AIMA Newsletter N°13 January 2019 Part 2
News and Resources

35th Annual Plowing Match
Howell Living History Farm 2018
Titusville, New Jersey, USA

Apis mellifera, Western honeybee by
Andreas Trepte https://www.photo-natur.net/ 4 August 2009
Wikipedia Commons by kind permission of the author

Agriculture * Food * Environment * People

- Be sure to visit the **AIMA website** at http://agriculturalmuseums.org/ for more information and frequent updates on subjects concerning museums of agriculture.
- … and send this **Newsletter** on to your friends to encourage them to join us in the AIMA, in its networks of practice, for advice and exchange.

Thanks to all the contributors who help us make the Newsletter

Nantaise Cattle Festival, Photo Jean-Léo Dugast

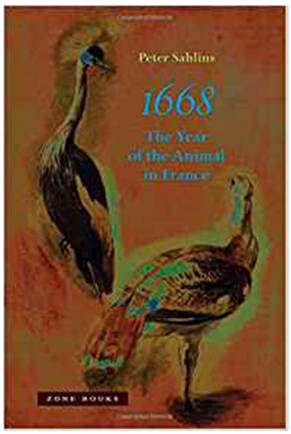
❖*** Special Notice ***

❖There were so many valuable contributions, that this Newsletter will be sent out in two parts

Contents

Resources

A Turning Point in the Perception of Animals

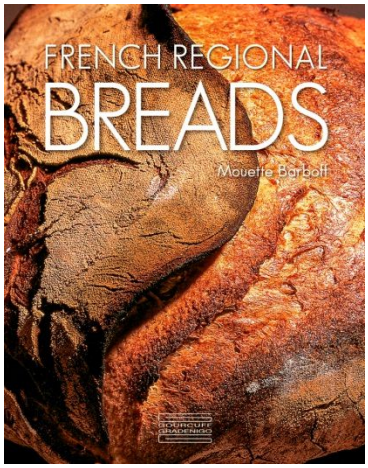


Vice-President Debra Reid calls AIMA Newsletter readers' attention to this outstanding book.

Peter Sahlins's *1668: The Year of the Animal in France,* (Zone Books, 2017) wins the 2018 J. Russell Major Prize, established in memory of J. Russell Major, a distinguished scholar of French history who served on the history faculty at Emory University from 1949 until his retirement in 1990. The **American Historical Association** is a nonprofit membership organization founded in 1884 and incorporated by Congress in 1889 for the promotion of historical studies. The AHA provides leadership for the discipline, protects academic freedom, develops professional standards, aids in the pursuit and publication of scholarship, and supplies various services to sustain and enhance the work of its members. As the **largest organization of historians in the United States**, the AHA is comprised of over 12,000 members and serves historians representing every historical period and geographical area.

"**Animal studies**, a critical field now well-established in literary inquiry and assessments of contemporary culture, has still considerable work to do in historical research and interpretation, especially in the pre-modern and early modern eras. Peter Sahlins's tightly argued book, *1668: The Year of the Animal in France*, seeks to redress this lack in a series of integrated case studies that overwhelmingly demonstrate how important animals were to the period in French history in which the young Louis XIV was consolidating his power. Technically, 'Circa 1668' would be a more accurate heading to characterize the topics Sahlins addresses, the dates of which extend from the establishment of the king's Menagerie in 1664 to Mademoiselle de Scudéry's publication of the 'History of Two Chameleons' in a collection of her writings in 1688. But the year 1668 gains particular significance in Sahlins' history not just because it epitomized the many and varied ways in which animals figured in and around the court both as representations and as living actors, but also because he construes it as a **tipping point when the ideology of the animal shifted**. In the early years of the Menagerie, animals were presented as models of a civilizing process for the admiration and even self-identification of the king and his courtiers, building upon a longstanding 'theriophilic' model of human and animal continuity, which Sahlins labels '**humananimalism**.' By contrast, in and after 1668, the animal fell increasingly under various kinds of control— scientific, medical, artistic, philosophical—and was correspondingly 'devalorized.' The human, for its part, gained a new, paradoxical status: while Cartesian philosophy definitively separated the human's spiritual soul from its animal body, art produced for the royal court came to promote, in Sahlins' view, a negative model of human animality that only a powerful monarch could regulate." By Sarah R. Cohen in *H-France Forum*, Volume 14, Issue 1, N°1, quote from the first of four reviews followed by Sahlins' response article, available online at : https://www.zonebooks.org/reviews-sahlins-h-france

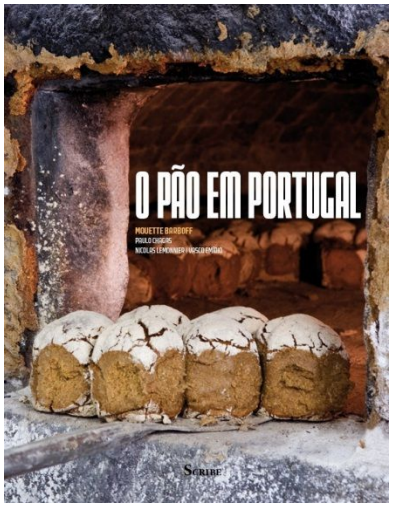
Gourmand World Cookbook Awards to Mouette Barboff for Breads in France and Portugal

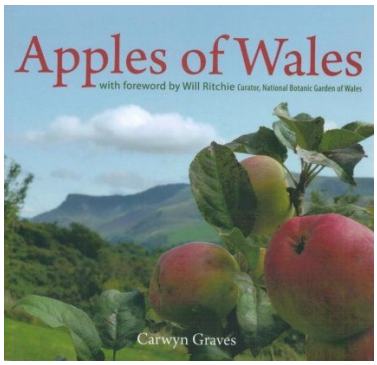


The Gourmand World Cookbook Awards are delighted to announce that “O pão em Portugal” and “French Regional Breads” are the winners selected to represent Portugal and France in the Special Gourmand Awards 2018 category. The Awards event was on May 2018, in Yantei, China.

Bread is truly a part of daily life in much of the world, where it was long a staple food and today is emblematic of traditional tastes and practices. These books will help you discover the history and the variety of breads in different regions of France and Portugal.

To order : www.gourcuff-gradenigo.com http://scribe.pt/produto/o-pao-em-portugal/ Contact author: mouette.barboff@wanadoo.fr





Carwyn Graves. *Apples of Wales*. With a foreword by Will Ritchie, Curator, National Botanic Garden of Wales. Gwasg Carreg Gwalch, 2018, 128pp.

