

# Ag4Dev

## Agriculture for Development



No. 45 | Autumn 2022

### Open issue

- ▶ Crop genetic diversity: a personal journey
- ▶ GFAR revived and rebooted
- ▶ Refugees in Uganda: providing agricultural finance to increase autonomy and improve livelihoods
- ▶ International agricultural research news
- ▶ Smallholder farming and productivity: what we know and what really matters
- ▶ Transforming food systems: restating the case for small farms
- ▶ CGIAR reform: One CGIAR

- ▶ The imperative of food systems transformation in rescuing the SDGs: what role will the United Nations Food Systems Coordination Hub need to play?

### Bookstack

- ▶ Development aid: the good, the bad and the ugly
- ▶ Climate change 2022: impacts, adaptation and vulnerability (IPCC Report)
- ▶ Outstanding Seale-Haynians
- ▶ Advances in conservation agriculture, vol. 3
- ▶ Regenesi: feeding the world without devouring the planet

# Guidelines for Authors

## Agriculture for Development

The editors welcome the submission of articles for publication that are directly related to the aims and objectives of the Association. These may be full articles (<3500 words), Opinion pieces (500–1000 words), news items (<500 words) and letters to the editor, especially if reacting to previous publications in the journal. TAA news items are now made available through the TAA website: [www.taa.org.uk](http://www.taa.org.uk).

Only papers written in English are accepted. They must not have been submitted or accepted for publication elsewhere. Where there is more than one author, each author must have approved the final version of the submitted manuscript. The nature of TAA and its journal means that authors are welcome to cite personal communications where informative, but they must have obtained permission for inclusion in the piece from the colleagues cited before submitting for publication.

Papers should be written in a concise, direct style and should not normally exceed 3500 words. Please use Word and number the pages. Tables, figures and photographs may take a further 1 page or more, but we try to keep the total length of each paper to 3–4 pages of the journal. Good-quality photographs are particularly welcomed, as they add considerably to the appearance of the contents of the journal. We prefer high-resolution digital images, JPG format (*ie* separate from the Word file).

### Format

- An informative title not exceeding 10 words.
- Authors listed, usually with first name and surname.
- A short biographical note about each author is included for Articles and Opinion pieces, preferably with a photograph. If an author is still in employment, indicate position, affiliation and email address. If retired, your previous job (*eg* formerly Professor of Agriculture, ABC University); please also include a current email address.
- For Articles, a short abstract (summary) of 150–200 words.
- A short introductory paragraph is useful describing, succinctly, the current state of work in the relevant field.
- Système International (SI) units should be used. Other units should be related to SI units at the first mention. Percentages to be given in numerals (*eg* 6 percent).
- No full stops should be used with abbreviations such as Dr or Prof, or *eg*, *ie*, *status quo*, *viz* and *inter alia*. Acronyms and initialisms such as GFAR, FAO, IFPRI and GDP do not have full stops or spaces between the letters. Acronyms and initialisms should be spelled out in full at their first mention.
- Tens of thousands should be indicated with spaces, *eg* 12 000 or 475 600.
- Use UK rather than US spellings, and 'is' rather than 'iz' (*eg* fertiliser, organisation, mechanisation); 'ou' rather than 'o' (*eg* labour, favourable), *etc*.
- Do not use hyphens or dashes except where necessary for comprehension or clarity.
- For chemicals, a trade name may be given, but only if accompanied by the active ingredient and percentage (in parenthesis).
- Commercial equipment and products referred to should name the product and company, but addresses should be omitted.
- State any statistical methods used, *eg* analysis of variance (ANOVA), and ensure that the analysis method chosen is appropriate for the data. Data tables presenting, for example, mean values should include the appropriate standard errors (SE) and degrees of freedom (df).
- Results should be presented in an orderly fashion and make use of tables and figures where necessary.
- Discussion should focus on the work presented and its relationship with other relevant published work.
- Sources of funding should be listed in the acknowledgements.

### References

- Unless absolutely necessary, do not use footnotes. Cited references, referred to in standard Harvard (author, date) style (outlined below), should all be listed fully under the heading 'References' at the end of the article. Clarifications of definitions, *etc*, should be addressed in the core text of the article in the appropriate place.
- Key references should be cited, but these should be kept to a minimum.
- Only papers accepted for publication or published may be cited. Reference can be made to the author's own forthcoming publications if already accepted for publication and connected with the author's institute or university. Cite such material in the usual form, but replace date with "in press" or, for books still in their infancy, "forthcoming"; journal name or publisher location and name must be provided.
- In the text, cite by author's surname and date – (Waller, 2009) or Waller (2009). Use '&' between names of two authors; use '*et al*' for three or more authors.
- At the end of the paper, give full details of references in alphabetical order and in the journal style as per the examples below.
- Personal communications in the text should be cited as: initials, name, affiliation and/or location, personal communication.

**Journal (article):** Aguilar-Støen M, Moe SR, Camargo-Ricalde SL, 2009. Home gardens sustain crop diversity and improve farm resilience in Candelaria Loxicha, Oaxaca, Mexico. *Human Ecology*, **37**(1), 55–77.

**Journal (online):** Osbourne K, Dolman AM, Burgess S, Johns KA, 2011. Disturbance and the dynamics of coral cover on the Great Barrier Reef (1995–2009). *PLoS ONE*. <https://doi.org/10.1371/journal.pone.0017516>

**Book:** Brammer H, 2012. *The physical geography of Bangladesh*. Dhaka: University Press.

**Book (edited):** Fuglie KO, Sun Ling Wang, Ball E, eds, 2012. *Productivity growth in agriculture: an international perspective*. Wallingford, UK: CAB International.

**Book (chapter):** Warner K, 1997. Patterns of tree growing by farmers in eastern Africa. In: Arnold JEM, Dewees PA, eds. *Farms, trees & farmers: responses to agricultural intensification*. London: Earthscan Publications, 90–137.

**Conference proceedings (published):** McIntosh RA, 1992. Catalogues of gene symbols for wheat. In: Miller TE, Koebner RM, eds. *Proceedings of the Seventh International Wheat Genetics Symposium*, 1987. Cambridge, UK: Institute of Plant Science Research, 1225–1323.

**Agency publication:** Grace D, Jones B, eds, 2011. *Zoonoses (Project 1) Wildlife/domestic livestock interactions*. A final report to the Department for International Development, UK.

**Dissertation or thesis:** Lenné JM, 1978. *Studies of the biology and taxonomy of Colletotrichum species*. Melbourne, Australia: University of Melbourne, PhD thesis.

**Online material:** IPC, 2020. Malawi: Acute food insecurity update of projection November 2019 – March 2020. Integrated Food Security Phase Classification (IPC). <https://www.ipcinfo.org/ipc-country-analysis/details-map/en/c/1152329/?iso3=MWI>. Accessed 14 May 2021.

### Tables

- Self-explanatory with an appropriate title (caption) above the table, without abbreviations.
- Number with Arabic numerals, *eg* Table 2.
- Refer to tables in the sequence in which they are presented.

### Figures

- Self-explanatory with an appropriate caption below the figure, without abbreviations.
- Number in a separate series from the tables.
- Use Arabic numerals, *eg* Figure 2.
- Subdivisions within figures should be labelled with lower-case letters, *eg* a, b and c.
- For any text within figures (labels, keys, *etc*), please use Arial font of a suitable size.
- Photo captions must include the photographer's name (and affiliation); figure captions should include the source (unless original).
- The author must obtain permission to reproduce illustrations (graphs, tables, images) that have already been published, and include the text required by the rights holder either at the end of the caption or in the acknowledgements. If rights holder does not specify wording, use "reproduced with permission from X" or add the formula for a Creative Commons licence if one applies.

### Submission

Your paper should be submitted ready for editing and publication.

*Accepted text file types:* Word (.doc or .docx) or rich text format (.rtf) only.

*Accepted figure file types:* .tif, .eps, .jpg or .pdf. Indicate approximate location of each figure in the text, and be sure to provide a cross-reference within the body of the text.

All photographs should be submitted as separate JPG files with an indication in the text of where each photo should be placed.

No lecture notes or PowerPoint presentations, please. PowerPoint presentations can be submitted to the webmaster for possible use on the TAA website news pages. However, please indicate when a figure has been created in PowerPoint, as the editors might ask for the file so we can make modifications.

Send submissions via email to [editor\\_in\\_chief@taa.org.uk](mailto:editor_in_chief@taa.org.uk), preferably in an attached file.

### Copyright

*Agriculture for Development* holds the copyright of all published articles, but the authors retain the right to publish all or part of an article elsewhere, with due acknowledgement.

### Cover images

High-quality colour images, suitable for the cover of *Agriculture for Development*, are welcomed and should be sent to the Editor-in-Chief ([editor\\_in\\_chief@taa.org.uk](mailto:editor_in_chief@taa.org.uk)).

December 2021



Odete, a refugee farmer now living in Uganda, has benefited from agricultural finance and is making her living as a vegetable grower – see Opinion 1 (pp14–16) (Photo: Kate Holt, taken in Uganda 2019. <https://aretestories.com/>)





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## BC Committee

### The Tropical Agriculture Association (TAA) is a

professional association of individuals and corporate bodies concerned with the role of agriculture for development throughout the world. TAA brings together individuals and organisations from both developed and less-developed countries to enable them to contribute to international policies and actions aimed at reducing poverty and improving livelihoods. It grew out of the Imperial College of Tropical Agriculture (ICTA) Association, which was renamed the Tropical Agriculture Association (TAA) in 1979. Its mission is to encourage the efficient and sustainable use of local resources and technologies, to arrest and reverse the degradation of the natural resources base on which agriculture depends and, by raising the productivity of both agriculture and related enterprises, to increase family incomes and commercial investment in the rural sector. Particular emphasis is given to rural areas in the tropics and subtropics and to countries with less-developed economies in temperate areas. TAA recognises the interrelated roles of farmers and other stakeholders living in rural areas, scientists (agriculturists, economists, sociologists, etc), government and the private sector in achieving a convergent approach to rural development. This includes recognition of the importance of the role of women, the effect of AIDS and other social and cultural issues on the rural economy and livelihoods.

