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We listen to our readers's response with pleasure, as we are here for you! Therefore, any responses are more than welcome, be it about the format, suggestions to improvements, changes, content or anything you can think of.

Contact us at: LindaS.Sorensen@icrofs.org

First results from the CORE Organic II projects

First results from the CORE Organic II projects

The CORE Organic II projects from the first call are now ready to communicate their first results. Fourteen CORE Organic research projects will present their results and plans at a research seminar 15 May 2013 in Amsterdam. You can register for the event and subscribe to the new CORE Organic newsletter via the website www.coreorganic2.org.

CORE Organic continuation

CORE Organic II will end in August and is applying for a third phase to launch an ERA-NET Plus call. The Plus implies that the European Commission will top up 33% of the funding with a maximum of 3 million euro. The network is expecting to launch the Plus call around January 2014. The partners in CORE Organic will continue except from Austria, Czech Republic, Ireland and Luxembourg. New countries/regions are Poland, Romania and Belgium (Wallonia).

Three projects selected in the second and third call of CORE Organic II

Three projects have been selected for the period 2013-2015 in the second and third call of CORE Organic II: COBRA - coordinating organic plant breeding activities, HealthyGrowth - combining volume and values in the mid-scale organic value chain, and IMPROVE-P - improving the phosphorous resource efficiency. Read more at www.coreorganic2.org



New director of DCA, Danish Centre for Food and Agriculture

The director of ICROFS, Niels Halberg has been appointed new director of DCA - Danish Centre for Food and Agriculture, Aarhus University. Niels Halberg stays director of ICROFS while taking on the new position at DCA. The combined leadership of DCA and ICROFS is expected to create a wider foundation for joint knowledge dissemination and synergy between research in organic and conventional agriculture and food systems. Aarhus University (AU) hosts the secretariats of both DCA and ICROFS.

The structures and activities within ICROFS will not be affected by the joint leadership with DCA. The board of directors and the program committee of ICROFS will continue their work, and a corresponding advisory committee for DCA is well underway. Both DCA and ICROFS have coordinating roles and responsibilities regarding research and research based advice to the public authorities within the agriculture- and food sectors.



The Organic Research Centre, UK, seeks a Principal Researcher

The Organic Research Centre is looking to appoint a Principal Researcher - Team Leader for its Crops and Agroforestry Research Team. The post will be responsible for all areas of the programme including delivery, development and dissemination of the research as well as management and development of staff. Read more at www.icrofs.org



New warning systems to help organic farmers fighting yellow rust

Organic farmers do not have many tools at their disposal against yellow rust in wheat and triticale apart from resistant varieties and good advice. Scientists from Aarhus University are now developing a better toolbox.

As organic farmers cannot treat yellow rust with fungicides, they



are helpless in an ongoing epidemic and must either suffer high yield losses or re-plough the fields when the disease shows up at epidemic scales.

With the intent of providing better early-warning and advice about yellow rust a new and more intensive warning system for yellow rust in wheat and triticale will be developed and implemented by Aarhus University in co-operation with the Danish Knowledge Centre for Agriculture, with financial support from the Ministry of Food, Agriculture and Fisheries.

The first ProGrOV MSc student has graduated

On 7th December, Mr. Josphat Njenga Gichure, graduated from the University of Nairobi where he has been a student at the Department of Food Science, Nutrition and Technology. His Dissertation entitled 'Analysis of the Networks and Traceability Systems of Organic Kales Value Chains in Nairobi and its Environs, Kenya' contributes to the knowledge generation of the project together with 5 other MSc studies and 9 PhD studies. We, the ProGrOV project partners, are very proud of our first graduate.



Mr. Njenga's fellow students in the ProGrOV project, from University of Nairobi, Makerere University in Uganda and Sokoine University of Agriculture in Tanzania, will graduate over the coming 3 years.

International organic research



ICROFS' fourth topic theme: Organic research in Korea

ICROFS news presents two articles from research activities in Korea. One general article with an introduction to the development of organic farming since 1970's and to organic agricultural research in South Korea.

Furthermore we are presenting an article from the Research Institute of organic Agriculture, Dankook University, Korea dealing with training, education and research within organic agriculture and finally the ISO FAR World Organic Expo 2015.



Research activities on organic agriculture in Korea

Current organic research programmes and projects in different countries

In this issue - and in forthcoming issues - *ICROFS news* will bring a number of topic themes presenting current research programmes in different countries on the globe.



Introduction to Organic Agricultural Research in South Korea



By Jee, Hyeong-Jin. Ph. D. Plant Pathologist, Director of Organic Agriculture Research Div. National Academy of Agricultural Science, Rural Development Administration, Korea

Organic farming in South Korea has been developed since 1970's by the private sector. A pioneering farmers group 'Jung-nong' started organic farming in 1976 affected by a Japanese organic farmers group 'Ue-nong'.

Presently 38 farmer and consumer groups belong to Korean Federation of Sustainable Agriculture Organizations (KFSA) are leading organic agriculture in the country.



The first organic farmers group in Korea (1976)

The last 5 years the organic food market in Korea has grown rapidly about 26% in average, however, proportion of the organic agriculture still comprises about 1.0% among total agro-production and cultivation acreage.

The main difficulties in organic farming in Korea

According to a survey on technical problems for organic farming in Korea, farmers considered that weed management (43.5%), soil and nutrient management

(21.7%), insect (19.6%) and disease control (15.2%) are main difficulties in organic cultivation.