This is a handy book for anyone interested in regional (in fact, national, as it covers all of Wales) apple varieties and the efforts to build up heritage collections, as well as the now-considerable thrust to relaunch cider production. It is a practical book with up-to-date lists of the probable older and rediscovered Welsh variety names, a list of tree suppliers and an extensive bibliography. As in most areas formerly possessing quite sufficient local apple production, supply today is dominantly from outside, often from afar, an estimated 94% decline in land area under orchards having taken place between 1958 and 1992. There is an interesting discussion of just what an orchard is, a fine point ("five apple trees present, the crowns of which are less than 20 metres apart") and one crucial to heritage efforts on the part of "apple hunters" today at work to find relict trees for the collections at the National Botanic Garden in Llanarthne. As in any period, devoted gardeners played and play an important role, in the Victorian era often attached to the great houses of the country and their requirements for supplies of the best fruit available, but the tradition dates back to the medieval monasteries, as domestic apple-growing spread across Europe from its presumed origins in the Tien Shan Mountains via the Silk Road. The book provides a colourful history of Wales, as seen through appleness, with a wealth of illustrations that will appeal to all those interested in pomology.

New entries now available in "Les mots de l'agronomie. Histoire et critique"

Agronomic terms in French

Pierre Morlon, co-founder with François Sigaut, of the website "Agronomic terms" announces the addition of new entries. This source defines and places in critical and historical perspective words and expressions used by agronomists – material objects, techniques, methods and concepts, as well as explaining where they came from, how they were used and in what context. They often led to debate and controversy that concerns us today.

The words are arranged in alphabetical order, but the most recent entries can be found under "Articles récemment ajoutés". Please check out the enlarged version of the website at https://mots-agronomie.inra.fr/index.php/Accueil and an example of an extensive entry under "Céréale" (cereal grain) https://mots-agronomie.inra.fr/index.php/C%C3%A9r%C3%A9ale

2018 Meat Atlas downloadable (in German)

For AIMA members and friends who read German, the Meat Atlas put out by the Heinrich Böll Foundation, is a gold mine, produced every year: fully aware of the threats to climate and to overall food production from meat and milk, the Böll Stiftung publication outlines **strategies to cut meat and dairy product consumption, while maintaining a healthy diet** – a highly complex issue. Several approaches are outlined, including radically **different distribution of land use** for stock-raising, including mixed-use lands and a revival of some forms of keeping livestock in forests, new concepts in stabling, methods to handle the seas of excrement (among the thorniest of problems, as Europe is "overmanured" in many areas), perspectives for how stockbreeders can transition to smaller herds and flocks, multiple-use breeds (revitalizing traditional breeds and practices), projects to reduce antibiotic use, short-circuit transport and delivery via Internet, voluntary re-organization of supermarket chain inventories, even concrete proposals for redistributing EU subsidies to underwrite these objectives. The publication also gives an appraisal of new protein-rich foods from insects and vegetal-origin or laboratory-produced milk and meat substitutes.

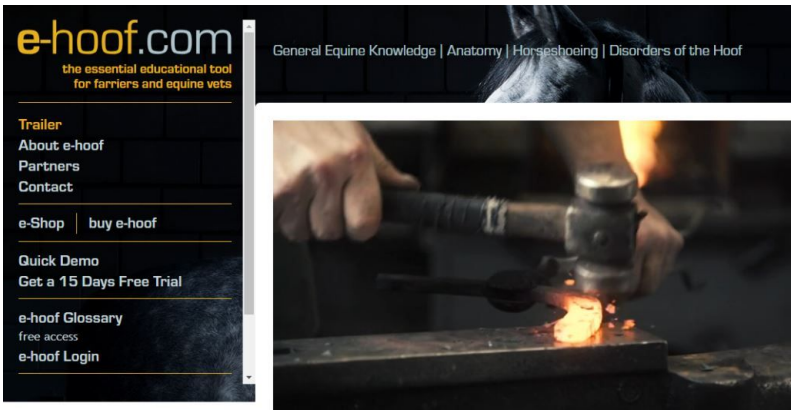
HEINRICH BÖLL STIFTUNG
Die grüne politische Stiftung

PDF downloadable at https://www.bund.net/fileadmin/user_upload_bund/publikationen/massentierhaltung/massentierhaltung_fleischatlas_2018.pdf NB that the Heinrich Böll Foundation also provides other atlases, at times in several languages, as the **Soil Atlas**, the most recent of which is for 2015: https://www.boell.de/en/2015/01/07/soil-atlas-facts-and-figures-about-earth-land-and-fields

het mot

The Museum for Old Techniques in Grimbergen, Belgium, ID-DOC tool identification online

Just to remind AIMA members and friends that the MOT has a remarkable online tool identification section in English, French and Flemish (work-in-progress) at https://www.mot.be/en/opzoeken/iddoc and many museum- and collections-friendly aids, such as "Tips for photographing (smiths') forge marks and printing on paper" that includes how to make effective and attractive rubbings – again, in English, French and Flemish at https://www.mot.be/en/opzoeken/smidstekens/tips



New educational tool for farriers and veterinarians

Farriers and veterinarians play a pivotal role in equine health and need effective communication and cooperation. Farrier education in Switzerland has recently been reorganized to focus on more depth in equine knowledge training, which led to development of a new educational aid entitled **e-hoof** designed by the Veterinary Faculty of the University of Zürich and the Swiss Farrier Association (in English).

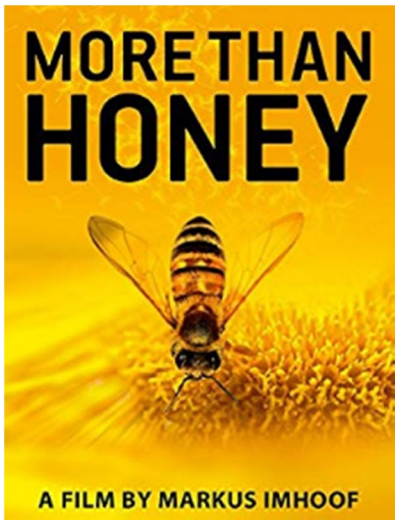
Check out the e-hoof website https://e-hoof.com/ and the video presentation https://e-hoof.com/en/trailer

Book Reviews

Of Bees and Bumblebees

Wikipedia caption: Drone short-haired bumblebee, *Bombus subterraneus*. The species was successfully reintroduced to England from Sweden. Photo: Creative Commons, Author Martin Andersson, 26-07-2011, *Bombus subterraneus* (male), picture taken in Skåne, Sweden.

Dave Goulson *A Sting in the Tale, My Adventures with Bumblebees*, 256 pp, London, Vintage, 2014. Documentary film by Markus Imhoof *More Than Honey*, DVD, 2012, http://morethanhoneyfilm.com/

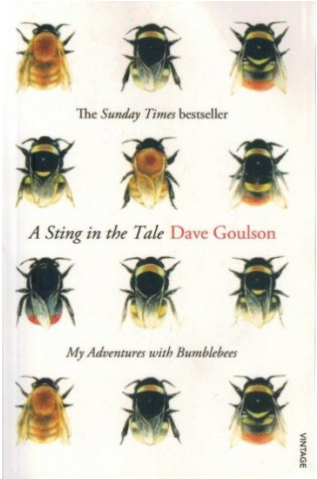


"If bees were to disappear from the globe, mankind would only have four years left to live", *attributed* to Albert Einstein.