**Editorial Committee:** Karim Hussein (Chair and Editor-in-Chief *Ag4Dev*), James Biscoe, Michael Fitzpatrick, Paul Harding, Shantanu Mathur, Patrick McKenna, Jamie Morrison, Brian Sims, Alastair Taylor, Andrew Ward, Elizabeth Warham (Technical Editors), Peter Gardiner, Amir Kassam, Matt Sullivan (website)

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Tel: +39 348 760 6276

ISSN 1759-0604 (Print)

ISSN 1759-0612 (Online)

# Editorial

## Karim Hussein (Editor-in-Chief)



*Karim Hussein has worked for more than 25 years in development-oriented research and development policy and practice. He has worked for international organisations such as International Fund for Agricultural Development (IFAD), Food and Agriculture Organization of the United Nations (FAO), Organisation for Economic Co-operation and Development (OECD), Global Forum for Rural Advisory Services (GFRAS) and United Nations Human Settlements Programme (UN-Habitat) in a range of staff and consultancy positions in advisory, policy, research and programme management roles relating to work in Africa, Asia and Latin America.*

[editor\\_in\\_chief@taa.org.uk](mailto:editor_in_chief@taa.org.uk)

The world faces a new, deep and multi-layered food crisis due to the continuing effects of the COVID-19 pandemic, the impacts of climate change and now the war in Ukraine. The war seems to be setting in for the long haul and is already having enormous effects on global food security – with effects touching developed and developing countries across regions.

Evidence discussed at a special Global Donor Platform for Rural Development (GDPRD) meeting on 20 May 2022, showed how international prices for the 3Fs – food, fuel and fertiliser – are increasing at alarming rates in the wake of the war in Ukraine. Russia and Ukraine are among the top exporters of wheat, maize and sunflower oil; hence the Platform notes that: *“countries that rely heavily on these imports are increasingly vulnerable, as food availability declines while prices of food, fuel and key agricultural inputs reach record highs. In addition, Russia is the world’s largest exporter of nitrogen-based fertilizer and the second largest exporter of potassium- and phosphorus-based fertilizers. Soaring prices of agricultural products are putting small-scale producers at risk for the upcoming harvest season, with the potential to have detrimental impacts on food security and livelihoods”* (see GDPRD webpages: [www.donorplatform.org/latest-detail-general/addressing-the-impacts-of-the-war-in-ukraine-on-3f-food-fuel-fertilizer-prices-for-rural-small-scale-producers.html](http://www.donorplatform.org/latest-detail-general/addressing-the-impacts-of-the-war-in-ukraine-on-3f-food-fuel-fertilizer-prices-for-rural-small-scale-producers.html)).

Coupled with the dramatic effects on economic growth in the short to medium term, there is a growing consensus that this will have an enormous impact on food and agriculture in the medium to long term.

In this context, it becomes all the more important for journals such as *Ag4Dev* to exist. They can mobilise expertise, impartial analysis and evidence-based thinking to inform policies and investments to assist the transformation of agriculture required in the diversity of contexts that exist across the rural, agriculture and natural resources sectors. They can identify issues, challenges and potential medium and

long-term solutions to the evolving agricultural and food crisis – based on experience in the sector and across the globe. Identifying responses that work will require creative, innovative and transformative agricultural, technological, social and policy solutions, which the contributors to *Ag4Dev* are perfectly able to provide from their vast experience in agriculture, food and rural livelihoods.

***Now is the time to draw on and capitalise on your knowledge and experience in agriculture for the good of global development, all people and peace.***

The international development community and country-level decision makers need it. We at *Ag4Dev* call upon our readers to dig into their experience to offer lessons and paths forward to assist the transformations required to assure livelihoods of poor people in agriculture and food security, seek to foster international cooperation and peace, to help the world get back on track with the Sustainable Development Goals (SDGs) as soon as humanly possible. ***I would like to call for evidence-based analytical, research and news articles that address these challenges, in the immediate, medium and long term, for a special issue of Ag4Dev in 2023 devoted to this strategic set of issues.*** As there will henceforth be two issues of the journal per year, I would hope to receive contributions by the beginning of 2023 for *Ag4Dev* 47, Summer 2023. Please reflect on how you might be able to contribute.

In this Open Issue of *Ag4Dev*, I am delighted to be able to present a range of articles from the Tropical Agriculture Association (TAA) community and beyond that draw on practical, technical experience in agriculture and development coupled with policy-oriented contributions highlighting key initiatives and processes on inclusive agricultural and rural transformation at the international and country levels.

This issue begins with a seminal piece by the TAA Agriculturalist of the Year in 2021, Geoff Hawtin. His



opening article addresses the strategic question of crop genetic diversity and the author's personal journey to understand the importance of this through his work over the decades. This is followed by an important article by Ravi Khetarpal and Hildegard Lingnau, the current Chair and Executive Secretary of the Global Forum for Agricultural Research and Innovation (GFAR), on their vision for a revived and rebooted GFAR. A third article by David Suttie focusses on the food systems of the future and the role for small farms. The author reflects on the implementation of the commitments made at the United Nations Food Systems Summit (UNFSS), which was the subject of an earlier Special Issue of *Ag4Dev* (No. 42). We welcome letters and Opinion pieces by TAA members on these perspectives as *Ag4Dev* increasingly seeks to position itself as a key forum for informed debate on such strategic questions.

We are privileged to present a number of Opinion pieces offered on strategic international topics by TAA members, partners and external readers. First, from Emily Wilson of Opportunity International, a contribution on how farming can help solve the refugee crises in Uganda through the provision of agricultural finance to increase autonomy and improve livelihoods. A second Opinion piece by Patrick McKenna, Lydia Smith and Jonathan Leake explores the issue strategic to many international organisations involved in supporting agricultural and rural development: Smallholder farming and productivity: what we know and what really matters. A third Opinion piece by Shantanu Mathur addresses the challenges of achieving a One CGIAR reform that reaches its intended objectives. This is intended to spark further debate and responses to be published in future issues of *Ag4Dev* to usefully inform the reform process. Shantanu formerly held senior positions in IFAD and represented the Fund in GFAR and CGIAR for over 20 years.

We are pleased, as usual, to present the regular contribution by Peter Gardiner reviewing International Agricultural Research News, which examines livestock vaccines in the COVID era. The issue is strategic, as COVID-19 and its impacts in agriculture in developing countries remain a key challenge for agriculture and global development, alongside climate and conflict.

In addition, we are grateful for contributions to our Mailbox section, providing insights on land use, agriculture, food security, climate change and development in Bangladesh from Robert Brinkman and how to end hunger in times of crises – a publication by Ignacio Trueba and Andrew MacMillan.

We include in this issue a news item of wide interest to members and institutions working in agriculture for development on progress on the SDGs and UNFSS follow-up, by Stefanos Fotiou, Director, Office of Sustainable Development Goals at FAO and Jamie Morrison. We are delighted that Jamie and Shantanu have agreed to join the *Ag4Dev* Editorial Team. Their wide and long experience in key institutions in agriculture and food will surely strengthen *Ag4Dev* and widen its reach.

*Ag4Dev45* includes three book reviews in the Bookstack section.

*Ag4Dev46* (Winter 2022) will be a Special Issue on Conservation Agriculture, guest edited by long-term TAA members, Terry Wiles and Amir Kassam.

I would like to note here that we are deeply saddened to announce the passing of Matt Dagg and David Trotman. Obituaries are included in this issue to appreciate their lives, work and contributions to agriculture for development.



Photo: © FAO/Giulio Napolitano

# Crop genetic diversity: a personal journey

## TAA 2021 Development Agriculturalist of the Year acceptance speech

**Geoffrey Hawtin**



*Geoffrey Hawtin is an agricultural scientist with expertise in agrobiodiversity, genetic resources, plant breeding and research management. He has headed two CGIAR Centres: International Center for Tropical Agriculture (CIAT) in Colombia and Bioversity International (then International Plant Genetic Resources Institute [IPGRI]) in Rome. He was founding CEO of the Global Crop Diversity Trust; Director of the Agriculture, Food and Nutrition Sciences Division of International Development Research Centre (IDRC), Canada; and was Deputy Director General of International Center for Agricultural Research in the Dry Areas (ICARDA), Syria. He has served on several Boards of Trustees, including those of the Royal Botanical Gardens, Kew, UK, and Tropical Agricultural Research and Higher Education Center (CATIE), Costa Rica. He has MA and PhD degrees from Cambridge University, is a 'correspondant étranger' of the Académie d'Agriculture of France, and has been awarded the Frank Meyer Medal for Plant Genetic Resources by the Crop Science Society of America. In 2017 he was awarded an OBE for "services to global agrobiodiversity conservation, subsistence livelihood enhancement and sustainable food programmes".*

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**Figure 1. Ghana 2001. Geoff being shown fra fra potatoes (*Solenostemon rotundifolius*)** (Photo: Courtesy of Geoffrey Hawtin)

Firstly, I would like to thank the Tropical Agriculture Association for awarding me the unexpected honour of being named Development Agriculturalist of the Year. Such recognition from one's peers is humbling but greatly appreciated.

I would like here to give an overview of the importance of crop genetic diversity to agricultural development and provide a personal account of how its conservation and use have evolved over the past half century (Figure 1).

In June of 1969 I was approached by my agricultural botany lecturer in Cambridge, the wonderful Alice Evans, to see if I was interested in doing a PhD on genetic variation in soybean. If so, she would help me get funding from the Overseas Development Administration's 'Study and Serve Scheme' to support my fieldwork at Makerere University, Uganda. I jumped

at the chance, and thus began both a long overseas career and a lifelong interest in genetic resources.

### Breeding food legumes at ICARDA

My first job after finishing my doctorate was as a plant breeder with the Ford Foundation's Arid Lands Agricultural Development programme (ALAD), based in Beirut, Lebanon. In 1977, when CGIAR set up the International Center for Agricultural Research in the Dry Areas (ICARDA) in Aleppo, Syria, it absorbed ALAD, and I was appointed leader of the new Center's Food Legume Improvement Programme. Our research, on faba bean, lentil and chickpea, aimed to contribute to improving human nutrition, diversifying agriculture and enhancing environmental sustainability in a region that extended from Morocco to Pakistan and from Turkey to Ethiopia.

I quickly learned that in initiating a breeding programme, two things are essential. Firstly, to find out what traits are important to farmers and their families. This was achieved through a series of surveys, interviews and participatory research. Secondly, to assemble as large a collection as possible of different landraces, farmers' varieties, improved varieties, crop wild relatives and other diverse genotypes, within which to search for genes conferring the desired traits.

To build the food legume collections, we acquired material from various research institutions elsewhere, especially in India, Iran and the USA. In addition, we undertook an extensive programme of field collecting throughout the region. I personally participated in expeditions to Afghanistan, Ethiopia, Lebanon,



Jordan, Syria and Turkey. Obviously, collecting in some of these countries would be very difficult, if not impossible, today. Furthermore, many of the varieties existing then have since disappeared, having been replaced by new ones or different crops. It is thus vital we continue to conserve the material collected at that time: much no longer exists elsewhere.