Agricultural conditions such as limited cultural land (1.46ha/farm family) and a hot and humid summer with long rainy days are also limiting factors to fulfill the principles of organic agriculture. Especially intensive all-year-round cultivation systems and few organic animal husbandry impedes crop rotation and nutrient cycle. Consequently, external inputs of organic

materials for nutrition supply and pest management become the main drawback for organic agriculture in the country.

Soil management

A research on the actual condition of organic agriculture showed that farmers managed soil and nutrients by crop rotation (17.8%), compost (17.8%), oil cakes (22.2%), and mineral soil amendments (15.6%).

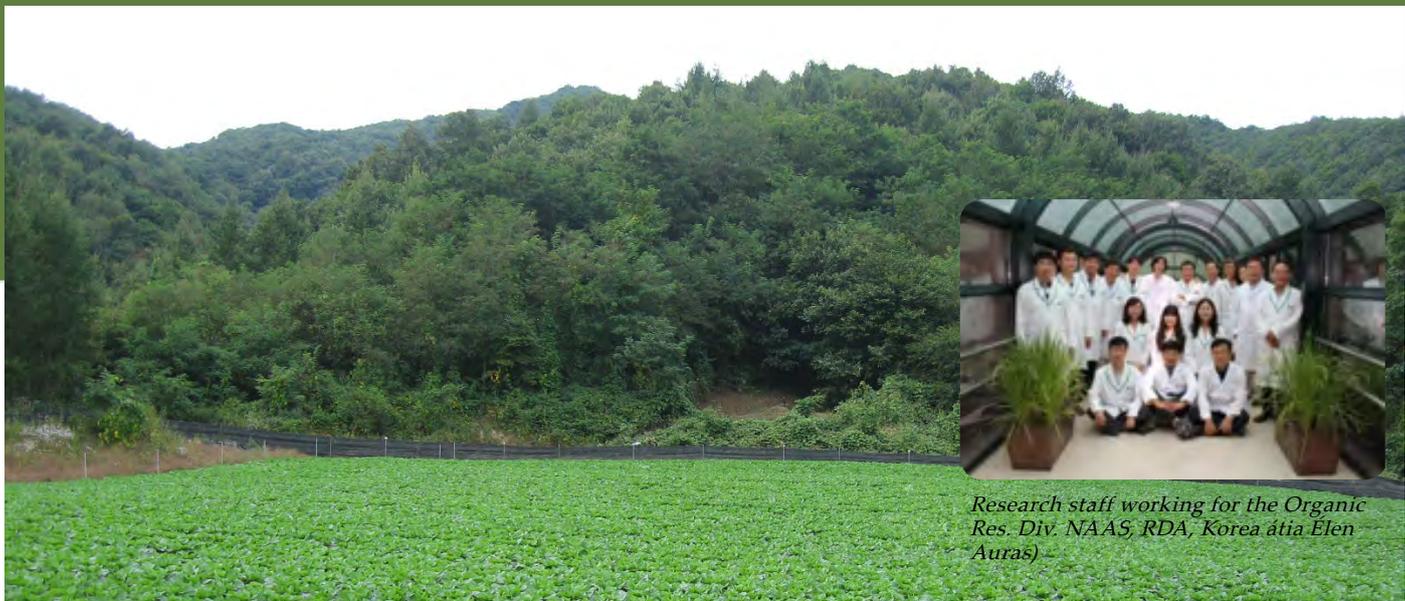
Diseases and insects are managed by organic or

natural materials allowed for organic farming (47.8%) and followed by microbes (20.6%) and physical means (18.5%) rather than cultural and ecological tools.

Weeds are treated by soil mulching with physico-chemical or bio-materials, and mechanical weeding and biological weed control by using rice duck or golden snail are also adapted. However, some practices often increase farming expense and discord with organic principles and norms



Ducks in organic rice field. They eat weeds and insects as bio-control agent



Research staff working for the Organic Res. Div. NAAS, RDA, Korea átia Elen Auras)

even if they do not violate certification rule.

Income and farming costs

Compared to conventional farming yield, income, and farming cost of Korean organic farming are estimated about 60-80%, 80-100%, and 100-120%, respectively. Consequently reducing cost and increasing yield and income turn out the goals of organic agricultural research, though developing low input and nutrient

cycling organic farming technologies.

In addition, productivity, environment, profitability, and safety (PEPS) are main concerns for the researchers.

Organic Agriculture Research Division

Substantial research to achieve the goals was activated since 2004 through the establishment of Organic Agriculture Research Division. The division is a government research or-

ganization at the National Academy of Agricultural Science (NAAS), Rural Development Administration (RDA), Korea. The division consists of 15 researchers from various special fields and 3 labs, namely Organic Farmland Management, Organic Crop Protection, and Organic Agro-environments.

Research areas, 2006-2012

The last seven years from

2006 to 2012, 30-40 research projects on organic agriculture have been carried out with 3.5-4.0 million US dollars of research funds each year. Research areas are comprised of soil and nutrient, disease and insect, weeds, animal husbandry, and others including organic seeds, nursery, processing, and organic materials. Among 296 research projects conducted during the years, 94(31.8%) projects belonged to soil and nutrient management, 71(24.0) to disease and insect management, 30(10.1%) to weed control, 27(9.1%) to animal husbandry, and 74(25.0%) to others.

Currently about 100-150 research papers on organic agriculture are published every year, and the value of organic technology development is estimated over 13.6 million dollars.

Future expectations

It is highly expected that organic agriculture in Korea grows continuously due to the expanding market size and government supporting policies. However, research on organic agriculture should answer to overcome various technical problems for safe production and to sustain healthy environments as well.



An experimental field for organic Chinese cabbage production by using push-pull insect management strategy



Golden snail is a biological agent of rice weeds.