THIS STATEMENT IS NOT SUPPORTED BY SCIENTIFIC RESEARCH and it brings out the gap between a fascinating – and beautiful – documentary film, and a book written by a scientist, indeed one of the UK's most able nature writers, who can provide a source as full of double-checked information as it is of humor. Investigating the Einstein quote is a minor criticism of the film by Markus Imhoof, which remains a classic of human and ecological interest, telling the tale firstly of beeness, looking honeybees in the eye, as close up as you can possibly get, then, of colony collapse disorder, from the viewpoint of people who love bees, be it the Swiss mountain farmer whose family always kept their own and whose bees are melting in front of his eyes or the American hyper-capitalist who cries in front of the camera, when he speaks of the devastation wrought on his hives, which he, too, loves and are transported for their work all over the United States, true warriors in the battles for food production.

Markus Imhoof's 2012 *More Than Honey* is a prize-winning documentary film that took awards around the world and visits honeybee colonies and their passionate tenders in California, Switzerland, Austria and China, except that colony collapse disorder (CCD) has wrought such havoc in China that the scenes there are mainly of human beings hand-pollinating fruit trees.

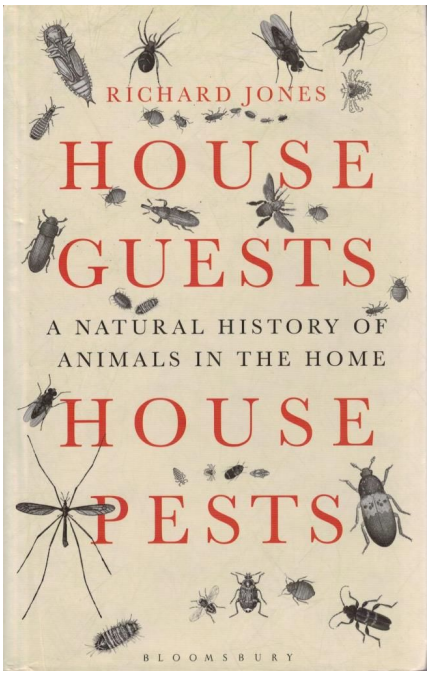
At the time the film was made, United States estimates suggested that over 1.5 million out of 2.4 million beehives had disappeared in 27 States. Germany's national beekeepers' association estimated the losses from CCD at 1/4 of all colonies, up to 80% on some farms. The same phenomenon is widespread over much of Europe and was originally termed the "Mary Celeste Phenomenon" after the ship whose crew disappeared in 1872.

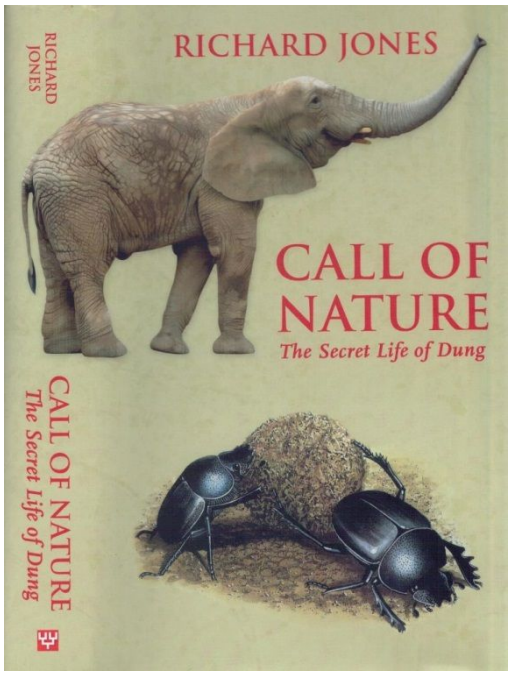


The "Marie Celeste Syndrome" was also Dave Goulson's preferred term for the event of the missing bee that spread round the world in the early 2000s and has ever since been an object of wild speculation and intense scientific investigation. Goulson adroitly points out that scientists are not very sure of what CCD actually is and the phenomenon appeared to have abated somewhat by the early 2010s. This is likewise what is clearly stated in *More than Honey* – that there is no single cause but multiple drivers involving disease, pesticide exposure and other factors. Goulson emphasizes that it is quite normal for 10-25% of honeybee colonies to die every winter and that CCD is probably not new, there being records of "disappearing bees" from the 19th century.

This brings Goulson to the heart of his own topic, which is not honeybees, but bumblebees, which are now also a highly profitable, high-tech business, with a conservative estimate of the European bumblebee trade running at one million nests, all of which are fueled by pollen, which is obtained from …. honeybees. The pollen they gather along with nectar is siphoned off in hopefully harmless proportions to sustain the bumblebees sent round the world, whose import-export is not as highly controlled as that of honeybees. This lucrative practice brings up the issue of disease transmission from honeybee to bumblebee and this kind of deep interconnectedness is among Goulson's main messages. Another of them is checking your facts, and he notes that there is nowhere a source attributed to Einstein with this widely quoted sentence. Firstly, honeybees do indeed account for about 1/3 of all insect pollination in the UK and, if the islands were to lose all their varieties of bees, it would represent a major disaster for food production, but hardly the end of the human species – we would still have the wind-pollinated staple crops in the form of cereal grains, although a lot of good-tasting and highly nutritious food from almonds to beans and on to pumpkins would be out. For potatoes or cabbages, the crops do not need pollination, but it is required to produce seed for the following year, so that there is no lack of nuance in his arguments. Goulson notes that cows need pollination, too, for their fodder in the form of clover and alfalfa, so that meat production quickly leads back to pollinators of all kinds.

Goulson covers nearly all the ground that bumblebees hover over and gives attention to the honeybee as well, passing from why Charles Darwin was moved to write to a friend, in a moment of passing desperation, "I hate myself, I hate clover and I hate bees", on to the American entomologist, bee temperature expert (and marathon runner) Bernd Heinrich's pithy remark that "time is honey". This is part and parcel of Goulson's mix of enticing titles, playful humor and solid science that includes the history of bees in general on a geological time scale, an attentive summary of recent research on bumblebee homing, disease, predators (and predation), and on to the effort that won him and his always-cited team of colleagues and graduate students the Heritage Lottery Award for best Environmental Project. This was twinned in 2010 with the "Social Innovator of the Year" award from the Biology and Biotechnology Research Council for their 2006 founding of the groundbreaking Bumblebee Conservation Trust, a paragon of crowd-sourced, citizen science. Check out the Bumblebee Conservation Trust at https://www.bumblebeeconservation.org/





Humans and their "guests" – from boll weevils to black rats and on to roller beetles and Invermectin

Richard Jones. *House Guests, House Pests, A natural history of animals in the home*. 288 pp, black and white illustrations, 70-page identification guide, index, bibliography. London, Bloomsbury, 2015.

Richard Jones. *Call of Nature. The Secret Life of Dung*. 292 pp, black and white illustrations, 24-page dung identification guide, index, bibliography. Exeter, Pelagic Publishing, 2017.