### In-trust germplasm collections

Starting in the 1970s, not only ICARDA but also many other CGIAR Centres, began to assemble large collections of crops of interest to them. They built specialised laboratory and cold storage facilities, known as gene banks, in which to conserve the material. The Centres now collectively maintain more than 750 000 different samples; however, these efforts have not been uncontroversial.

CGIAR was increasingly portrayed by its critics in the 1980s and early 1990s as an agent of the industrialised world. Accusations of 'biopiracy' began to be levelled against the Centres, especially by a few small but influential NGOs. The Centres were depicted as acquiring genetic diversity for their collections that had been bred and selected by farmers in developing countries, in order to channel it to private breeding companies in industrialised countries. These, in turn, would then restrict its further use through the application of intellectual property rights. Such arguments were widely aired despite all available data showing that the large majority of recipients of material from the Centres were international and public sector institutions in developing countries.

The situation was coming to a head in 1991, at the time I was appointed director of the International Board for Plant Genetic Resources (IBPGR), and subsequently when I became head of its successor, the International Plant Genetic Resources Institute (IPGRI – now Bioversity International). Various heated public exchanges took place with activist NGOs on this issue, one of the most notorious being at the final negotiating session of the Convention on Biological Diversity (CBD) in Nairobi in May 1992. As a result of these confrontations, CGIAR and the Food and Agriculture Organization of the United Nations (FAO) decided to try to settle the issue of the status of the collections once and for all. On behalf of CGIAR, I headed the discussions with FAO that resulted in the Centres declaring that the collections were not their property but were held by them in trust for the world community. No intellectual property protection measures would be allowed on the material itself, and it would be made available without restriction to all *bona fide* individuals and organisations. Agreements to this effect were signed with FAO in 1994 and resulted in much improved relations with the NGOs concerned.

## The International Treaty on Plant Genetic Resources

Although things eased politically for the Centres, there was a strong and growing international move to have biodiversity – including genetic resources – accepted as a national sovereign asset. This was recognised in the CBD which came into force at the end of 1993 and which promoted the granting of access to biological materials based on bilaterally negotiated terms and conditions.

While bilateral arrangements may be appropriate in many situations, such as bioprospecting for pharmaceuticals, they are much less suitable for crop genetic resources. Historically, these have been very widely shared among farmers and breeders, and it is extremely hard, and often impossible, to establish origins and ownership rights. Furthermore, the extensive international movement of crops over centuries has resulted in a very high interdependence among nations for genetic resources. A modern cereal variety, for example, might have parental lines originating in over 20 different countries and be grown by farmers in many more. In such situations, it is practically impossible to negotiate appropriate terms and conditions of access on a bilateral basis with every institution or country that is willing to provide or wants to acquire genetic resources.

Recognising this, in 1993 FAO launched negotiations to establish a new international agreement that, while in line with the CBD, would address the specific situation of crop genetic resources. Although the formal negotiations were carried out between national government representatives, CGIAR was present at every negotiating session to provide technical advice. As leader of the CGIAR delegation, I attended almost all the sessions over an 8-year period, until the text was agreed in 2001. Following the required ratification by 40 countries, the International Treaty on Plant Genetic Resources for Food and Agriculture finally came into force in 2004. To date, 147 countries have agreed to adhere to it. The Treaty sets out the terms and conditions of a multilateral system for accessing the genetic resources of 35 food and 29 forage crops, and for sharing the benefits arising from their use. It requires recipients of genetic resources, under specified conditions, to pay a share of any royalties received into a multilateral fund. The fund, in turn, is used to support the conservation and use of plant genetic resources around the world, and especially by farmers in developing countries.

### International Plant Genetic Resources Institute (now Bioversity International)

I was fortunate to head IPGRI from 1991 to 2003, a period that saw growing interest and support for plant genetic resources worldwide. With generous donor



financing we were able to considerably broaden the programmatic focus beyond *ex situ* conservation. Under a new institutional strategy, 'Diversity for Development', research programmes were initiated on *in situ* and on-farm conservation, socio-economics, policy, forest genetic resources, crop wild relatives, neglected and underused crops, dietary diversity and bioinformatics. Running through it all was an increased effort to promote a greater use of plant genetic resources as an underpinning for agricultural and economic development (Figure 2).



**Figure 2. IPGRI stand at CGIAR AGM Manila 2002**  
(Photo: Courtesy of Geoffrey Hawtin)

IPGRI was first and foremost a research organisation. However, while further research was and still is needed, it became abundantly apparent that conservation was often limited more by a lack of sustained funding than a lack of knowledge about what to conserve or how best to conserve it. This was brought home in the late 1990s when IPGRI received a request from an African national gene bank for help to pay for the electricity to keep its cold stores operating. A European development agency had earlier provided finance to construct the small but highly effective and functional gene bank. However, what was now lacking was money to keep the facility operating. For the want of about USD 5000, the entire seed collections could have been lost. Clearly what was required was a mechanism that would provide a steady, reliable and long-term source of funding.

## Global Crop Diversity Trust

This realisation led to the idea of creating a non-wasting endowment fund, the investment proceeds from which would provide a dependable source of income to support *ex situ* conservation in perpetuity. With this in mind, much of my time during my final years at IPGRI was devoted to setting up such a fund. The possibility of it being managed by either FAO or CGIAR was extensively explored, but for various

reasons neither were deemed suitable. It was thus established, in 2004, as an autonomous institution under international law as the Global Crop Diversity Trust (Crop Trust). Although independent, its constitution ensured close ties were maintained with both FAO and CGIAR, and it quickly became formally recognised as an essential component of the benefit-sharing mechanism of the International Treaty.

The Crop Trust's goal is to support the long-term conservation and availability of crop genetic diversity as a key contributor to sustainable food security. It operates through promoting and financing an efficient, goal-oriented, global system of *ex situ* conservation, in line with the International Treaty. As its founding director, I led the creation and institutional development of the Crop Trust and oversaw the raising of the initial USD 50 million of its endowment fund. Since then, the fund has grown to almost USD 400 million and approximately USD 60 million of its investment income has been granted to gene banks around the world to help them maintain their collections. This is in addition to funds provided for specific projects to help regenerate ageing collections and to expand the number of samples of crop wild relatives conserved *ex situ*.

## Svalbard Global Seed Vault

In addition to dependable funding, a truly secure global system for conserving crop diversity requires that all samples be duplicated elsewhere in a different facility, ideally in a different country. Thus, should anything happen to the original sample, a backup will be available, and the unique genetic make-up of the sample will not be lost. It is common practice among gene banks to house duplicates of all their material at another site, often under 'black box' arrangements by which all rights over the material are retained by the depositor. Many gene banks make reciprocal arrangements for this. However, as an additional safety measure, the Norwegian Government has provided a facility on the island of Spitsbergen, in the Svalbard archipelago, to house duplicate sets of collections from around the world, at little or no cost to the depositor.

The idea for the Svalbard Global Seed Vault originated in the 1980s when the Norwegian Government invited FAO and IBPGR to explore the feasibility of creating an international backup seed store in Svalbard, modelled on the facility operated by the Nordic Gene Bank (now NorGen) in a disused coalmine. Although found technically feasible, the idea was shelved because few countries were willing to deposit their seeds in such a facility in the absence of an international agreement covering ownership, access and user rights. However, with the adoption of the International Treaty, interest revived and a second feasibility study, of which I was part, was undertaken in 2004. The study

recommended that the initiative go ahead and laid out some of the key requirements. I was then requested by the Norwegian Government to draw up technical specifications for the seed vault, and the construction went ahead with the opening of the vault taking place, with grand fanfare, in 2008.

Built by the Norwegian Government as an internationally available, backup seed store, the Svalbard Global Seed Vault is located in the permafrost, 120 metres inside Platåberget Mountain near the town of Longyearbyen, just 1000 kilometres from the North Pole. It was constructed to hold 4.5 million seed samples at a temperature of  $-18^{\circ}\text{C}$ . While overall responsibility for the Seed Vault rests with the Norwegian Government, technical management is overseen by NorGen, and the Crop Trust funds the operating costs. The vault currently houses more than 1.25 million samples of almost 5500 agriculturally related species from 89 different gene banks around the world. Even with global warming and sea-level rise, the vault will remain one of the coldest and safest places on Earth in which to store seeds (Figure 3).



**Figure 3. Svalbard Global Seed Vault in 2014**  
(Photo: Courtesy of Geoffrey Hawtin)

The Vault has already proved its value on several occasions. The ICARDA collections, for example, were duplicated in Svalbard for safety soon after the facility was opened. When ICARDA's gene bank and the original collections it housed were destroyed by the fighting in Aleppo, the duplicate samples were sent from Svalbard to Morocco for regeneration. These

were multiplied, and fresh seed stored in ICARDA's new gene banks in Lebanon and Morocco. Further duplicate samples have now also been returned to Svalbard for a second round of safe keeping. Interestingly, and coming full circle, this included accessions that I had helped collect in the 1970s.

With an annual running cost of about USD 300 000, the Svalbard Global Seed Vault must rank among the world's best insurance policies.

## Conclusions

Plant genetic diversity remains as important today as it was when I started out as a plant breeder more than 50 years ago. New crop varieties offer one of agriculture's best tools for helping tackle the multiple challenges posed by climate change, growing populations, shifting dietary preferences, new pests and diseases, and continuing environmental degradation. At the same time, vastly more powerful genetic techniques and bioinformatic tools are providing novel ways to identify and use genetic material. As a result, the genetic diversity of species that may be only very distantly related to our crops is becoming ever more valuable for crop genetic improvement. This, in turn, is opening new possibilities for using the resources maintained in other, non-agricultural gene banks, such as that of Kew Garden's Millennium Seed Bank. This world-leading facility, which houses seeds of about 40 000 different plant species, is increasingly collaborating with plant breeders and other scientists in agricultural research institutions such as the CGIAR Centres.

The considerable accomplishments of the past half century have resulted in a dramatically improved situation: from the creation of large international gene banks holding hundreds of thousands of samples in trust for humanity, to the Svalbard Global Seed Vault that offers a safety net for the world's collections. And these developments have been greatly facilitated by the establishment of the International Treaty's legally binding policy framework and by the long-term financing provisions of the Crop Trust.

However, despite these advances, more remains to be done. Even as genetic diversity has assumed ever greater importance, much of it is still threatened in the wild, on farmers' fields and even in some of the gene banks that are intended for its preservation. Likewise, more needs to be done to conserve crops that cannot be stored as seeds, crop wild relatives and crops that are regarded as only minor today but that might well become important in the future. Only when the full range of our priceless crop genetic heritage has been secured can we rest assured that it will continue to be available for the benefit of generations to come.