Organic pepper production under a rain-proof system to avoid anthracnose



Weed control by a blackout curtain mulching

Organic agriculture in Korea: - training, education and research

By Sang Mok Sohn, Research Institute of Organic Agriculture, Dankook University, Cheonan 330-714, Republic of Korea



Organic Agriculture in Korea is still at an early beginning stage compared with European countries. That is in terms of minimum requirements such as rotation, resistant variety, appropriate fertilization, buffer zone etc.

In order to implement more science based skills and locally adopted techniques, farmers want to learn the principles of Organic Agriculture and most up-dated techniques. Since 2005 several advanced organic agricultural courses have been established and the ISO FAR World Organic Expo 2015 will be held in Korea.



The Advanced Organic Agriculture CEO Course was established at first at Dankook University in March 2005 as a one-year course for farmers and consumers to teach basic knowledge of agriculture and principles of Organic Agriculture (OA) and techniques. Later on, three other universities such as Kangwon National University, Chosun University and Sangji University followed to offer the six-month courses.

Attending the course

once a week, participants learn not only the scientifically based idea of organic farming but also a lot of up-dated skills for implementation of OA as well. The courses provide a first-rate education and the opportunity for cross-disciplinary study within whole countries and invite foreign lecturers.

Each semester they join two workshops and one excursion abroad to learn from others' experiences.

During the course, they learn all the different areas

of OA, such as organic rice / vegetables / fruit production, organic grassland management / animal production, organic food processing, marketing and certification systems.

Wide range of participants

The participants join from across the country and include farmers, journalists, reporters, government officers, extension workers, researchers, students, teachers, doctors and professors paying the tuition fee themselves.

Many farmers interested in learning OA

Most participants of registered students for Advanced CEO Course in Dankook University in 2007 were organic farmers (68%). But the number of organic farmers in Kangwon National University was different from Dankook University where participants should pay all the student fees, 900 US\$/year, themselves while the same course in Kangwon National University did not request any student fee anyway. The local county,

Figure 1: Registered participants group for Advanced CEO Course for Organic Agriculture in Dankook University in 2007 who paid all student fees by themselves.



Figure 2: Registered participants group for Advanced CEO Course for Organic Agriculture in Kangwon national University in 2007. All student fees were paid by the local government.

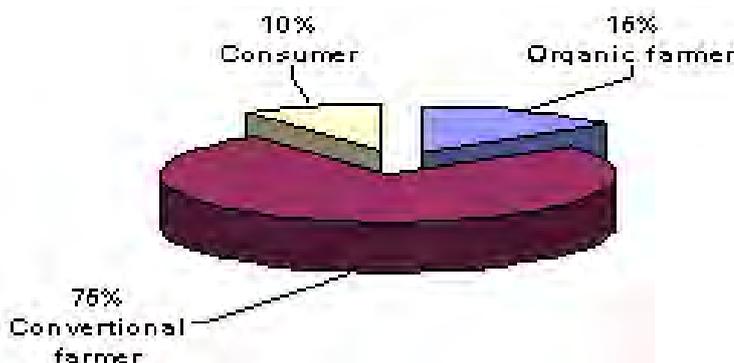


Table 1: Lecture topics of Advanced CEO Course for Organic Agriculture in 2007.
* Numbers show how many lecture hours (90 minutes) were given during the course.

	Introduction & Principles of OA	Organic plant production	Organic animal production	Organic food processing	Marketing & Certification
Dankook University	14 (18.4%)	30 (39.5%)	12 (15.8%)	10 (13.2%)	10 (13.2%)
Kangwon National University	4 (10.5%)	22 (57.9%)	6 (15.8%)	4 (10.5%)	2 (5.3%)



Lecture room of Advanced CEO Course of Organic Agriculture attached at Dankook University in an educational cooperation with ISOFAR since 2004.



Every year participants of Advanced CEO Course of Organic Agriculture at Dankook University is travelling abroad to learn about experiences from European organic agriculture. Here a visit on an organic experimental farm at University of Giessen, Germany.

Samcheok City Council, paid all the course fees for the participants, i.e., no participant of the courses at Kangwon National University needed to pay the fee. No conventional farmer had registered in Dankook University, but 75% of registered participants at Kangwon National University were conventional farmers.

From the Figures 1 and 2, it might be concluded that there are many farmers interested in learning Organic Agriculture. And it seems as if conventional farmers are still not ready to pay the high costs of student fees to learn Organic Agriculture in a course.

Participants learn mostly organic plant production and principles of Organic Agriculture in both Advanced CEO course and Organic Agriculture Academy as well. Organic Agriculture Academy offered to Gangdong Agriculture Cooperative 56.3% of lectures on organic

plant production, which is equivalent to only nine lecture hours, while they gave one lecture hour (90 minutes) for organic food processing and marketing & certification (Table 1).

Education and research at universities

Since 1986 Dankook University has offered six lectures

on organic agriculture in a Bachelor course and also a Master and Ph D course in organic agriculture. Recently, Sangji University followed to offer an ecological agriculture Bachelor course.

Research Institute of Organic Agriculture (RIOA) established

For the first time in Korea, Dankook University established Research Institute of

Organic Agriculture (RIOA, <http://www.rioa.or.kr>) having four research divisions in it; Crop Production, Animal Production, Food Processing, and Marketing. 14 researchers are cooperating in the research projects. Every year RIOA organizes the national and international symposium events to promote organic agriculture in Korea inviting several foreign speakers.

RIOA offers the Advanced Organic Agriculture CEO Course. It was established at first at Dankook University in March 2005. And in 2006 RIOA established Dankook certification body to deliver certification services for organic farmers.