Richard Jones is a well-known specialist in entomology, who enjoys writing for the general public, witness his volumes on dung and its inhabitants (see below), another on nits, and the magnificent 2018 New Natural Library volume *Beetles* (beetleness in all forms, as he is at heart a coleopterist*). Jones combines scientific rigorousness with a priceless sense of humour that may well even persuade the reader to become fond of a bed bug. Of course, his overall objective is the house and home, where animal guests, from termites to cockroaches, can become most unwelcome, especially, as he observes, when they take on pest *proportions*. Some guests are more welcome than others, often for reasons difficult to ground scientifically, but people are usually not as aghast at a swarm of lazing seven-spot ladybirds (*Coccinella septempunctata*) in the living room, as at a wasps' nest under the eaves.

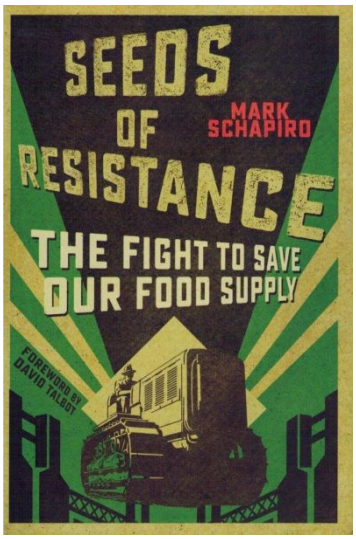
The author insists on the Latin names of the beasts examined and makes it a pleasure that fits smoothly into the context. What is **important for AIMA readers** is that "home" includes all the out-buildings, barns, haystacks and nearby fields and forests, as the book is a goldmine on agricultural pests, such as the boll weevil, a domesticate so aligned to human existence that no wild antecedent has been found. The long relationship between humans, their dwellings, crops and livestock is thoroughly explored, including the note that humans themselves may well be the "pests", having infected other animals, once domesticated, with afflictions such as tapeworms. There is ample scientific description and discussion of damage, lubricated by Jones' humour, for example, since hair lice are not transferred except through hair-hand or hair-hair contact, there is no argument for not transporting them live to an entomologists' meeting for examination under a microscope, which he (famously or notoriously, in any case,

successfully) has done. He does not, however, skirt the serious, even lethal, issues: famine and the human-animal "arms race" to store foods without vermin, evidence of climate change as a possible boost for evolution of larger cereal seeds and the rise of proto-agriculture, last, but not least, the immense import of the many varieties of honeybee, transported around the world and rarely regarded as a pest, although far more dangerous for humans than wasps in close domestic contact. Indeed, Jones makes a good case that we and our pests have become so intertwined in our lifeways that gently getting them out of the house or barn may be tantamount to delivering them to an early death in a world unknown to them.

Call of Nature has all the attractions of Jones' books – fine illustrations, a delightful mix of science, in this case very "hands-on", with regular deposits of humour. After all, many a museum – for example, the Canada Agriculture and Food Museum – capitalizes on the public's interest in…. poo of all kinds, most often from farm animals, so readers will find chapters on exactly what it is (see equation), on sewage more generally, dung as resource worldwide and the ecological stakes involved in the rich web of dung's inhabitants, visitors, users, and abusers. Perhaps among the most useful sections for museums dealing with the **complex issues of food and farming** is the nuanced dissection of the use of the veterinary medicine Invermectin in domestic animals to eliminate the various bot flies that can afflict them. This provides a balanced scientific view of "a disaster of our own making" that can contribute greatly to the debates around animal welfare, food and ecological crisis (175-180).

* Richard Jones. *Beetles*. 482 pp, b/w and colour photographs, illustrations, appendix on online resources, The New Naturalist Library, N°136, William Collins, 2018.

Worldwide Battle over Seeds



Mark Schapiro. *Seeds of Resistance. The Fight to Save Our Food Supply*. Forward by David Talbot. New York: Hot Books, 2018. 184pp, bibliography, online resources, index.

The author is a lecturer at the University of California, Berkeley, School of Journalism and investigates the background to the present-day threats to seed independence of farmers world-wide. The historical setting highlights the work of seed pioneers such as Luther Burbank and Nicolay Vavlilov,* prominent actors in early warning such as Rachel Carson, and traditional, indigenous people's practices in developing varieties of seed that, through their very diversity, could respond to changing environmental conditions. He goes on to outline today's world of genetically modified, hence patented seeds + the pesticides that they are designed to resist, such as glyphosate (also known as Roundup), and the legal battles over intellectual property that have accompanied various GMO crops in the last decades. With the now merged agro-chemical firms – Dow-DuPont, Bayer-Monsanto and Syngenta-ChemChina – controlling terminator seeds, the importance of seed banks such as the internationally known Svalbard (recently subject to unexpected flooding due to tundra melt) or the far more local seed banks around the globe, is emerging in this high-stakes race towards protection of

diversity on the one side and elimination of it on the other.

Farmers in developed countries are long since used to seeing local seed companies bought out and Schapiro emphasizes several events that foreshadowed present concerns, such as the 1982 corn blight event in North America, when two thirds of farmers were using basically the same hybrid strain which fell prey to the corn fungus *Helminthorporium maydis,* then the grey leaf spot fungus in the early 1990s, Jordanian tomato producers whose monoculture crops were ravaged by yellow leaf virus and white fly, and other dramatic crop losses, at times boosted by repeated drought. Explicit warnings over the years from the US National Academy of Sciences and other authorities on the dangers of declining bio-diversity and growing under-funding of research have gone largely unheeded, so that small-scale, local reactions are now emerging as often the most effective efforts to guarantee protection of seed resources, with a whole chain of seed libraries literally held in… libraries, where farmers can "check out" seeds, test them in the field and report back on results. The assault on larger seed banks has been especially poignant in the case of the ICARDA (International Centre for Agricultural Research in Dry Areas), whose holdings narrowly escaped total destruction, first in Iraq, then when transferred to Syria, although they have now been saved by protection in Italy, where the wheat strains are being developed and should appear as major players in lessening the impact of the northward creep of climate change in cereal-producing areas.

Creative Commons, A partially shelled cob of popcorn, 25 November 2007, Author User RoyalBroil

Schapiro clearly points out the advantages that farmers perceive in using the conglomerates' GMO crops, such as the cut in working time from less tillage or the reduced fight against weeds that gives farmers more time for family life. He also highlights the emergence of GMOs in a legal grey zone during the first Bush administration in the US, where regulators let them through as equivalent to traditionally bred seed, in spite of opposition from the Food and Drug Administration. He explains why organic farming seeds can be contaminated by GMOs and the ensuing expenses necessarily incurred by the former to protect their crops, while crop insurance likewise falls into this legal void. Scientific studies on GMO crops on the whole have emphasized the uncertainty of results, rarely comparing them directly to organics, and some 40% of scientists involved are in fact funded by bio-tech networks, in which unethical competition practices have been proven by official bodies such as the SEC (Security and Exchange Commission). The conceptual paradigm most often cited for the conglomerates is the goal of "uncoupling the farm from the environment".