# The Global Forum on Agricultural Research and Innovation (GFAR): revived and rebooted

Ravi Khetarpal and Hildegard Lingnau



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## Abstract

In this article, the new Chair and Executive Secretary of the Global Forum on Agricultural Research and Innovation (GFAR) lay out their vision for the Forum in the new context defined by the European Commission's 'Development Smart Innovation through Research in Agriculture' initiative, the Food and Agriculture Organization of the United Nations' (FAO) new Office of Innovation and the UN Food Systems Summit. Convinced that networking with initiatives in the global South is more important than ever in order to support countries and regions to achieve the Sustainable Development Goals (SDGs) with limited resources and under heavy constraints, they aim to revive the 'network of networks' (with

over 650 members from the global South) along the following lines:

- For and by small-scale farmers in the global South;
- Bottom-up instead of top-down;
- Innovation-oriented;
- Focussed on achievement of the SDGs;
- Value-based (fair).

## Partnerships matter

It took many years for the global community to realise that global goals can only be achieved if actors around the world, from different constituencies, work



together as partners. To this end, the 2030 Agenda for Sustainable Development (UN General Assembly, 2015) dedicated global goal 17 to implementing and revitalising global partnership.

However, the question remains *how* to partner? How to turn the traditional top-down approach into a bottom-up cooperation? The Development Assistance Committee of the Organisation for Economic Co-operation and Development has come up with an answer – the criteria for effective development cooperation – and monitors to what degree providers of development cooperation:

- respect the ownership of countries of the global South; and
- align their support to countries' policies and priorities (OECD, no date).

In agricultural research, bottom-up cooperation is unfortunately not often realised in the true sense. Agricultural research is still very much driven by a few big international players who often have their own agenda, while national agricultural research systems (NARS) are generally not very much involved (if at all) and farmers' organisations even less so.

This is all the more surprising since insufficient partnering with countries of the global South is a well-known problem and has been recently stressed again by the UN Food Systems Summit (UNFSS).

The importance of partnership has been known since GFAR was established by FAO, International Fund for Agricultural Development (IFAD), the International Service for National Agricultural Research (ISNAR) and the World Bank 25 years ago, with the mandate to mobilise all the stakeholders involved in agricultural research for development and to support their efforts to alleviate poverty, increase food security and promote a more sustainable use of natural resources.

This was rightly emphasised once more by the UNFSS last year. The Secretary-General's Chair Summary and Statement of Action on the UNFSS clearly states:

*"We must support national mechanisms that develop and implement national pathways to 2030 that are inclusive and consistent with countries' climate commitments, building upon the national food systems dialogues. With the UN system and all relevant stakeholders, including the International Finance Institutions, private sector, and civil society playing a pivotal role in supporting country implementation" (UN, 2021).*

So, if the UNFSS agreed that the *"follow-up to the Summit will build on existing efforts of countries and*

*supporting organizations"* (UN, 2021), what needs to be done in order to live up to this challenge of working in partnership – bottom-up instead of top-down?

There is no need to create a new partnership to bring together small-scale farmers, national agricultural (research and innovation) systems and other relevant actors who can offer diverse perspectives (including indigenous knowledge and science-based evidence). It already exists: GFAR is a network of networks with over 650 members from 13 constituencies in the global South including national and regional agricultural research organisations, farmers' and consumer organisations, youth and women's organisations, governmental and non-governmental, from the public, but also from the private sector, all sharing GFAR's vision and mission.

The network has huge potential. Much more can and should be done to achieve the transformation of agri-food systems as set out in the five action areas of the UNFSS (UN, 2021):

1. Nourish all people;
2. Boost nature-based solutions;
3. Advance equitable livelihoods, decent work and empowered communities;
4. Build resilience to vulnerabilities, shocks and stresses;
5. Accelerate the means of implementation.

Here we present our vision on what GFAR should be doing and how it should be done.

## Our strategic vision

We would like to highlight our new strategic vision for GFAR's way forward. This will explain GFAR's capacity to establish its mission or purpose, to determine long-term objectives, to make a substantive analysis of our performance relative to other global agencies engaged in agricultural research and innovation, and to set parameters for growth and value addition based on Partnership Principles.

## Our vision for GFAR I: What will GFAR be doing?

GFAR will facilitate collective actions – a GFAR Collective Action is a multistakeholder programme of work at national, regional and international level initiated by three or more Partners and prioritised by the Global Forum. GFAR aims to contribute in this way to the SDGs – especially to SDGs 1, 2 and 17. As GFAR Chair and GFAR Executive Secretary, we have the ambition to achieve this by making agri-food research and

innovation systems more responsive and equitable towards achieving the SDGs.

To transform agri-food systems, small-scale farmers need to be centre stage: their farms account for 84 percent of all farms worldwide, but they manage only around 12 percent of all agricultural land by area, and produce roughly 35 percent of the world's food (Lowder *et al*, 2021). This is the main result to be achieved by GFAR via the European Commission (EC) funded project 'Reconnecting the world: The GFAR Partnership transforming agri-food research and innovation for development impact' (EC DeSIRA & GFAR, 2020): farmers and communities are empowered at the centre of innovation.

To truly put small-scale farmers (especially female and young farmers) centre stage, they need to have stronger agency and voice (no symbolic action, no tokenism) to play their recognised role.

### **Establishing Partnership Principles as a global standard**

In view of the importance of partnerships, we aim to establish Partnership Principles as a global standard. Having worked in the field of agricultural research for many years, we regret to say that a lot of agricultural research has not been done in a way that leverages and maximises partnerships of key stakeholders on the ground. The NARS often continue to be overlooked or marginalised by well-funded global / Northern agricultural research and development institutions. This is what we hear again and again from most of our members. Even though progress is being made towards collaborative research, this is not happening in a standardised or systemic way. Too often, local players who have better ideas on sustainability of the outputs and outcomes of such a research effort are not involved.

The transformation of agri-food systems can only happen if partnering with the most important actors, *ie* small-scale farmers in the global South and their organisations, becomes our standard *modus operandi*; and if everything else (research, innovation, extension, training and investments) focusses on them. This requires partnering with all stakeholders, and this is why GFAR was established. It is still – and maybe more than ever – its *raison d'être*.

Accordingly, the most important mission for GFAR is to connect its members with existing agricultural research endeavours, to cooperate and to complement, not to compete with them. This is why GFAR, together with the Commission for Research Partnerships with Developing Countries (KFPE) of the Swiss Academy of Sciences (SCNAT), has developed Partnership Principles. The Partnership Principles are

derived from KFPE's original 11 principles of research partnership:

1. Decide on the objectives together;
2. Build up mutual trust;
3. Share information;
4. Develop networks;
5. Share responsibility;
6. Create transparency;
7. Monitor and evaluate the collaboration;
8. Disseminate the results;
9. Share profits equitably;
10. Increase research capacity; and
11. Build on the achievements.

This is perhaps the single most important thing that GFAR can do: to establish these principles as a global standard in order to ensure that agricultural research is conceived, designed, carried out and followed-up in partnership with the most important actors – small-scale farmers.

By applying these Partnership Principles to our own Collective Actions and to Swiss research projects, and then bringing them to global fora (such as One CGIAR), GFAR aims to facilitate the identification and stimulation of agricultural research and innovation by and for farmers, and to avoid agricultural research and innovation that is top-down.

### **An innovation survey**

Innovation is the only way to tackle the huge challenges of poverty reduction and hunger. Innovation is about achieving better results, while maximising impact with fewer resources and/or different inputs. To make this magic happen, agricultural research and innovation need to be done more closely with the key actors, *ie* small-scale farmers.

One example of this comes from Palestine. When land and water had been taken away from Palestinians and agriculture had been reduced to 3 percent of gross domestic product (GDP), it was possible to launch innovative climate smart agriculture because the World Food Programme (WFP) prudently weighed people's constraints in the region to guide investment and partnerships. WFP worked with a local agricultural research organisation (Agricultural Research Institute in Jerusalem [ARIJ]), leading to the co-development of small-scale hydroponic systems which the poorest of the poor were able to run on their rooftops and in their backyards. These not only improved their livelihoods (food, income) but also their nutrition (because the

best produce to grow in these small-scale hydroponic systems is vegetables).

To find out more about the potential of, and constraints to, innovations on the ground, GFAR will undertake a survey among all its 659 members. This will complement an in-house survey, implemented last year by FAO. We are excited to see what we will find and we will follow up on our members' ideas through future Collective Actions.

### Collective Actions

Based on needs and priorities previously voiced by our members, GFAR is currently facilitating two Collective Actions: a Collective Action on Forgotten Foods and a Collective Action on Inclusive Digital Agriculture.

The Collective Action on Forgotten Foods (GFAR, 2022a) has facilitated broad and intensive multistakeholders' consultations in Africa, Asia-Pacific and the Middle East, together with regional research organisations and their partners, in particular Association of Agricultural Research Institutions in the Near East & North Africa (AARINENA), Asia-Pacific Association of Agricultural Research Institutions (APAARI) and Forum for Agricultural Research in Africa (FARA), supported by the Alliance of Bioversity International and International Center for Tropical Agriculture (CIAT) and Crops for the Future. Thousands of actors from many countries have constituted novel communities of practices which converged on a shared perspective for the transformation of research and innovation systems – the Global Manifesto on Forgotten Foods (GFAR, 2021) – identifying the co-innovation steps needed for unleashing the full potential of traditional crops to make agri-food systems more resilient and nutritious. The scale and scope of this initiative are unprecedented and represent a big step forward on the global forgotten foods agenda, which now can rely on a comprehensive and consistent framework: the Global Forgotten Foods Plan of Action.

The Collective Action on Inclusive Digital Agriculture (GFAR, 2022b) fosters farmer-centric, multistakeholder activities leading to best practices and business models that empower farmers to play their important role as co-innovators in the design, governance and benefit sharing of digital agriculture solutions. The first activities started in Latin America and the Caribbean in August 2021 under a partnership between the Forum of the Americas for Agricultural Research and Technology Development (FORAGRO), the Confederation of Family Producers Organizations of the Expanded Mercosur (COPROFAM), the Global Open Data for Agriculture and Nutrition (GODAN) initiative and the AgGateway consortium of digital

agriculture solution providers. Activities are being planned in Asia-Pacific under a partnership between APAARI and the Asian Farmers' Association (AFA), while an inter-regional Task Force has been established under the auspices of FARA.