An excursion group of participants of Advanced CEO Course of Organic Agriculture at Dankook University. They organized excursion more than 60 times already from 1989 to 2012 to visit not only Europe but also whole globe.

ISOFAR World Organic Expo 2015

Title	ISOFAR 2015 Goesan World Organic Expo + Industry Fair
Period	Sep 11, 2015. ~ Oct 10, 2015 (30 days)
Place	Goesan, Chungbuk, Republic of Korea
Host/Support	ISOFAR, CHUNGBUK
Total cost	30 billion won
Main contents	10 theme pavilions, Academic events

ISOFAR World Organic Expo 2015

ISOFAR and Chungbuk wish to organize the 2015 Goesan World Organic Expo (WOE) together in order to develop an organic movement worldwide with the slogan, "Organic Life – Science meets public". Both institutions agreed the basic concept of WOE presented and shall prepare not only for high quality of Expo but also the best of ecologically sound expo ever before.

This ISOFAR expo will be held in Korea for the first time, but the next venue will be moved to another continent.

ISOFAR is going to supply the scientific resource materials for 10 exhibition halls of WOE and conduct scientific events such as conferences, symposia, workshops, seminars and conferences. And To prepare and conduct the ISOFAR WOE in a way of organic lifestyle in the fields of foods, drinks, energy & electricity, wastewater treatments, drainage recycling systems, building constructions, landscape management, transportation systems, hygienics & detoxicants, papers & printed materials, and a whole management of ISOFAR WOE.

And Chungbuk Province

(CBP) is going to take full responsibility to prepare and manage the WOE with a budget of about 30 billion KRW (equivalent to 25 million US\$ with exchange rate of 21 December 2011). And CBP is going to pay the ISOFAR for the scientific event arrangements and it's conduction such as symposia, seminars, workshops and conferences in 2013, 2014 and 2015 respectively.

The WOE will follow the traditional slogan of Organic Agriculture like 'Healthy soil – healthy crops - healthy animals-healthy environment - general well-being of humans'.

Ten topics in the individual exhibition halls

- 1) Healthy and resilient soil
- 2) Clean water
- 3) Clean air

- 4) Favorable climate
- 5) Enriched biodiversity
- 6) Enhanced animal health
- 7) Optimal product and process quality
- 8) General human well-being(consumer satisfaction)
- 9) Organic life style
- 10) Practical skills of organic agriculture

Seven outdoor exhibitions

CBP will also display seven outdoor exhibitions. The physical models or facilities in the open field exhibition will show visitors what is an organic agriculture and organic life for future;

- 1) Agronomical skills: rotation, green manure, legume, salt accumulation, direct seedling, bio-diversity, optimum fertilization, organic seed, flame weeding, animal weeding and etc
- 2) Animal production: trench silo for compost-

ing, barn, hay bedding, moving grazing, moving chicken house, green grass feeding to pig, free-range, mixed pasture and etc

3) Horticulture: solar greenhouse, biogas heating and etc

4) Food processing: drinks, cheese & bread making, fermented foods and etc

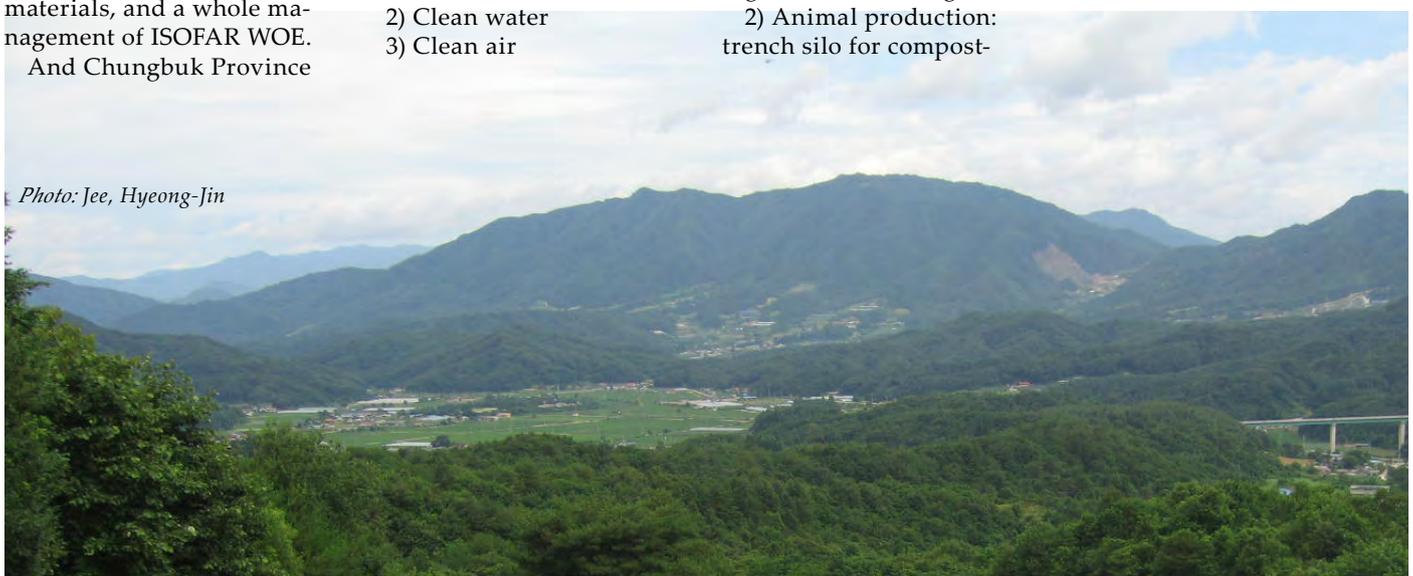
5) Life style: textile, cosmetics, organic hotel, medical care and etc

6) Architecture: breathing walls, living machine, non-toxic construction materials, surplus house and etc

7) Alternative energy: bio-gas, wind-power, solar-energy and etc

In the expo, all materials displayed in 10 exhibition halls and seven outdoor exhibitions will be in Korean and English. And for the children, the organizers will display an easy version (Children's version) down in each panel. Visitors can catch a QR code via mobile and can access all necessary information later on through internet access.