The author presents the many actors involved in encouraging seed diversity and more local taste in crops, such as the Edible Schoolyard movement, the chefs of the Gourmet Society, the Indigenous Environmental Network, UNESCO, the Land Institute or the Millennium Institute, among many others. The book also highlights the tug back and forth between the World Bank or the FAO and the scientists they have engaged to analyze world food production, the latter plainly criticizing the lack of efficacy and long-term viability of official strategies and funding. This has recently led to a modest upswing in funding for organic and agro-ecology research and encouragement to participatory plant breeding, letting farmers take the task back into their own hands. There have been impressive legal

upsets as well, as in the present European Union experiment allowing the sale of mixed seed producing more dynamic populations that indeed do not give higher yields, but provide dependable production with more resilience to change. Perhaps one of the hotspots of public concern is over the GMO-glyphosate twinning, accused of triggering gluten intolerance, so that the suspense is considerable over future legal decisions. Above all, there is a broad view of the arguments applied in the debates: is the issue only to double food production as quickly as possible, or is it centered on reconnecting crop production with consumer access, be it in West Africa or California? How does increased production weigh up in light of the cost in chemical poisoning? In any case, as the scientific discourse puts it "stationarity is dead", that is, the older baselines for measuring productivity and quality no longer apply.

The book has an effective index, the notes are highly satisfactory to encourage consulting the ample, up-to-date bibliography and the extensive list of online resources that include the viewpoint of all "sides" in the debate, from the watchdog NGOs to official government reports.

*for Vavilov, see longer development in Thor Hanson, *The Triumph of Seed*, Basic Books, 2016, reviewed in AIMA Newsletter N° 6

News about Agriculture and Food

Blueprint to save bees and enrich farmers

More than 80% of food crops require pollination but the populations of insects that do most of this work have collapsed, bringing about a fall in pollinators of up to 75% in a country like Germany. Reactions around the globe have been divergent: one of the world's most important food exporters, Brazil, recently voted to lift restrictions on pesticides, whereas the European Union banned neonicotinoids. However, pesticide bans are expensive and bring little benefit to farmers.

Stefanie Christmann of the ICARDA (International Center for Agricultural Reseach in Dry Areas) told the United Nations biodiversity conference in November, 2018, of her research on a large-scale intercropping system. The long-term objective is gradually phasing out pesticides without financial pain or a loss of production, although, as she said, the approach may not please Monsanto and other agro-chem producers. This is called "farming with alternate pollinators" and consists in planting one in every four cultivation strips in economically interesting flowering crops such as spices, oil seeds, medicinal and forage plants. It also involves providing pollinators with cheap nesting support, such as old wood and beaten soil that ground-nesting bees can burrow into, as well as planting sunflowers as wind shelters, and the technical package is so easy that even farmers in the poorest countries can do it without new equipment or technology and a very low investment in seed.

Photo: Nicolas Vereecken, ICARDA report website below

In the four different climatic regions where trials were carried out, the total income of farmers increased, though the benefits

were most marked on degraded land and farms without honeybees, with the biggest gains in semi-arid climates, where pumpkin yields rose 561%, aubergine 364%, broad bean 177% and melons 56%. In areas with adequate rain, tomato harvests doubled and aubergine went up 250%. Christmann will now use German Environment Ministry funds over five years to scale up the experiment and hopes to broaden membership in the 24-country "coalition of the willing", mainly in Europe, already involved. Her hope is that this could lead to multilateral environmental agreement on pollinators similar to the international convention on trade in endangered species. Worldwide, reports suggest that even agriculture ministries, long hesitant to commit, are lining up to observe.

Jonathan Watts "Scientist unveils blueprint to save bees and enrich farmers" in The Guardian Online, 23 November 2018 https://www.theguardian.com/environment/2018/nov/23/scientist-unveils-blueprint-to-save-bees-and-enrich-farmers For the downloadable report see https://promotepollinators.org/wp-content/uploads/sites/117/2018/12/Presentation-Stefanie-Christmann.pdf

ICARDA
Science for resilient livelihoods in dry areas

Economic impacts of Farming with Alternative Pollinators (FAP) in Morocco
first results of the IKI project on pollinator protection (2017-2022)

If you think farming is tough business, it was worse in 536 CE

Wikipedia Creative Commons, Overlooking the Eyjafjallajökull glacier and the ongoing volcano eruption from Hvolsvöllur on April 17th, 2010, Author Boaworm

Researchers have concluded that times were rarely worse in the British Isles for farming than in 536, when farmers lost the sun. Massive volcanic eruptions, now thought to have been in Iceland, sent up plumes of ash that may well likewise have contributed to the decline of Maya civilization. It took European civilization nearly two centuries to recover, according to ice cores and dendrology results.

Kate Williams "You think 2018 is the worst year ever? Try the real dark age: 536" The Guardian Online https://www.theguardian.com/commentisfree/2018/nov/23/2018-worst-year-ever-536-world-sun; Also see https://en.wikipedia.org/wiki/Extreme_weather_events_of_535%E2%80%93536

Breakthrough in poultry-raising: no more male chicks need be killed

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http://www.flagstaffotos.com.au/?z

Male chicks lay no eggs and do not grow fast enough to justify the cost of feeding them up for meat, so they are simply destroyed. German scientists at the University of Leipzig developed a chemical marker similar to a pregnancy test that can detect a hormone signaling female eggs. The marker changes blue for a male and white for a female with a 98.5% accuracy rate just 9 days after fertilization. This enables producers to process male eggs into animal feed, leaving only female chicks to hatch after the 21-day incubation period and eliminating a massive issue in animal welfare: the estimated 4-6 billion male chicks slaughtered globally every year because they serve no economic purpose, some of them suffocated, other fed live into grinding or shredding machines.

This process is brand-named "Seleggt" and has been scaled up to make it easy, fast and hygienic for every-day use in hatcheries. One of the challenges to the Leipzig scientists and the Dutch technology company HatchTech was extracting test fluid from eggs without damaging them or keeping them outside an incubator for more than the strict limit of two hours. Instead of a needle, Seleggt uses a laser beam to burn a hole in the shell, then applies air pressure to the outside, thus pushing a drop of fluid out, at one second per egg. The project was part of a four-year programme by German supermarket Rewe Group to make its own-brand eggs more sustainable and was funded by the German Ministry of Food and Agriculture and should be rolled out to the poultry industry rapidly.

Josie Le Blond "World's first no-kill eggs go on sale in Berlin" in *The Guardian* online 22 December 2018
https://www.theguardian.com/environment/2018/dec/22/worlds-first-no-kill-eggs-go-on-sale-in-berlin

Yuanyang, 15 March 2014, Author: Anders Johnson,
https://www.panoramio.com/photo/105431279,
Wikipedia Creative Commons

Can China feed itself?

It is a commonplace to say that the 1.4 billion Chinese are becoming more accustomed to "western" tastes and diet, turning towards more industrialized agriculture while a crucial role is still played by its small farmers, with more than 90% of farms still at less than 2.5 acres (1.01 hectares). How to feed nearly one-fifth of the world population with one-

tenth of its farmland? The country has now overtaken the United States in daily consumption of calories from meat, poultry, seafood and offal, as well as a fondness for convenience foods. As befits the race to modernity, the organic sector has also grown 30-fold since 2006. So, how does the future look?