This year GFAR will engage in two other Collective Actions: one on Family Farming and one on Transformational Learning. The next one in the pipeline is a Collective Action which helps small-scale farmers to tackle climate change challenges. We are currently also considering a Collective Action on agroecology.

### Our vision for GFAR II: How will GFAR be working?

To revive and bring GFAR to its full potential, we also aim to improve GFAR's way of working through in-house consultations and collective wisdom in order to best serve our members.

#### An independent evaluation and seven recommendations

An independent evaluation undertaken in 2018 (Engel *et al*, 2018) came up with the following seven recommendations on how to further develop GFAR:

1. Continue to empower GFAR's constituencies, in particular small-scale farmers, women and youth;
2. Improve the capitalisation of, and learning from, the results of Collective Actions;
3. Develop a more explicit GFAR strategy with a focus recognisable to all;
4. Make better use of members / partners: strengthen GFAR's presence in the regions;
5. Improve operational management, develop a *modus operandi* for identifying and supporting GFAR Collective Actions and develop a monitoring, evaluation and learning framework;
6. Develop a professional learning culture;
7. Engage better with FAO, IFAD, EC-funded Development Smart Innovation through Research in Agriculture (DeSIRA) project, Tropical Agriculture Platform (TAP) and other important stakeholders.

The revival of GFAR started in 2021 with the re-engagement of GFAR's governance bodies, that is, by calling meetings of the Steering and Executive committees, and the election of a new Chair and Vice Chair. In 2022, regional workshops will take place to re-engage with the partners and discuss the way forward in the coming years. Building on the evaluation of GFAR, the following seven recommendations are



being proposed to GFAR members and partners to strengthen the Forum.

1. We will undertake a survey and conduct regional workshops ('regional interactions') in 2022 to listen to, learn from and follow-up on the interests, ideas and innovations of GFAR's 13 constituencies representing all sectors in agri-food. We will partner with the Young Professionals for Agricultural Development (YPARD) on a systematic way to make the voice of young farmers heard and taken into consideration, while also aiming to move from a gender-sensitive to a gender-transformative approach.
2. We will institutionalise learning via a global debate series called 'GFAR Talks', via regular inter-regional exchanges and via decentralised knowledge hubs.
3. We are restructuring GFAR and its work on fewer but more powerful work areas focussing on 'putting small-scale farmers centre stage' (the 'what') and on 'Partnership Principles' ('the how'). We aim to be able to communicate in simple terms how GFAR adds unique value.
4. We are already engaging with our partners via regional workshops to see how best to decentralise GFAR. The aim is to relocate our main structure (as a 'network of networks') to the field; only part of the secretariat will stay in FAO headquarters in Rome to provide core support (facilitation, monitoring, evaluation and learning or MEL, reporting, fundraising support, advocacy, communication etc) and to tap into the expertise and experience of FAO.
5. We are working on improved operational management, on 'engagement principles' and on a MEL system which will make it easier for our members and partners to engage in Collective Actions and to monitor their progress.
6. We are keen to develop a learning and innovation culture which will be driven by innovative approaches and methodologies.
7. We are grateful to FAO for hosting us and to the EC for funding us. We are working to get IFAD back as a co-facilitator and funder and hope to be able to engage more intensively with CGIAR and other important actors for the benefit of small-scale farmers in the global South.

In addition to the above-mentioned recommendations, several other important things have happened, on which we also plan to reflect and act upon:

- GFAR is funded by the EC's DeSIRA initiative which supports actors around the world. We are not only committed to delivering as commissioned but also to join forces with other DeSIRA projects.

- We are excited about being part of the Office of Innovation and the Chief Scientist stream in FAO. This is a great opportunity for evidence-based work in an environment dedicated to innovation.
- The UNFSS Science Days held in 2021 offered a great new opportunity to engage with researchers across the globe and develop evidence-based policies.

## Conclusion: from GFAR to GFAIR

The Global Forum on Agricultural Research and Innovation (GFAR) turned 25 last year. We did not celebrate because we are busy reviving the Forum after a period of hibernation. This is worth all efforts given that we are a network of networks, and that networking with initiatives in the global South is more important than ever in order to support countries and regions to achieve the SDGs with limited resources and under heavy constraints.

Our credo for GFAR of the future contains the following key elements:

- For and by small-scale farmers in the global South;
- Bottom-up instead of top-down;
- Innovation-oriented;
- Focussed on achievement of the SDGs;
- Value-based (fair).

In order to reflect this new and more focussed ambition we will suggest to our members and partners (coming together in the GFAR Partners' Assembly scheduled to take place in early 2023) to slightly rename ourselves from GFAR to GFAIR (Global Forum on Agricultural Innovation and Research).

This would reflect that GFAR is not just committed to research, but also to innovation. However, just to add the letter 'I' is not enough. According to Harald Welzer not every innovation is progress:

*"The fact that there are so many fewer victims of violence in modern societies than in the Middle Ages is not due to better weaponry or surveillance cameras, but to the state's monopoly on violence, and that is the result of social intelligence, not knowledge. Such intelligence must always be based on a normative purpose, and what then emerges is not innovation but progress. The fact that the concept of innovation seems to have replaced that of progress is no coincidence: for innovation does not need a normative reference, it is*

*already achieved when something is newer than something else, irrespective of the question of whether it needed renewal at all.” (Welzer, 2021: 26 – author’s translation).*

Ergo: innovation is only progress if it relates to values. These are defined by the SDGs and by the Agenda 2030.

By committing GFAR to being ‘fair’ the rewording from ‘GFAR’ to ‘GFAIR’ would be doing both: acknowledging the importance of innovations while clearly binding them to a value-based approach. We are conscious of the fact that changing mindsets or perceptions is not easy and we are prepared to work on that front to make our mission for GFAR successful.

## References

Engel P, Biermayr-Jenzano P, Dore N, 2018. GFAR – An independent forward-looking learning review 2018. <https://www.gfar.net/documents/independent-forward-looking-learning-review-global-forum-agricultural-research-and-innovation-0>. Accessed 26 April 2022.

EC DeSIRA, GFAR, 2020. Reconnecting the world: The GFAR Partnership transforming agrifood research and innovation for development impact. January. <https://europa.eu/capacity4dev/desira/documents/gfar-global-forum-agricultural-research-and-innovation-0>. Accessed 26 April 2022.

GFAR, 2021. Global manifesto on forgotten foods. <http://www.gfar.net/documents/global-manifesto-forgotten-foods>. Accessed 26 April 2022.

GFAR, 2022a. GFAR collective action on forgotten foods. <https://www.gfar.net/content/kfa1-empowering-farmers-center-innovation#CA-forgotten-foods>. Accessed 5 September 2022.

GFAR, 2022b. GFAR collective action on inclusive digital agriculture. <https://www.gfar.net/content/kfa1-empowering-farmers-center-innovation/#CA-digital-agriculture>. Accessed 26 April 2022.

Lowder SK, Sánchez MV, Bertin R, 2021. Which farms feed the world and has farmland become more concentrated? *World Development*, 142, art. 105455. <https://doi.org/10.1016/j.worlddev.2021.105455>.

OECD, no date. Effective development cooperation. Paris: OECD. <https://www.oecd.org/development/effectiveness/>. Accessed 26 April 2022.

UN, 2015. The 2030 Agenda for Sustainable Development. New York: United Nations. <https://sdgs.un.org/2030agenda>. Accessed 26 April 2022.

UN, 2021. Secretary-General’s chair summary and statement of action on the UN Food Systems Summit, 2021. September. <https://www.un.org/en/food-systems-summit/news/making-food-systems-work-people-planet-and-prosperity>. Accessed 26 April 2022.

Welzer H, 2021. Nachruf auf mich selbst. Frankfurt: S. Fischer.



Photo: courtesy of Musfiqur Rahman

# Opinion 1

## Refugees in Uganda: providing agricultural finance to increase autonomy and improve livelihoods

Emily Wilson



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Uganda hosts Africa's largest refugee population with over 1.4 million people living across 14 settlements. Its progressive refugee policy upholds a refugee's right to move freely, work, own property, resettle, and access land and basic services. Yet refugees face many challenges. They may receive a plot of land when they arrive at a refugee settlement, but they often lack access to financial services, training and support, and are isolated from local markets.

Opportunity International's most recent and innovative project is working with refugees in Uganda to assist them to move from dependency to self-reliance by building their own businesses. To date, the charity has enabled over 5000 refugees to access financial literacy training and developed refugee-specific finance products. It will be working with 12 000 refugees over the course of the project.

Overall, these interventions aim to reach 70 percent refugees and 30 percent Ugandan nationals. They have a target of 50 percent of the refugees reached being female (although reaching this target is a challenge). Women and young people make up the majority of refugees in the settlements and there are a large number of female-headed households.

Opportunity International has over 50 years' experience of helping people to work their way out of poverty by enhancing access to financial products and training. The charity believes that one key way to support refugees is through agricultural finance. Agricultural training, paired with business skills and tailored financial products, can enable refugees to build sustainable livelihoods as well as help them feed their families.

The project seeks to prove the business case for lending to refugees through its partner organisation: Opportunity Bank Uganda Ltd (OBUL). OBUL has

demonstrated its commitment by establishing a permanent bank branch in Nakivale refugee settlement, which has raised its visibility and increased its client base. We also know that there is a low default rate on the loans disbursed, demonstrating that loan clients are keen to make a success of their livelihoods and continue to grow them. The project has a budget of GBP 613 000, which is being raised from private donors.

The project works in Nakivale refugee settlement and is supported by the OBUL branch in Mbarara, the project team in Kampala and headquarters in the UK. OBUL in Nakivale has 19 employees, of which 12 are at the branch and 7 are Financial Inclusion Officers, responsible for delivering the financial literacy training in refugee communities. Ten of these staff are Ugandan, nine are refugees; eight are female and eleven are male. In addition, OBUL has a Project Associate to coordinate activities from Kampala.

There are at least three ways that agricultural finance of this kind can improve the livelihoods of refugees.

1. By increasing the profitability, wellbeing and resilience of smallholder farmers. This is achieved through improved farm performance, for example improving productivity, ensuring enterprise profitability, spreading the uptake of good agricultural practices, increasing the inclusion of under-represented community and family members, and improving market conditions.
2. By increasing micro, small and medium agribusiness capacity and inclusivity. This is achieved through improved business practices and linkages to financial institutions, ensuring the inclusion of women and a focus on increasing innovation and having a gross margin analysis available for the enterprise before a loan is granted.