Photo: Jee, Hyeong-Jin



Systemic approaches to pest management without pesticides - do Chinese and Danish researchers have common interests?



By Lise Andreassen, ICROFS and Qiao Yuhui, China Agricultural University (CAU), Beijing, China.

With China being more than 220 times bigger than Denmark covering temperate, sub-tropic and tropic climates, as well as both lowland and mountainous zones while all of Denmark is lowland with a temperate climate, one might think that it would be different for Chinese and Danish researchers to share research interests and agree on priorities.

When adding structural and cultural differences it might be even more difficult to imagine researchers from the two countries jointly identifying research topics where they could see collaboration be beneficial for both China and Denmark. A group of Chinese and Danish researchers joined forces to investigate this to identify research areas of priority within pesticide free pest management. They experienced that mutual interests were stronger than the differences and that the differences just raised interesting questions and challenges.



Reduction of the use of pesticides in organic as well as in conventional agriculture and the search for alternative pest management approaches is a priority in Denmark and in China – China may focus more on food safety while not compromising food security for the 1.3 billion Chinese people, while Denmark may focus more on the environment and protection of groundwater as a source for

clean drinking water.

Both in China and Denmark demand for high value products produced without the use of pesticides is increasing driven by health and environmental concerns, but conversion to non-pesticide management relies on available alternatives to pesticides and different applicability of possible system design solutions. In spite of the many differences between variation in climate and ecosystems, as

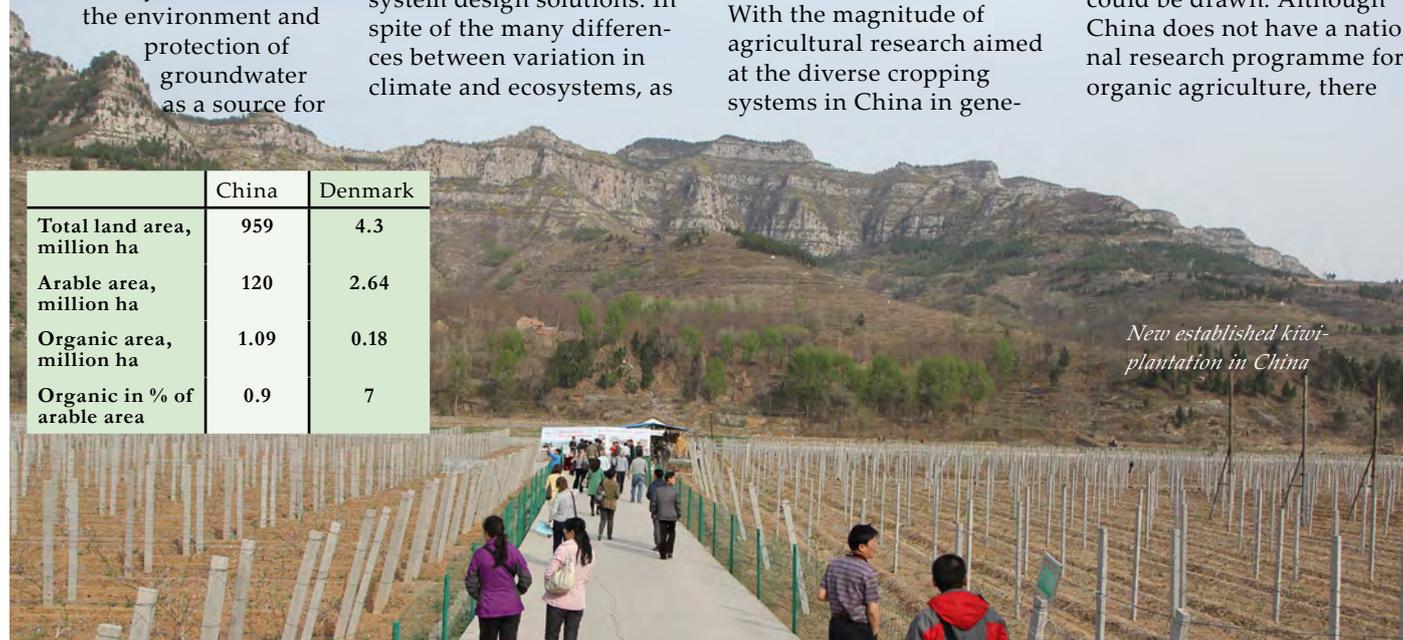
well as in farming systems and their organization in China and Denmark, there are many similarities in the production of high-value crops in the two countries, such as vegetables, fruit and berries and, therefore, an obvious focus for joint research efforts.

What do the countries have to offer to each other?

With the magnitude of agricultural research aimed at the diverse cropping systems in China in gene-

ral, there is an abundance of research which might be relevant for systemic approaches to pesticide free pest management and/or organic agriculture. At the same time areas in China are managed in traditional ways, which might come close to the principles of organic agriculture, from where traditional knowledge of relevance also could be drawn. Although China does not have a national research programme for organic agriculture, there

	China	Denmark
Total land area, million ha	959	4.3
Arable area, million ha	120	2.64
Organic area, million ha	1.09	0.18
Organic in % of arable area	0.9	7



New established kiwi-plantation in China



”PEST MANAGEMENT WITHOUT PESTICIDES”

The wording ‘pest management without pesticides’ was used to address the pest management in organic farming systems but also to include informal/non-certified organic farming systems as well as to link experiences in the organic sector with the requirements for reducing the use of pesticides in conventional agriculture, and as such use the organic sector as a driver for development in general.