Food autonomy, even if symbolic, and most especially food safety, are prime concerns of citizens and government. "Western-style" industrial farms are hard to replicate because so much of China's terrain is mountains or deserts, so the government and private investors are acquiring farmland and food companies in the US, Ukraine, Tanzania and Chile, but China still cherishes the ideal of self-sustenance in staple grains.

On the one hand, fragmentation of farming has distinct benefits, as farmers care for their crops and produce higher yields per unit at modest prices than mechanized operations. Any precipitous effort to change tiny farms into a Kansas-style holding would spur social disruption by dislocating millions of farmers, so a middle path is being followed, for the moment – clustering adjoining fields into farms the size of a western supermarket parking lot. On the other hand, the move to set up larger-scale farm operations, moving villagers and employing them in the new operations, is not always providing the hoped-for results: most cannot be effectively absorbed by the limited number of ag-industrial jobs and farmers are discovering the ills of higher water pollution. A 2010 government pollution census found the new agriculture was polluting water even more than manufacturing.

At one extreme of "development", the largest dairy operation in China in Anhui Province has 600 acres (243 hectares), eight barns for 2,880 milk cows, with an accessory cow-and-calf population around 40,000. Large modernized operations were actively promoted after the 2008 melamine-contaminated* infant formula scandal, one among several widely reported. Transnational corporations are investing billions of yuan into agri-food complexes like one near Shanghai that produces an array of crops from rice to broccoli and poultry, producing enough bird manure to provide 22,000 of organic fertilizer. Such companies build vertical farms that look like models in the Netherlands** with internal environment control that enables targeted fertilizer application, eliminating the need for most pesticides and producing four times the yield of a regular field. This may indeed contribute to China's official goal of capping fertilizer and pesticide use by 2020.

Wikipedia Creative Commons, Author Vmenkov, 15 December 2016, Strawberry fields in Beicheng Subdistrict, Hongta District, Yuxi, Yunnan

The down side of such gigantic operations is evident – if, for example, there is an outbreak of listeria, contamination spreads more quickly than in decentralized production, reflected in the outspoken distrust of industrial farming on the part of urbanites. And, some of them are among the small number of country-bred folk returning to the countryside to farm, supported by their own professional organization, a dedicated development center and communication through the magazine / website Sustainable Farming. So, what is the shape of the future? For the moment, a diversity of strategies of all sizes.

Tracie McMillan, photographs by George Steinmetz. “Feeding China” in National Geographic, February 2018, 82-107. * On melamine, see below “Scanning Food for fakes”.

Wikipedia Creative Commons, Olive oil, 5 October 2015, Author Poyraz 72

Scanning food for fakes

The BASF subsidiary trinamiX is developing a hand-held spectrometer called Herzstück (heart piece) using infrared radiation to check the chemical make-up of products, including foodstuffs. It can distinguish between silk and polyester and, more especially for food concerns, between olive and sunflower oils, rye and wheat flower, sugar and sweeteners. As it can test medicines or cosmetics to see if the label reflects the contents, it can check for allergens or contaminants in foods – with your smartphone while you are sitting in the restaurant or standing in a maize field. The device can help supermarket chains check freshness without opening packaging.

Wikipedia Creative Commons, Swedish: Ett barn som flaskmatas, 16 August 2012, Author Smmchapman

More dramatically, it can tell a farmer if the herbicide s/he is using is the brand-name product or a counterfeit, a source of over a billion euros loss per year for European companies and of ruined crops. World-wide, counterfeiting food is a big business – olive oil contaminated with seed oils, pine nuts that are peanuts (and so dangerous to consumers with allergies). Perpetrators of the tragic mix of melamine (see “Can China feed itself”) in baby formula struck many Asian markets, especially important because melamine is similar to milk in the nitrogen content in its powder, used in standard detection of adulteration, but infrared spectrometry can “see” the difference. Less dangerous for health, but of immense economic importance, the world’s most widespread food fraud is fake “grading” of olive oil, the next target for the new device.

Scanning the future of food in *New Scientist*, Vol. 240 N°3204, 17 November 2018, 20-21.

Food for the future

Left: Wikipedia Creative Commons, crickets feeding on carrot Right: Wikipedia Creative Commons, An image of Honeywell's Green Jet Fuel produced with algae in a beaker, Provided by Honeywell with permission, 21 August 2007

World population is now predicted to tip over the 9 billion mark by 2050, entailing 50% more food requirements and the attached questions of how to produce this without eliminating more forests, expanding industrial agriculture and further damaging soil health. Animal protein production is straining capacities, while contributing about one seventh of greenhouse gas emissions, with beef in industrial operations taking in eight times the water and 160 times the land per calorie as do vegetables and grains. One proposed solution is imitation plant-based "beef" burgers that ooze "blood" from a laboratory-designed protein called heme.* Entirely lab-grown meat can also follow the culture vat processes used for beer or – have a cricket.

Edible insects are traditional in many countries and can be used in high-protein animal feed and in processed snacks. Crickets thrive in dark, dense living conditions that can underwrite factory-scale production with a tiny footprint, especially little waste in contrast to the manure lagoons of cattle and swine farming. One of the food-cricket leaders now boasts its output is sold two years in advance.

Oil plants like palm with its coterie of environmental and social issues, might be replaced by "algae oil", fed with sustainably branded Brazilian sugarcane in six-story fermentation vats and pressed to provide cooking oil with mono-unsaturated fats. The equation so far is one acre of sugarcane for eleven tons of algae oil. For grain crops, one among the oldest experiments at the ecological agriculture research Land Institute in Kansas is now getting close to commercial scale: Kernza, a perennial grain from intermediate wheatgrass with a ten-foot root system able to produce for up to six years and already used in brewing a pale ale and bread-making. The ultimate goal is to have a more resilient grain crop contribute to more resilient agriculture world-wide.

Tracie McMillan, photographs by Grant Cornett. Menu of the Future in *National Geographic*, November 2018, 82-93; * heme https://en.wikipedia.org/wiki/Heme; Kernza https://landinstitute.org/our-work/perennial-crops/kernza/;

Earliest archaeological attestation to cheese-making pushed back to 7,200 years ago

The first evidence of cheese-making was dated to about 5,000 years ago, but now finds in two villages in Dalmatia, Croatia, have pushed the date back to 7,200 b.p. Most of the pottery remains showed signs of meat, fish and milk, but some of the rhyton-shaped items, and equally important, sieves, contained traces of fermented milk products such as yoghurt and cheese.

These findings go beyond any question of taste. Beyond early childhood, milk digestion is made more difficult, because the enzyme enabling lactose assimilation, lactase, is no longer produced in most populations of the world. However, milk fermentation for cheese or yoghurt reduces lactose content and thus would have made consumption possible for older children and adults, thought to have spurred a demographic boost and perhaps opened the door to spread of agriculture-practicing populations to Central and Northern Europe.