3. By creating a financially sustainable, inclusive and dynamic agricultural finance portfolio for financial services providers. This is achieved by growing the portfolio and outreach, by improving operational efficiency (*ie* sustainability to deliver agricultural finance products), and by fostering inclusive business practices and innovations.

Agriculture is already changing the lives of refugees in the project areas in Uganda. Africa's oldest and most established refugee settlement, Nakivale, which is in southern Uganda, is home to 140 000 people seeking safety and security.

Odete arrived at Nakivale from Burundi with her five children in 2010 and this is her story. "There was insecurity, and my husband was killed when people came in police clothes to our house. After that attack, I decided to leave. I thought I was going to be killed." Odete walked with her children to the Rwandan border, where she met a family who cared for them for a month.

They paid for her to get a bus to safety at Nakivale.

*"It was very hard – I didn't know anyone or the language. I have been living here for 11 years. I now have five children. My hope for the future is to pay my children's school fees and ensure a good life for them. I sell farm produce, like vegetables, green peppers, basil, spinach and beans that I have grown. But with this rain, the farming stopped. All the vegetables I had planted were affected by the heavy rain and haven't grown. I am still growing a bit, but what I grow, I cook. If I had capital, I would set up a small retail shop to sell rice, beans sugar, oil and charcoal. It isn't easy for people like me to borrow money to set up businesses, because it is hard for people to trust you. The banks need some form of a guarantee before they will lend you anything. I am part of a savings group now. Every week I save 20p. When I was farming, it was easy for me to save this amount because I was growing and selling, but now I am struggling to save. If I get my food distribution, I try to sell some of that so I can save. It is hard."*

Two years later and Odete is now saving GBP 2 every week through Opportunity International financial literacy sessions, Odete has applied for a loan to open a new garden. She is now growing more vegetables (Figure 1 and Figure 2).



**Figure 1. Odete in her vegetable garden** (Photo: courtesy of Kate Holt and taken in Uganda 2019. <https://aretestories.com/>)



**Figure 2. Odete shows a crop of healthy, leafy vegetables** (Photo: courtesy of Kate Holt and taken in Uganda 2019. <https://aretestories.com/>)

Growing more agricultural produce will not solve Africa's refugee crises. But, the impact of Opportunity International's agricultural finance work is already proving itself. Thousands of people benefit from training and loans in the countries we work in, including: Uganda, Ghana, Rwanda and the Democratic Republic of Congo.

In the future Opportunity International hopes to see more refugees engage with agricultural finance, stimulating demand for formal financial products and services. We encourage agro-dealers to work alongside refugees – to recognise their skills, ideas and potential. Because, as more people are empowered with



financial training and access to finance products, such as savings groups and loans, women and men grow in confidence, mothers employ their neighbours, family businesses grow and more children attend school, which provides participants with the opportunity to farm their way out of poverty.

Opportunity International serve hardworking, inspiring entrepreneurs around the world. Our clients are women and men with ambitious dreams who need an opportunity to thrive. We provide access to loans, savings, insurance and training: tools that empower

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Woman collecting fuelwood with donkey, Tigray, Ethiopia (Photo: D Radcliffe)

# International agricultural research news

## Who is the guinea pig? Livestock vaccines in the COVID era

### Introduction

There can be no trivialising the effects of the current COVID-19 pandemic, which, at the time of writing, has infected nearly 400 million people and caused over 5.7 million deaths globally (WHO, 2022), as well as disrupting social and commercial life across countries. However, we can look for silver linings even in the darkest of clouds. The first of these is, surely, to appreciate the speed of scientific response that is possible when there is a flourishing international research community. The second is that we are engaged in a test of major new technologies, the deployment of messenger RNA (mRNA), other recombinant vaccines and adjuvants, on a global scale. We can expect these precedents and the knowledge that is being accumulated across the fields of vaccine design, production, regulation and efficacy to bring fundamental advances in branches of both human and veterinary medicine.

### Messenger RNA vaccines

Traditional vaccines have been made using attenuated living or killed pathogens, their protein antigen components, or DNA plasmids or constructs. Although the possible efficacy of nucleic acid vaccines was shown in the early 1990s, and DNA-based vaccines have been licensed for veterinary use (Fomsgaard & Liu, 2021), there were initial concerns about whether their use would lead to permanent integration of introduced DNA and tolerance of pathogens. In clinical trials, the original experimental choices for DNA vaccines generally led to the elicitation of good cell-mediated immunity to the target antigen, but more modest neutralising antibody production than had been expected from research results. This swung the medical research focus towards RNA vaccines, which had potential application not only in disease control (public health concerns like influenza and immunologically recalcitrant infections such as HIV), but also through highly specific targeting of certain cancers (employing mRNA for monoclonal antibodies targeting cancer markers, for instance) or autoimmune disease. The advantage for mass production of vaccines is that gene and mRNA constructs are relatively straightforward to make once a target (eg viral isolate) sequence is available, and procedures can be standardised. Purification procedures (eg to remove double stranded RNA) can help ensure that no unwanted stimulation

of non-relevant arms of the immune response are triggered. mRNA constructs are virtually the same as natural mRNA and enter into the protein production and secondary modification processes of normal host cells. mRNAs are subject to nucleases and are short lived. Even when substitute nucleic acids are included for stability, or additional replication sequences are added to constructs to rapidly increase the number of mRNA copies, they do not have the same theoretical likelihood of integration into the recipient's DNA. The critical step of complexing the putative mRNA vaccine with protective lipid-based nanoparticles helped address the needs for storage, administration of injections and of mRNA stability. Growing knowledge of vaccine molecule pharmacology and routes of injection is starting to help tune the immune responses (eg the induction of immunological memory) that will be generated to any construct. At the time that the world needed an effective countermeasure to the growing COVID-19 pandemic, the scientific and medical communities were already engaged with pharmaceutical companies in clinical human trials of mRNA vaccines or treatments (seven registered clinical trials against infectious disease agents by May 2017, and 38 against cancers: Pardi *et al*, 2017). This important interweaving of scientific and medical research knowledge and capacity was underpinned by substantial investments in collaborative new ventures seeking to exploit initial successes (Pardi *et al*, 2017, and annotated references therein).

After COVID-19 infection was recognised as an international emergency, it took the National Institutes of Health, USA working with Moderna Inc, 27 days to produce clinical grade mRNA vaccines following the publication of the viral spike protein sequence. Following phase I, II and III clinical trials, conducted with unprecedented rapidity, an Emergency Use Authorization was granted for vaccine use in the USA in under a year. By the end of December 2020, eight versions of mRNA vaccines to SARS-CoV-2 (COVID-19) were also undergoing clinical trials around the world (Kim *et al*, 2021).

Simply because small modulations of each vaccine construct can influence immune systems in different ways, rigorous clinical trials for human use for each vaccine candidate will remain necessary. Having established the mRNA synthesis platform, however, the safety and regulatory assessments for any target disease are likely to be much more time consuming



than the vaccine production (Knezevic *et al*, 2021). A potential caveat is that the current mRNA vaccines are expected to be widely applicable to generating humoral responses towards viral diseases, and/or cellular immunity provoked by constituent antigenic peptides of the viral pathogen. However, it is not yet clear if the approach will work so well for constructs containing bacterial, fungal or parasite antigens, as the final synthesis of active proteins in the host will then be directed in 'unnatural' cellular settings and may not result in the same post-translational processing or provide the three-dimensional characteristics of the antigen molecule. This is still to be explored.

### Expanding the concept to (other) zoonotic diseases and through other platforms

It should be remembered that COVID-19 (like the related SARS and MERS viruses, see below) is a zoonotic disease. Sampling has shown that a large number of animal species can also be potentially infected: in the month of January of this year, 22 instances were reported from six countries and for seven animal species (OIE, 2022). These include particularly mink (especially in the context of mink farming which has been associated with human infection; Oude Munnink *et al*, 2021), white-tailed deer and domestic cats. To avoid the culling of large numbers of animals, as happened with mink, recombinant protein vaccines against COVID-19 in mink, and potentially other animal hosts, are being tested in northern Europe and in North America (*eg* FIFUR, 2021). There are concerns that the new variants of COVID-19 with altered antigenic profiles, infectiousness or pathogenicity could be mutating in animal reservoirs or immunosuppressed human cases, as long as the disease remains widespread. Firm evidence is not yet to hand. Nowhere near the same level of testing has been carried out for animal species as has been done for the human population globally. Nevertheless, sequence data from the very many isolates collected will contribute to better knowledge of viral evolution and potential for combatting future disease.

A global view of zoonotic disease epidemiology requires that there is a very practical involvement with animal and human disease testing and research simultaneously, and channels for communication and joint efforts in control of outbreaks. To take a proactive stance to zoonotic disease outbreaks more generally (in which, potentially, wild animal species, concentrated groups of livestock and humans are involved) we need more positive integration of epidemiological and vaccine approaches. Vaccine platforms developed with a One-Health perspective in mind could make major contributions to confronting zoonotic disease (Fomsgaard & Liu, 2021; Warimwe *et al*, 2021), and

potentially piggy-backing on the larger funding directed to human medical science and pharmaceuticals.

An additional vaccine platform, which illustrates this potential value for simultaneous livestock and human use, is the attenuated chimpanzee adenovirus construct. Replication-defective chimpanzee adenoviruses (ChAd) can be used as vaccine vectors in humans as they are less likely to provoke anti-vector immunity compared with constructs based on whole human viruses. ChAd vectors can accommodate relatively large insertions of antigen DNA – coding for surface molecules or other potentially protective viral components. Vector constructs have passed safety evaluations in humans for a wide range of infectious disease targets including malaria, HIV, tuberculosis, influenza, hepatitis C, respiratory syncytial virus (RSV) and Ebola (see Warimwe *et al*, 2016, and references therein). Mixed initial vaccine and booster strategies have been helpful in producing long-lasting cellular immunity in the case of influenza A (Coughlan *et al*, 2018). The platform also provides the basis for the ChAdOx1 nCoV-19 vaccine developed by AstraZeneca/Oxford University that has been widely deployed in the UK and elsewhere during the current COVID pandemic (*eg* Voysey *et al*, 2021).