While the word ‘pests’ in association with crops can cover a very broad range of organisms causing damage to the plants, the group limited the work to include

- 1) microorganisms causing diseases in crops and
- 2) invertebrates causing damage to crops, such as insects and arachnids - thus excluding mammals, birds and reptiles.

Management of weeds is not included – although ideally it should be a part of integrated systemic approaches.

are research institutions where research in organic agriculture or agro-ecological approaches has high priority. China Agricultural University is one of them.

While the agricultural research sector in Denmark is small compared to the one in China, research in organic agriculture specifically but also in agricultural systems with low environmental impact in general, has been a priority for several decades. National organic research programmes have been conducted since 1996 and a national research strategy was formulated in 2012. Danish researchers have participated in European organic research programmes coordinated by ICROFS since 2008 as well as in the formulation of a European strategic research agenda and implementation plan.

Similarities in trends in agricultural development

In both China and Denmark organic vegetable, fruit and berry farmers are under economic pressure to intensify production, aiming at higher yields and larger profitability. This development takes two directions: one is farm enlargement with product specialization another is moving from field produc-

tion to protected cultivation. In conventional agriculture both intensification pathways have traditionally been linked with increased demand for inputs, primarily pesticides, because of emerging problems with pests and diseases. Therefore there is a need, within the organic sector, to find alternative ways to intensify and improve systems by designing solutions on systems level, which are based on knowledge and human organization (‘eco-functional intensification’) and which are effective, applicable and cost-efficient in the relevant contexts.

Recent policy developments

In China, organic farmers in areas with more than one crop per year face a requirement from standards for more diverse crop rotations. In EU, the ‘greening of the CAP’ supports the reservation of 7% of the farm area as uncropped areas as well as the implementation of increased crop diversity by requiring at least three crops in the rotation for commercial farms. These measures are mainly directed towards conventional farmers, as organic farmers are assumed to automatically comply with them. System designs such as use of

rotation, crop diversity and uncropped areas for biodiversity enhancement can be expected to have high priority as measures to satisfy the goals.

To date many researches and practices are focusing on partial technology development - such as the development of a natural pesticide as a substitute for a synthetic chemical treatment – less research has focused on integrated and holistic approaches where the farming system is an integrated part of the pest management – so called systemic approaches.

Towards systemic approaches

Many practices have been used traditionally in both China and Denmark and are known to be beneficial in the management of pests. However, the knowledge of the specific functions and interrelations of the known practices may be too limited for using it systematically and intentionally in systemic approaches to pest management based on eco-functional intensification. Therefore, it is important to further investigate some of the well-known pest management practices and their functionality and role in a systemic approach.

Research focus areas

The Chinese and Danish researchers had many and varied research interests but agreed that in the field of systemic approaches to pest management without pesticides collaboration between China and Denmark would be of benefit to

both countries and that the research should focus on the following areas:

- Research to provide the biological foundation and understanding of mechanisms and interactions for development of non-chemical solutions and to improve the efficiency of new and existing control methods for severe pest problems.
- Research in ‘How best to integrate multifunctional plants (and crops) and use diversification to create a more healthy and productive farming system which is resilient to pests?’
- Research in ‘How to design and integrate pest management in eco-functional cropping systems at field and farm/landscape level?’

More information

This article is based on the work of Chinese and Danish researchers of the project ‘Chinese-Danish Network on Systemic approaches to pest management without pesticides’.

The project is funded by the International Network Programme of the Danish Ministry of Science, Innovation and Higher Education.

See the full report from the project: http://www.icrofs.org/pdf/2013_kinaraport%20endelig.pdf

Read more about the project: http://www.icrofs.org/Pages/Research/international_research.html



Restricted use of antibiotics in organic pig farming

By Søren Aabo and Annette Nygaard Jensen,
Technical University, National Food Institute, Denmark.



Can the restricted use of antibiotics in organic pig farming be documented to provide a safer, high quality meat product with less antibiotic resistant bacteria?

The project SafeOrganic aims to document that the restricted use of antimicrobials in organic pig production leads to lower levels of antibiotic resistant bacteria compared with the level in conventional pigs. However, the project will also address the risk of losing this quality parameter, due to a widespread practice of slaughtering organic pigs together with conventional pigs, implying a risk of cross-contamination.

Spread of antibiotic resistance along the food-chain is a major food safety concern due to the risk of treatment failure of human foodborne infections. Recent reports suggest that the restricted use of antibiotics in organic animal farming promotes lower levels of antibiotic resistant bacteria in organic animal products as compared to conventional. This offers an important quality parameter of organic meat, but this is currently only scarcely documented in the EU. The field-survey

planned in SafeOrganic is expected to provide this documentation.

What is the level of antibiotic resistant bacteria in organic pigs?

Approximate 25 herds of organic as well as conventional origin have been selected in DK, FR, IT and SE for comparison of the antimicrobial resistance levels in organic and conventional pigs. Two animals from each herd will be examined with respect to the level of resistant *Escherichia coli*

bacteria as well as resistance patterns. Only very limited results have been obtained yet, but it may seem that the antibiotic resistance levels in pigs will differ among the participating countries. If a lower level of antibiotic resistance can be documented it is an advantageous quality parameter of organic pigs that holds the opportunity to be exploited in marketing of organic pork.