Summary from Donovan Thiebaud 'Des traces de fromages vieilles de 7 200 ans très parlantes' in *Libération*, 11 September 2018, https://www.liberation.fr/sciences/2018/09/11/des-traces-de-fromages-vieilles-de-7-200-ans-tres-parlantes_1677755 See full article in *PlosOne* https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0202807

Liquid coffee waste turned into electricity

Wikipedia Creative Commons, Coffee berries, 3 March 2011, Author Stanislaw Szydlo

The coffee industry generates a huge amount of liquid waste during the process of turning the raw material of the tree – the coffee cherries – into the 9.5m tons of coffee the world produces each year. Now, a programme at the University of Surrey, working with Colombian researchers, has proven that it can remove the contaminants from the water and make electricity in the process, using a fuel cell run on microbes that eat the waste matter and generate a small amount of energy. The small size and low cost should make it available to coffee farmers world-wide, giving at least a modest boost to farm finances and adding another point to the green energy economy. Coffee waste was already used as biofuel in compacted "biologs".

Summary from Adam Vaughan "UK scientists turn coffee industry waste into electricity" in *The Guardian* online, 14 Oct 2018 https://www.theguardian.com/business/2018/oct/14/uk-scientists-turn-coffee-waste-electricity-fuel-cell-colombia

Gao trees bring environmental change to African agriculture


Left: Wikipedia Creative Commons, Agroforestry in Burkina Faso with *Borassus akeassii* and *Faidherbia albida*, 2004, Marco Schmidt; Right: Creative Commons, S63 Road, Pafuri area, Kruger NP, South Africa, 5 December 2013, winter thorn (*Faidhrbia albida*) pods, Bernard Dupont, France.

Niger is one of the centres of a transformative re-greening, not through any UN project to offset climate change, but through small farmers promoting the gao tree (*Faidherbia albida*, known as winterthorns in English) for its benefits to crops, health and local economies, simply by not clearing saplings as they begin to thrive. Interestingly enough, this is taking place in high-density areas, where farmers understand they have no choice but to regenerate degraded land. The trees bring a multitude of advantages – high-quality fertilizer (one gao = 10 cows), nutritious animal fodder in their pods, firewood from branches that lighten the burden of women and children responsible for gathering cooking fuel. They are even a source of pocket money in the form of traditional medicines that are sold through local women's cooperatives.

Part of the motivation came through a change in ownership – until the mid-1980s, trees were considered property of the state in Niger. Once they became the property of the farmers whose land they were on, they were rigorously protected from outside firewood-gathering and grazing animals, so prospered. And because their root system is nearly as large as the branches, they fix nitrogen from the air and fertilize the soil around them, doubling yields (when used in combination with mineral fertilizers) as well as holding water effectively, a boost in drought years. Unlike other native trees, their leaves fall in the rainy season, thus letting more sunlight through to surrounding crops.

Over the last three decades, they have spread from the Senegal peanut basin to Mali, to the degraded soils of Burkina Faso and as far south as Malawi, with Niger counting over 200 million new trees, mainly gao. The down side? they are vulnerable to disease in areas where there is a gao monoculture. The Guardian online, 16 August 2018, https://www.theguardian.com/world/2018/aug/16/regreening-niger-how-magical-gaos-transformed-land

Tony Rinaudo, the trees-for-farms man, wins Right Livelihood Award

Photo: https://www.rightlivelihoodaward.org/laureates/tony-rinaudo/ (screen capture)

For his work on land regeneration, Australian agronomist Tony Rinaudo was recognised on 23 November in the 2018 Right Livelihood Awards, often described as the alternative Nobel, and focused on fields such as environmental protection, human rights, sustainability and peace. His regeneration technique, developed in West Africa 30 years ago, has helped bring back forest over 6 million hectares, from arid Somaliland to tropical East Timor.

Rinaudo moved to Niger in 1981, where he was in charge of a reforestation project that was failing miserably, as 80 or 90% of the trees in the planting project died. He noticed that the Niger landscape was full of what appeared to be small bushes, in fact, trees that had been hacked down. Species chosen for their environmental benefits, pruned and allowed to grow, are at the heart of farmer-led regeneration, without a multi-million dollar budget and years of work. On the contrary, everything needed was already in the ground, as the root system of the chopped-down trees remained alive under the ground – a still-living "underground forest".

The technique is compared to pruning a grape vine back to just one or two stems each season and is officially called **farmer-managed natural regeneration** (FMNR). It is, as Rinaudo says, an "embarrassingly simple solution" to what appeared to be an intractable problem. But it involved overturning generations of accepted wisdom, and a resistance to giving some land back to nature in countries where the perception was that you need every square inch of farmland to grow food crops. In Niger, he managed to convince ten farmers to try it and when yields were, at first, no worse, then better, then dramatically so, the new technique took off and reforestation of the landscape can be seen on satellite images from space.

At the UN's global climate talks in Katowice, Poland, Rinaudo quietly took his farming message from meeting room to meeting room, delegation to delegation, to demonstrate to agriculture leaders that the technique improves farming yields, reduces ground temperatures and retains water in the soil, as well as providing firewood and animal fodder. Equally important, the trees also act as a powerful carbon sink, with the potential to draw in billions more tonnes of carbon. Even if regeneration is not a silver bullet for climate change, there are 2 billion hectares of degraded land in the world and much of it can be restored to help pull carbon from the atmosphere. "We can do this very cheaply, we can do this very quickly, and we can do this at scale."

Note: the Right Livelihood Award was established in 1980 by German-Swedish philanthropist Jacob von Uexkull and is presented annually. The three cash awards are worth SEK 1 Million (EUR 96,000) each and are used to support the Laureates' successful work. The prize money is not for personal use.

See https://www.worldvision.com.au/global-issues/work-we-do/poverty/forest-maker for 3-step how-to video; On Right Livelihood Award: http://fmnrhub.com.au/tony-rinaudo-named-2018-right-livelihood-award-laureate/#.XBN-lNJKhdg and on the prize money: https://www.rightlivelihoodaward.org/wp-content/uploads/2018/09/General-PR-Final-EN-23-Sep-2018.pdf Extract and summary from Ben Doherty, reporting from Katowice, Poland, "Reforesting the world: the Australian farmer with 240m trees to his name" in *The Guardian online*, 13 December 2018

Rotterdam, Brexit, and "just-in-time" systems

Wikipedia Commons, Cosco Guangzhou, Rotterdam, 06-01-2009, AlfvanBeem

Rotterdam accounts for 180,000 jobs, 3.5% of Dutch economic output, and will be hard hit by Brexit, perhaps losing 0.9% of annual economic activity worth €450 (£400) per person by 2030. Assuming the UK leaves the EU's single market and customs union on 29 March 2019, Rotterdam will have to run checks on 10,500 suddenly "foreign" boats, now predicting a 30% increase in import inspections and a 100% increase in export inspections. There will then be vastly more form-filling, involving nine pieces of documentation instead of two at present, with consequent delays that will impact producers and supermarkets on both sides, especially the some 35,000 small and medium-sized Dutch companies that trade with the UK and have never lived in an age of massive paperwork. All Rotterdam's port facilities for customs checking of transiting goods were dismantled in 1993. The number of lorries passing through Rotterdam is five times that of 1989, many of them checked on to the ferry in 90 seconds.