The ChAdOx approach holds promise, therefore, as a common vaccine development platform, allowing multiple vaccines to be manufactured rapidly with standardised processes and at relatively low cost. There is also good evidence for its use in vaccinating against important diseases of animals. Warimwe *et al* (2016) have already shown that for the zoonotic viral disease Rift Valley fever (RVF), a single-dose immunisation with ChAdOx1-GnGc vaccine – encoding, in this case, RVFV envelope glycoproteins – elicits high-titre RVFV-neutralising antibody and provides solid protection against RVFV challenge in natural target species for the virus: sheep, goats and cattle. The same construct stimulates neutralising antibodies in dromedary camels. Subject to human safety trials, it is probable that we already have a tool to protect humans in local outbreaks of RVF in the future. In the case of another zoonotic disease, MERS (Middle East Respiratory Syndrome – caused by another virus of the SARS and COVID family of coronaviruses), a ChAd-based vaccine construct, ChAdOx1 MERS, was generated inserting the complete surface spike gene from a MERS-CoV isolate. This too stimulated virus-neutralising antibodies in dromedary camels which are principally affected by the virus and which serve as a reservoir for human disease (Alharbi *et al*, 2019).

### Magnifying results across systems and regions

In light of the current COVID-19 pandemic, the mRNA and ChAdOx vaccine platform approaches are being

tested at large scale in human populations. As the more normal order of things is, we hope, gradually resumed, the focus could be moved back to creating constructs for vaccination against emerging zoonotic diseases which meet current Good Management Practice quality (cGMP, Knezevic *et al*, 2021), and testing these in target livestock. Such mammalian immune systems are more similar to that of humans than the laboratory mouse's is, providing research platforms for the rapid extrapolation of findings for both human and animal immunisation with the same construct (Warimwe *et al*, 2021). For this more comprehensive One-Health approach to work, investment is needed to bring the state of immunological marker reagents in these species to the same commercial grade that is available to researchers in human immunology and medicine. Today, one can imagine the situation in which a thorough vaccine 'dossier', covering the whole range of observations associated with vaccine trials and longer-term corollaries, could be built up initially in the pertinent livestock species (cattle, sheep or swine). Such dossiers could then underpin both choices and strategies for animal vaccines as well as human clinical phase I trials.

Another requirement is the establishment of networks between medical and veterinary science teams to do this. In a pandemic, epidemiological concerns are global and not just local. Responses to the COVID-19 pandemic have been accompanied by worries that vaccine delivery strategies have initially favoured some regions of the world at the expense of others. Recognition of both the potential utility of mRNA-based vaccines and the appreciation that greater numbers of centres of excellence are required worldwide to equitably meet the challenge of vaccine roll out, led, in July 2021, to accreditation of Afrigen Biologics Ltd in South Africa by the World Health Organization (WHO) as the mRNA global technology transfer hub for human vaccine production and training. A consortium of actors has been formed to develop the hub over the next four years as an mRNA vaccine training facility, and where the technology is established at industrial scale for clinical development and use. Manufacturers from low- and middle-income countries can receive training, and WHO and partners will bring in the production know-how, quality control and necessary licences so that a single entity can facilitate rapid technology transfer to multiple recipients around the world (Afrigen Biologics, 2022). Many, not all, zoonotic diseases arise and make initial headway in developing countries. It will be similarly important to support and network the global teams engaged in veterinary disease research to these vaccine platforms. Opportunities for frontline exposure of livestock to test vaccines for zoonotic pathogens in affected countries can speed up all aspects of vaccine

testing. Huge amounts of new knowledge continue to be compiled from the use of mRNA and other vaccine vector constructs in controlling the COVID-19 pandemic. Future collaborative ventures between medical and veterinary science teams can expect to make accelerated progress in research and vaccine testing relevant to controlling zoonotic diseases in their several host species, including humans.

## Acknowledgement

I am grateful to Vish Nene, of the International Livestock Research Institute (ILRI), for helpful discussions and for comments on an earlier version of this manuscript. The views expressed are those of the author.

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## References

- Afrigen Biologics, 2022. The mRNA vaccine Technology Transfer hub. <https://www.afrigen.co.za/2021/11/17/the-mrna-vaccine-technology-transfer-hub/>. Accessed 1 July 2022.
- Alharbi NK, Qasim I, Almasoud A *et al*, 2019. Humoral immunogenicity and efficacy of a single dose of ChAdOx1 MERS vaccine candidate in dromedary camels. *Scientific Reports*, **9**, art.16292.
- Coughlan L, Sridhar S, Payne R *et al*, 2018. Heterologous two-dose vaccination with simian adenovirus and poxvirus vectors elicits long-lasting cellular immunity to influenza virus A in healthy adults. *EBioMedicine*, **29**, 146–154.
- FIFUR, 2021. FIFUR release of conditional usage permit on mink vaccine. <https://fifur.fi/en/ajankohtaista/artikkeli/fifur-has-obtained-conditional-usage-permit-mink-vaccine-finnish-food>. Accessed 1 July 2022.
- Fomsgaard A, Liu MA, 2021. The key role of nucleic acid vaccines for One Health. *Viruses*, **13**, 258. <https://doi.org/10.3390/v13020258>.
- Kim J, Eygeris Y, Gupta M, Sahay G, 2021. Self-assembled mRNA vaccines. *Advanced Drug Delivery Reviews*, **170**, 83–112.
- Knezevic I, Liu MA, Peden K *et al*, 2021. Development of mRNA vaccines: scientific and regulatory issues. *Vaccines*, **9**, 81. <https://doi.org/10.3390/vaccines9020081>.
- OIE, 2022. SARS-CoV-2 in animals – Situation report 9. <https://www.woah.org/app/uploads/2022/02/sars-cov-2-situation-report-9.pdf>. Accessed 1 July 2022.
- Oude Munnink BB, Sikkema RS, Nieuwenhuijse DF *et al*, 2021. Transmission of SARS-CoV-2 on mink farms between humans and mink and back to humans. *Science*, **371**, 172–177; eabe5901. doi:10.1126/science.abe5901.
- Pardi N, Hogan MJ, Porter FW, Weissman D, 2018. mRNA vaccines – a new era in vaccinology. *Nature Reviews. Drug Discovery*, **17**, 261–279.
- Voysey M, Costa Clemens SA, Madhi SA *et al*, 2021. Safety and efficacy of the ChAdOx1 nCoV-19 vaccine (AZD1222) against SARS-CoV-2: an interim analysis of four randomised controlled trials in Brazil, South Africa, and the UK. *The Lancet*, **397**, 99–111.
- Warimwe GM, Gesharisha J, Veronica Carr B *et al*, 2016. Chimpanzee adenovirus vaccine provides multispecies protection against Rift Valley fever. *Scientific Reports*, **6**, 20617.
- Warimwe GM, Francis MJ, Bowden TA *et al*, 2021. Using cross-species vaccination approaches to counter emerging infectious diseases. *Nature Reviews. Immunology*, **21**, 815–822.
- WHO, 2022. *WHO COVID-19 Weekly Epidemiological Update*. Edition 78, published 8 February 2022. <https://www.who.int/publications/m/item/weekly-epidemiological-update-on-covid-19---8-february-2022>. Accessed 1 July 2022.

## Opinion 2

# Smallholder farming and productivity: what we know and what really matters

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Smallholder farming in the developing world contributes significantly to global food production. Many studies cite these smallholders (generally defined as operating on less than 2 ha) as producing ~70 percent of food globally, and this has become a lynchpin of agricultural development policy in recent years (IFAD, 2013; FAO, 2014; ETC Group, 2017). Initiatives such as the United Nations Year of Family Farming (2014), the Sustainable Development Goals, the Alliance for a Green Revolution in Africa and research projects at the University of Cambridge such as ENSA (Engineering Nitrogen Symbiosis for Africa) have drawn on the global significance of smallholder productivity to inspire and motivate their work. However, this figure of ~70 percent has often been cited without an original reference in grey literature and without research methodology; the true figure may yet be very unclear. We know that cereals and soybeans occupy significant acreages of agricultural land but, except for maize and rice in sub-Saharan Africa and rice in some parts of Asia, these crops are predominantly grown on large farms. Much of this production is destined to become animal feed, which means that the ~70 percent figure for human

consumption may still be true, but the paucity of data on this question merits further investigation.

Research has explored this question in the past few years and, where research materials such as demographic data from the World Census of Agriculture (WCA) have been included, results have suggested smallholder farming may not produce as much food as was previously thought. Knowledge of smallholder contributions to food production and security is, of course, key to establishing research programmes and extending technologies. We therefore seek to clarify current knowledge on this topic and to analyse what this may mean for agricultural development projects.

Formal research has combined census data and survey work from the social sciences. For example, Lowder *et al* (2016) used WCA data from 167 countries to investigate farm size trends from 1960 to 2010. The study indicated that smallholders, as defined above, occupied 12 percent of global farmland but comprised 84 percent of total farms. Another study by Samberg *et al* (2016) also used census data and estimated smallholder production to be 52.5 percent of all food



in the studied countries. However, here smallholders were defined as operating on less than 5 ha. A landmark study by Ricciardi *et al* was then published in 2018 which combined traditional census data with robust production statistics from the Statistical Database of the Food and Agriculture Organization of the United Nations (FAOSTAT). This estimated that smallholders (defined as those farming less than 2 ha) produced 30–34 percent of the global food supply. The study also allocated the single biggest contribution to smallholders when farm sizes were broken down into categories, and it was estimated that they produce 40 percent of the world's pulses and grow a greater diversity of crops than larger farms.

These efforts represent the latest chapter of a broader effort in agricultural research to understand the relationship between farm size and productivity, an issue which has influenced agricultural development since the seminal studies of Sen (1962). Sen, like many other scholars, described an inverse relationship between food productivity and farm size; indeed Ricciardi *et al* (2021) showed this to be the case in a meta-analysis, but with caveats relating to correlation and causation. Family labour on small farms is not commonly costed and often more reliably available, which can allow for higher productivity relative to larger farms. Other authors have proposed a more complicated model of the farm size/productivity relationship, describing a 'U-shaped' relationship, with smallholders having high productivity, medium-sized holdings getting lower productivity, and then very large farms having high productivity again. This seems intuitive given what we know about very high-input high-yielding large farms in the Americas and the productive intercropping systems in sub-Saharan Africa, but the debate continues, and it remains difficult to be certain that these trends are globally applicable. Unaccounted-for urban and peri-urban horticultural productivity may also be more significant than we believe, as these systems can give high yields on low acreages (Edmondson *et al* 2020).

Our best efforts so far indicate that the share of food production by smallholders is closer to 34 percent than 70 percent of the global total. This degree of smallholder production remains enormously significant and is often achieved without access to modern technologies, machinery or other capital investment by some of the world's poorest people. We may further improve our understanding of this using modern surveys and geographic information systems technologies, but further refinement is unlikely to diminish the importance of smallholder farming for global food security, and smallholders will still require support from governments and institutes to make their contribution.