A cross-contamination problem?

Slaughtering of organic and conventional pigs at the same slaughter lines without special hygiene barriers to avoid cross-contamination is not unusual. This may threaten the quality parameter of organic meat obtained by the restricted drug politic in organic farming. Therefore, the project also aims to investigate to which degree antibiotic resistant bacteria from conventional raised animals are transferred to organic meat during processing. This is done by examination of intestinal content and carcass swabs from organic and conventional pigs along the slaughter line in DK, FR and SE. The results are still preliminary;

however, the numbers of *E. coli* on the carcasses prior to freezing seems to be relatively low, indicating a good level of hygiene of the investigated slaughterhouses in general. Nevertheless, the results of SafeOrganic may provide knowledge allowing suggestions of preventive measures to avoid a potential cross-contamination of organic pork with resistant bacteria.



Swabbing of carcass for determination of the *E. coli* contamination level



Read more

Find more information about the SafeOrganic project at www.coreorganic2.org/safeorganic.

The project is funded by partners of the ERA-NET CORE Organic.



CORE Organic II is a European transnational research cooperation project supported by the European Commission and coordinated by ICROFS.

How to improve disease control in European organic viticulture?



By Legler S.E. and Rossi V., the Agriculture Faculty of the Università Cattolica del Sacro Cuore, Piacenza, Italy

Organic agriculture and, in particular, organic viticulture have grown considerably in the last decade, nonetheless organic farming still has a huge potential for innovation and improved solutions.

The research project VineMan.org, supported by the CORE Organic II, aims at improving disease control, which is one of the main and most difficult tasks in organic viticulture, by integrating plant resistance against fungal pathogens, vineyard management practices, and the use of biological control agents according to optimized outbreak forecasting systems.



Global consumption of organic wine continues to grow despite recent years of crisis and consequently, more and more grape growers are keen to adopt organic vine production. Organic viticulture faced more than a 4-fold increase worldwide between 1998 (48'600 ha) and 2010 (217'634 ha) (www.organic-world.net/); Europe covers most part of this surface. Nonetheless, organic grape-producers face several issues, one of the most crucial being how to maintain healthy plants.

The five main principles of plant protection

In organic viticulture, there are five main principles of plant protection (Trioli and Hofmann, 2009):

- i) soil fertility and health;
- ii) viticulture practices, selection of appropriate varieties and training systems;
- iii) timing of protection measures and application methods;
- iv) enhancement of natural defense mechanisms; and

v) biological pest control and habitat management.

Efficient strategies for controlling grape diseases

Considering that the Council Regulation (EC) No 834/2007 requires the progressive reduction of copper fungicides, the development of new and efficient strategies for controlling grape diseases based on environmentally friendly and durable methods is necessary and will provide new opportunities for European grape growers in the organic sector.

Achieving this is the main goal of the VineMan.org project funded within the CORE Organic II ERA-Net.

The different research topics of the project have been studied by different authors in the past, but have not yet been combined into an overall vineyard management strategy. In addition, the project focuses on the impact of organic cropping methods on the general microbial community structure of the vineyard, which has been poorly investigated as well.



Experimental vineyard in Northern Italy.



Bunch sampling in the Italian experimental vineyard.

Four different aspects of disease control

In the first year of the project, the partners carried out research on four different aspects of disease control in organic viticulture and a first overall strategy for organic vineyard management was proposed.

Enhancement of plant resistance

All plants have an innate immunity against pathogenic fungi and oomycetes that is triggered by pathogen associated molecular patterns (PAMPs) which comprise soluble molecules from the pathogen cell wall such as oligosaccharides, peptides, and lipids. Repeated application of these molecules or their structural analogues can activate and enhance the innate defense

response against a following infection. This can lead to an early and effective defense response also in susceptible plants.

Several methods have been developed to test PAMPs for triggering defense responses in grapevine and some resistance inducing molecules have already been characterized.

Modification of canopy and cluster structure

Different methods for manipulating vegetative growth, canopy density, and fruit exposure were evaluated as a means for making the microclimate less favorable to pathogens and more ideal for the ripeness of the grapes.

Primary leaves and second shoots developing from nodes 1 to 6 were

removed at pre-flowering (ELR) and at pre-veraison and compared to control vines, in Italian, Spanish and Austrian vineyards. ELR was effective in reducing bunch sensitivity to grey mold by reducing bunch compactness and increasing berry skin thickness. The beneficial effect of ELR was more evident in Austrian vineyard, where the weather was conducive to the disease. Both treatments did not affect the titratable acidity of the musts while ELR increased the tartaric acid suggesting the possibility to obtain more balanced wines by preserving acidity.

Above-bunch-zone leaf removal applied at pre- and post-veraison was also tested on potted vines and compared to untreated

vines. The seasonal carbon/yield ratio did not differ between treatments and neither berry fresh mass nor relative growth of skin, flesh and seeds were affected by treatments. Above-bunch-zone defoliations were effective in temporarily delaying technological maturity without affecting bunch color and the content of phenoles.

Environment and disease development

Existing models for predicting plant disease outbreaks/epidemics were evaluated for their ability to support decision-making about crop protection, based on the presence of favorable environmental conditions and/or biological information concerning the disease and/or the host plant. Mechanistic, weather-driven models



Scaphoideus titanus second instar nymph parasitized by the entomopathogenic fungus *Lecanicillium lecanii*.

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for downy and powdery mildews (Rossi et al., 2008; Caffi et al., 2011 and 2013) were implemented in a web-based platform provided by Horta s.r.l., able to produce decision aids for crop protection in organic viticulture. For downy mildew, the model was able to reduce the amount of copper by 20% as average of 18 vineyards, with a maximum of 73%.