Flikr, copyright free, 21-12-2009, https://www.flickr.com/photos/53133240@N00/4206360542

"Just-in-time" supply chains reign over the market today. Such finely tuned systems mean a British supermarket can order a crate of Dutch cucumbers at 8 a.m. and have them on the shelves before teatime. These "just-in-time" supply chains work on the principle of reserving neither space nor money for a surplus, meaning that so much less inventory greatly reduces operating costs. If stocks now kept for a few days must be increased to a few weeks' worth, businesses across the sector will need five to ten times the working capital they now possess and stockpiling itself has become highly problematic. At present, factories have enough storage space to manage a day's worth of deliveries, as do supermarket depots. Most UK factories rely on multiple daily deliveries to keep 24-hour production flowing and it is estimated that 18 to 36 hours without deliveries of ingredients would stop production in almost all of the UK's food sector, the country's largest manufacturing sector.

"Rotterdam prepared for worst when Britain crashes out of EU" by Jennifer Rankin, *The Guardian Online*, 22-09-2018 https://www.theguardian.com/business/2018/sep/22/rotterdam-prepared-for-worst-after-brexit (accessed 24-09-2018)

"Stockpile food in the event of a no-deal Brexit? Dream on" by James Ball, *Guardian Online*, 26-07-2018 https://www.theguardian.com/commentisfree/2018/jul/26/stockpile-food-no-deal-brexit-dream-on (accessed 24-09-2018)

Creative Commons, veal carcasses in the meat products sector of the Rungis International Market, France. 9 March 2011, Photo: Myrabella/Wikipedia Commons/CC By-SA 3.0

Farmers and food producers are among the most vulnerable businesses facing Brexit and the supply of seasonal harvest workers, mainly from eastern Europe, will be curtailed unless new immigration rules are brought in quickly. Of particular concern to the National Farmers' Union (NFU) is the impact on meat and food exporters who will face World Trade Organization tariffs making their products less competitive on the continent, as well as EU rules which may make them wait up to six months before they are certified as approved exporters to member states. British producers will be subject to the same health checks that that apply to countries such as China and the United States. Meat processing plants exporting to the EU will have to undergo individual audits by British authorities, which will then be checked by EU officials and put to a standing veterinary committee for approval, a process that the NFU has calculated will take six months "at a conservative reading". Abattoirs are also facing a shortage of official state veterinarians, 95% of whom are foreign, mainly from the EU, according to the British Veterinary Association (BVA) and the proposed £30,000 salary threshold for EU workers in Britain could lead to the elimination of veterinarians in public health roles in UK slaughterhouses.

Guardian authors on "Food prices to finance: what a no-deal Brexit could mean for Britain" in *The Guardian Online* https://www.theguardian.com/politics/2018/dec/30/food-prices-to-finance-what-a-no-deal-brexit-could-mean-for-britain

Rural crime a headache for farmers in Great Britain and France

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Offences against farmers and other rural businesses cost an estimated £44.5m in 2017, with the largest increase in Wales, followed by the Midlands, then the south-east, only Scotland and north-east England showing a decrease. The most targeted items were agricultural vehicles, including quad bikes accounting for 13% of total cost of rural crime, followed by tools and machinery. The estimated cost of livestock theft for the same year was £2.4m. It is especially the theft of large numbers of lambs that raises concerns they are being stolen for slaughter and processing outside regulated abattoirs before illegally entering the food chain.

The nature of rural crime changes quickly – ten years ago, it was unstructured. Today, it is done more often by organized crime with links to drugs, large-scale money laundering, even in some cases, human trafficking. In many cases, gangs are taking expensive machinery and shipping it across the world, winching it onto a vehicle and taking it straight to a port. This hits farming and rural communities at a time when police forces have reduced resources because of budget cuts. To fight back, farmers are using "medieval measures", putting up earth banks and dry ditches to block criminals who use 4 x 4 vehicles to get on to farm land, while some use guard animals such as geese, llamas and dogs. The NFU (National Farmers' Union) has launched a dedicated anonymous crime report website at Crimestoppers UK.

Summary from Haroon Siddique "Farmers using medieval methods to combat rural crime" in *The Guardian* online, 6 August 2018: https://www.theguardian.com/uk-news/2018/aug/06/farmers-using-medieval-methods-to-combat-rural?utm_source=esp&utm_medium=Email&utm_campaign=GU+Today+main+NEW+H+categories&utm_term=282780&subid=14928670&CMP=EMCNEWEML6619I2

Reports from France add another dimension – the theft of highly valuable GPS systems costing 10,000 to 20,000 euros, with one theft per day reported in 2017. Outright tractor theft, too visible, has declined, while robbing the machines of their high-precision instruments has soared, targeting especially large-scale cereal and rapeseed-producing areas. The only protection farmers find for the moment is to remove the equipment after every use and… get more insurance.

Summary from Eric de La Chesnais "Les vols de GPS de tracteur, nouveau fléau des campagnes' in *Le Figaro* online, 25 June 2018, http://www.lefigaro.fr/actualite-france/2018/06/25/01016-20180625ARTFIG00260-les-vols-de-gps-de-tracteur-nouveau-fleau-des-campagnes.php

Farmers turn to a new "crop" - willow-farming

Wikipedia Commons, Golden weeping willow *Salix* × *sepulcralis* (syn. *S. alba* 'Tristis'), Morton Arboretum acc. 58-95*1, 26 May 2008, Author Bruce Marlin, http://www.cirrusimage.com/tree_golden_weeping_willow.htm

Flooding is a major threat to farms near waterways, but some farmers have been protected by a new crop – willow trees – a "produce" encouraged by the Swedish firm Iggesund that makes premium cardboard packaging for Toblerone and L'Occitane and needed a sustainable source of wood chips for fuel to reduce their carbon footprint. A study indicated that willow trees would be the best energy crop because they are quick-growing (six inches

in a week is not unusual) and do not have particularly deep roots (a concern for farmers trying to grow other crops nearby). Farmers can earn £230-250 per acre per year and prices are guaranteed for 22 years, a boon in an increasingly marginal business. One sheep farmer turned to willow, among other diversifications because it costs £1.20 to shear a sheep while price for a fleece is 20p. Other farmers are simply interested in renewable energy with a cash pay-off and pleased with increased biodiversity brought by the willow. Planted by definition on moist soils, the "crop" has provided a second advantage in flood control.

Helen Pidd "Flood defenses: how willow proved to be a natural defender" in *The Guardian* Online, 30 December 2018, https://www.theguardian.com/uk-news/2018/dec/30/flood-defences-cumbria-how-willow-proved-to-be-a-natural-defender

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