/id/eprint/39154/)

Løes AK, Frøseth RB, Dieseth JA, Lindö C, Skaret J 2019. Kvalitetskorn til mat – muligheter i ikke-kommersialisert norsk sortsmateriale. Forsøk med vårhvete til økologisk dyrking og håndverksbakst. *NORSØK rapport Vol 4. Nr. 5, 56 s.* [orgprints.org/id/eprint/35278/](https://orgprints.org/id/eprint/35278/)

Løes AK, Eikås S 2019. Ta fosforet tilbake. *Kronikk, Nationen* 24.9.2019 s 18.

Løes AK, Frøseth RB, Dieseth JA 2019. Passer moderne vårhvetesorter for økobonden? Del 1 *Økologisk landbruk* 38 (2): 30–31; Del 2 *Økologisk landbruk* 38 (3): 31–33.

Løes AK 2019. Ta fosforet tilbake! *Økologisk landbruk trenger resirkulering. Økologisk landbruk* 38 (4): 8–9.

Cabell J, Brod E, Ellingsen J, Løes AK, Solli L, Standal IB, Toldnes B, Vivestad H 2019. Bruk av tørket slam fra settefiskanlegg som gjødsel i norsk landbruk. *NIBIO rapport Vol. 5 Nr. 146, 2019.* [orgprints.org/id/eprint/37474/](https://orgprints.org/id/eprint/37474/)

Løes AK 2018. Økologisk verdenskonferanse i India. [www.agropub.no](http://www.agropub.no) 28.2.2018.

Løes AK, Dieseth JA, Frøseth RB Vårhvete til håndverksbaking – viktige egenskaper for økologisk dyrking. [www.agropub.no](http://www.agropub.no) 25.7. 2018.

Cabell J, Løes AK 2018. Forsøk med fermentering av husdyrgjødsel. *NORSØK rapport Vol. 3 Nr. 8, 2018, 24 s.* [orgprints.org/id/eprint/34268/](https://orgprints.org/id/eprint/34268/)

Mjøen GT, Carvajal AK, Slizyte R, Rustad T, Løes AK 2017. Fra restråstoff til verdifulle råvarer. *Fjørfe* 9-17, s. 35-37.

Løes, AK 2017. Høner som gjødsel? *Fjørfe* 8-17, s. 35-37.

Løes AK 2017. Hva gjør vi med slakteklare verpehøns? Økologisk landbruk 3-2017, s. 14-16, og Agropub <https://www.agropub.no/fagartikler/hva-gjor-vi-med-slakteklare-verpehons>  
Løes AK 2017. Mangfold i åkeren, og vafler fra fôrkorn. Agropub 26. juli 2017.  
Løes AK 2016. Å strebe etter gode regler. Økologisk landbruk 4 (2016), s. 39-41.  
Løes AK 2016. Såfrø- livsviktig og sårbart. Økobloggen 15. april 2016, forskning.no  
Løes AK 2016. Den vanskelige resirkuleringa. NORSØK nettside 22. august 2016  
Løes AK 2016. Hva slags korn trenger vi å foredle i Norge? Hamar Arbeiderblad 16. juli 2016 s. 34.

#### Examples of lectures and presentations at conferences and webinars

Økologisk kunnskap om jordhelse. Jordhelsesymposium (webinar) arrangert av Jordforeningen, 6.12.2021. <http://www.jordforeningen.no/?p=354>  
Tidligpotet til lagring – en strategi for å redusere tørråte? Landbrukets økologikongress 2020, 22.1. 2020, Hellerud, Oslo  
Farm level management of phosphorus: organic farmers need recycled fertilisers. 1st EU/North-African Conference on Organic Agriculture (EU-NACOA) 11-12th November 2019, Marrakech-Morocco. [orgprints.org/36867](http://orgprints.org/36867)  
Långsiktig näringsförsörjning för ekologisk produktion – hur löser vi den? Invitert foredrag på sesjon om «Løsningar för framtidens hållbara kretslopp» på konferansen «Forskning och utveckling inom ekologisk produktion» 17.-18.10.2017, Linköping, Sverige. Arr. Jordbruksverket. <https://www.slu.se/globalassets/ew/org/centrb/epok/dokument/programfou2017.pdf>  
Upcycling food industry co-streams: feed and fertilizer products. NoRest conference (Nordic Research and Innovation Pathways towards a Circular Bioeconomy) Copenhagen 25.-26. October 2016 <http://cycleweb.no/wp-content/uploads/2016/10/NoRest-programme-Copenhagen.pdf>  
Soil ecosystem quality improvement in organic farming in Europe. Invited speaker at the Chinese National Organic Congress, Chengdu, China November 2014.  
N supply in stockless organic cereal production under northern temperate conditions. Undersown legumes, or whole-season green manure? 3rd QLIF Congress, Hohenheim, Germany, March 20-23, 2007. [orgprints.org/ 10417](http://orgprints.org/10417)  
Repeated undersowing of clover in organic cereal production. Nutrient dynamics and sustainability. NJF 23rd Congress 2007 - Trends and Perspectives in Agriculture, Copenhagen June 26-29  
N-forsyning til økologisk korn – gjentatt bruk av kløver underkultur, eller ettårig grønngjødsling? Plantemøtet Østlandet 2007, Sarpsborg 7.-8. februar 2007