Improve fitness and efficacy of BCAs

Fitness and efficacy of bio-control agents, representing formulations of bacteria and fungi already registered in Europe, were evaluated in relation to grape pests and disease control un-

der organic practices. For instance, the entomopathogenic fungus *Lecanicillium lecanii* was used against the leafhopper *Scaphoideus titanus*, the vector of the phytoplasma causing flavescence dorée. *L. lecanii* proved to be virulent to the second instar nymphs of the grasshopper.

Overall strategy for organic vineyard management

Based on the results obtained in the first year of the project, two innovative management strategies will be tested in the experimental vineyards in the second year. The first strategy is more conservative, i.e. risk-averse strategy, while the second one is more risk-seeking.

according to the models and

The risk-averse strategy is based on the combination of:

i) fall treatments with the hyperparasite *Ampelomyces* spp. for the reduction of the overwintering cleistothecia of *Erysiphe necator*,

ii) the web-portal with models for the prediction of downy and powdery mildews to schedule copper and sulphur treatments at label dose during the season;

iii) usage of BCAs for the control of grey mold. The risk-seeking strategy is based only on:

i) dose minimized copper and sulphur applications

ii) early leaf removal for the control of grey mold.

More information

Find more information about the project, VineMan at the webpage: www.coreorganic2.org/vineman.org

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Publications

ORGANIC AGRICULTURE - "A strategy for climate change adaption"

The dossier edited by the IFOAM EU Group presents a collection of articles by researchers who, from a multidisciplinary approach, analyze scientific data and demonstrate the potential of Organic Agriculture, as a holistic sustainable production system which contributes to increase farmer's resilience to adapt to changing climate patterns. Get the publication: http://www.ifoam.org/about_ifoam/around_world/eu_group-new/workareas/policy/pdf/IFOAMEU_dossier_Organic_as_a_strategy_for_CC_Adaptation.pdf



New Research Agenda for Organic Agriculture from EPOK, Sweden

EPOK, Centre for Organic Food and Farming at the Swedish University of Agricultural Sciences has issued a new research agenda for organic agriculture. The agenda identifies the current knowledge requirements and challenges for organic food and farming in Sweden. Get the publication: <http://www.slu.se/Documents/externwebben/centrum-bildningar-projekt/epok/Publikationer/Research%20Agenda%202013-web.pdf>



Activity report from FiBL

The 2012 activity report documents on 60 pages the advances made in FiBL's research and consultancy work. Lively texts generously illustrated with photographs give an insight into FiBL's projects, both completed and ongoing. Clients and partners will find particularly useful the up-to-date overview of all activity areas of FiBL Germany, Switzerland and Austria and the detailed listing of all staff and their latest publications. Get the report: <https://www.fibl.org/fileadmin/documents/shop/1444-activity-report.pdf>



Calls

First joint call from ERA-Net SUSFOOD

The first Joint Call for Proposals of the ERA-Net SUSFOOD has opened on February, 15th, 2013. The deadline for the submission of pre-proposals will be May, 3rd, 2013 - 3 p.m. CET. The research project consortia must apply to at least one of the three call topics: Improving input, waste and side flow strategies to increase resource efficiency and provide added value in food products and food processing, manufacture, reducing input (energy, water) in the food chain Innovation in food processing technologies and food products to support a sustainable food chain Understanding consumer behaviour to encourage a (more) sustainable food choice. Read more: <https://www.susfood-era.net/index.php?index=16>



Call for abstracts for the ISOFAR / MOAN Symposium, May 14-16, 2013 in Sousse, Tunisia

On the topic: Crop Protection Management in Mediterranean Organic Agriculture, there is now call for abstracts for the joint ISOFAR/MOAN Symposium in May. Organic Agriculture has experienced a rapid expansion in recent years in the Mediterranean region. Crop protection management is a critical issue and is considered one of the most challenging tasks facing organic farmers. Read more: <http://www.isofar.org>



Congresses

Njf seminar: "Organic farming systems as a driver for change", August 21-23, 2013, Denmark.

The seminar will be arranged around the following four tracks:

1. Societal and economic viability
2. Transition to renewable resources
3. Nutrient sufficiency and management in farming systems
4. Productivity and sustainable production levels in animal and crop production.

Read more: <http://www.njf.nu/site/seminarRedirect.asp?intSeminarID=461&p=1004>



Congresses



Second International Conference on Organic Food Quality and Health Research (FQH) 5-7 June 2013, Warsaw, Poland

The Conference will focus on the sustainable systems of agriculture and their impact on food quality and human health, in the following areas: The future of sustainable agriculture Quality of food from organic and related systems New methods for food quality determination Systemic view on food and health. Read more: <http://www.fqh2013.org/>

Meetings



SOLID meeting in Greece

The stage is set for the next meeting of the partners of the SOLID project. This time, it will be held in Thessaloniki, Greece on the 9-11 May 2013. The SOLID project on Sustainable Organic and Low Input Dairying is an EU FP7 project running for five years. Read more at www.solidairy.eu



Scientific workshop on organic pig production

A Scientific workshop on organic pig production will be held at Hovborg Kro, Denmark, June 12th - 13th 2013.

Organic pig production aims for high animal welfare and natural products and therefore a stop for castration would be favorable. However, the risk of boar taint in the meat is a major barrier for marketing meat from entire male pigs. This issue will be discussed based on the results from the research project NOCAST as well as ongoing Danish research projects on entire male pigs in conventional pig production.

Read more at: www.icrofs.org