It is human to digest a worldview through aphorisms and maxims. We also do this through our institutions and the world of farming is no different. However, extraordinary claims require extraordinary evidence. How often do we remind ourselves that 60 percent of the world's farmers are women? Or that the food system accounts for 30 percent of anthropogenic greenhouse gas emissions? That 60 percent of a typical developing country's economy is based on agriculture, or that almost half of Chinese dairy products are produced by farmers who own five cattle or fewer? This builds the institutional truths that inform our policies, research and advisory services, but the reliance on precise language in these statistics may be unwise. Global-scale considerations can only be based on estimates and emphasising the detail may obscure the general point we are trying to make: the exacting language here is unnecessary.

In the future, we may accurately determine how much food is produced by smallholders globally, but as we have seen, whether this falls closer to 30 percent or 70 percent, it does not change the significance of the contribution. The bigger picture of how research and development can contribute to this critical component of food security remains the same. We do not need precise statistics to understand that a significant majority of the world's farmers are women, or that the food system's greenhouse gas emissions are comparable to transport or energy. Up to 60 percent of a typical developing country's population is employed in agriculture, and we have seen what happens when states do not provide for these people, for example the 'Special Period' in Cuba (Rosset, 1997) in the 1990s or more recently in Sri Lanka (Sultana, 2022). The significant contribution to food production made by smallholders must be facilitated through research and policy, regardless of the precise percentage it amounts to.

## References

- ETC Group (Erosion, Technology and Concentration), 2017. *Who will feed us? The peasant food web vs the industrial chain*, 3rd edition, Ottawa, Canada: ETC Group.
- Edmondson JL, Cunningham H, Densley Tingley DO *et al*, 2020. The hidden potential of urban horticulture. *Nature Food*, **1**, 155–159. <https://doi.org/10.1038/s43016-020-0045-6>.
- FAO, 2014. *The State of Food and Agriculture 2014: Innovation in family farming*. Rome: Food and Agricultural Organization of the United Nations.
- IFAD, 2014. Smallholders, food security and the environment. International Fund for Agricultural Development and United Nations Environmental Programme. [https://www.ifad.org/documents/38714170/39135645/smallholders\\_report.pdf/133e8903-0204-4e7d-a780-bca847933f2e](https://www.ifad.org/documents/38714170/39135645/smallholders_report.pdf/133e8903-0204-4e7d-a780-bca847933f2e). Accessed 4 July 2022.
- Lowder SK, Scoett J, Raney T. 2016. The number, size, and distribution of farms, smallholder farms and family farms worldwide. *World Development*, **87**, 16–29.
- Ricciardi V, Mehrabi Z, Wittman H *et al*, 2021. Higher yields and more biodiversity on smaller farms. *Nature Sustainability*, **4**, 651–657. <https://doi.org/10.1038/s41893-021-00699-2>.

Ricciardi V, Ramankutty N, Mehrabi Z *et al*, 2018. How much of the world's food do smallholders produce? *Global Food Security*, **17**, 64–72.

Rosset, P. 1997. Alternative agriculture and crisis in Cuba, *IEEE Technology and Society Magazine*, **16**(2), 19–25, <https://doi.org/10.1109/44.592253>.

Samburg IH, Gerber JS, Ramankutty N *et al*, 2016. Subnational distribution of average farm size and smallholder contributions to global food production. *Environmental Research Letters*, **11**, 124010.

Sultana, G. 2022. Economic crisis in Sri Lanka: an assessment. Manohar Parrikar Institute for Defence Studies and Analyses. <https://policycommons.net/artifacts/2273308/economic-crisis-in-sri-lanka-an-assessment/3033121/>. Accessed 10 May 2022.

Sen AK. 1962. An aspect of Indian farming. *The Economic Weekly*, Annual Number February 1962. [https://www.epw.in/system/files/pdf/1962\\_14/4-5-6/an\\_aspect\\_of\\_indian\\_agriculture.pdf](https://www.epw.in/system/files/pdf/1962_14/4-5-6/an_aspect_of_indian_agriculture.pdf). Accessed 2 September 2022.



Photo: courtesy of Istiak Ahmed



# Transforming food systems in the wake of the UN food systems summit: restating the case for small farms

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*The following is an abridged version of an upcoming IFAD publication with the same title.*

Much has been said and written about the contribution of small-scale farming to global food systems and food security. But while mainstream discourses, including those at the UN Food Systems Summit, have devoted attention to addressing the challenges small farms face, relatively little consideration has been given to the inequities and power imbalances that have given rise to the inadequate rewards many small-scale farmers receive for their work. Even less attention has been given to the advantages of a food systems transformation that was driven by small-scale farming. This article sets out the advantages of small-scale farming models. It outlines some of the major biases that see many small-scale farmers facing vulnerable and food insecure situations, and it suggests entry points for addressing the present situation and fostering a food systems transformation that delivers across the social, environmental and economic dimensions in which systems are currently failing.

There was much discussion and support for the role of small farms at the United Nations Food Systems Summit. Small farms are central to many of the coalitions of action that have emerged, not least those on family farming, on decent incomes for all food systems workers, on indigenous food systems and on local supply chains.

However, there is still a feeling that the enormous advantages of small-scale farms are not fully understood and appreciated.

This article aims to highlight the advantages of small farms in the context of the challenges of transforming global food systems so that they provide quality food for all, and to acknowledge a number of macro-level issues that need to be addressed for them to realise

their potential. In this regard, the article is arranged as an advocacy piece in favour of small farms.

The overall objective is to present an optimistic view of the future of small farms globally with reference to evidence in the academic literature – and to set out the conditions needed for this optimism to become reality.

## Small farms and productivity

The remarkable productivity of small farms rarely gets the attention it deserves.

IFAD's *Rural Development Report 2021* (IFAD, 2021) finds that farms of 2 hectares and less produce 31 percent of the world's food calories on less than 11 percent of the farmland. This is consistent with findings in similar studies in the literature: a study by Lowder *et al* (2021) estimates that farms smaller than 2 hectares produce 35 percent of the world's food on 12 percent of the land, while Ricciardi *et al* (2018) argues that these farms produce between 30 and 34 percent of the world's food supply on just under a quarter of the gross agricultural area.

Clearly, then, the small size of farms is not an impediment to productivity.

Huge numbers of people rely on the food produced by small farms globally. Although more research is needed on this topic, it is reasonable to suppose that the majority of the global population – including almost all of the world's more than three billion people who live in rural areas, as well as up to a billion food producers based in peri-urban or urban settings – rely on the food produced on small farms for most or all of their food (ETC Group, 2017).

In particular, the food produced by small farms is especially important in times of scarcity, conflict and



crisis, with vulnerable people relying on more locally produced foods to prevent their families from falling into hunger (ETC Group, 2017). Further, the diverse output of smaller farms is generally geared towards human consumption, while much of the cereals and soybean which are predominantly produced on large farms in many contexts is more likely to become livestock feed (McKenna *et al*, 2022).

What accounts for the productivity of small farms? Evidence from recent studies generally supports the view that small farms enjoy productivity advantages as a result of the labour advantages associated with employing members of the family as workers. This view was put forward by Amartya Sen (1964) almost half a century ago and remains relevant today.

The remarkable productivity of small farms and their significance for global food production is in many contexts achieved in spite of a lack of access to modern technologies, machinery and investment (McKenna *et al*, 2022) – as well as the tendency of research systems to neglect their needs. And small farms are further disadvantaged in many contexts by policy and investment regulations that favour large farms and large-scale land acquisitions (Vorley *et al*, 2012). Imagine, therefore, what small-scale farmers could achieve if they were adequately supported!

There is surely much potential to further increase the contributions of small farms to global food security.

The story is not all about productivity. Small farms offer advantages that cut across the economic, environmental and social domains of food systems transformation. These go to the heart of our shared goals of transforming food systems so they are more equitable, inclusive and sustainable (United Nations, 2021).

## Social development and small farms

Small-scale farming is a key source of social engagement, civic inclusion and thriving community life. Research over the years has shown that communities with thriving small-scale family farming sectors offer wider opportunities for civil and social engagement, and higher levels of trust between those living in local communities (FAO & IFAD, 2019: 7). It is therefore not surprising that the development of small-scale farming is strongly associated with social empowerment and with reduction in poverty. Indeed, there are few examples in history of successful large-scale reductions in poverty that have not been associated with the development of small-scale agriculture (HLPE, 2013: 62). One of the main reasons for this is the links between higher incomes and productivity on small farms and the growth of the rural, non-farm economy, which is a key engine of broader structural transformation, in particular at

the early stages of the process. Indeed, the positive spill-over effects on local economies of growth generated by small-scale farming have been found to be especially strong (Bautista & Thomas, 1998; Ngqangweni, 1999; Simphiwe, 2001). In contrast, large-scale industrial farming models managed by corporate managers have been found to place the interests of local communities at risk (*inter alia*: MacCannell, 1988; Crowley *et al*, 2004; Lyson, 2004; Labao & Stofferahn, 2008).

## Small farms and sustainability

Promoting and maintaining biodiversity is crucial both for reducing carbon in the atmosphere, as well as for boosting resilience – especially of food production systems and food producers themselves – to the impacts of climate change.

That is why it is significant that research has shown small farms harbour greater biodiversity – both crop and non-crop – than larger farms (Ricciardi *et al*, 2021). This is hardly surprising given the traditional attachment of small-scale farming communities to their surrounding ecosystems. It also reflects the suitability of sustainable farming practices – such as organic agriculture, permaculture and other agroecological approaches – to be practised at local, smaller scales, based on an intimate knowledge of landscapes.

## Small farms, food security and nutrition

Small-scale farming systems are key contributors to global food security and nutrition.

Small farms are especially important in developing countries and in contexts of heightened vulnerability to food insecurity (Samberg *et al*, 2016). Billions of people across the world rely on small-scale farming for most or all of their food – including almost all of the 3.2 billion people who live in the rural areas of the world's low and middle income countries, as well as a large share of lower-income urban populations. Small farms are especially important for food security throughout Africa, where around 80 percent of farms are smaller than 2 hectares, but also in much of Asia and the Pacific, where the distribution of farm size is similar (Lowder *et al*, 2021). In Latin America and the Caribbean and in developed countries, on the other hand, small farms are less predominant.

Importantly, small-scale farms are also key for maintaining nutritional diversity. In fact, shifts to larger-scale industrial farming are associated with declines in the diversity of nutrient production (IFAD, 2021: 120).

Further, employment-generating activities such as small-scale farming (which is more employment intensive than industrial farming) are especially important for generating income to enable rural people to afford more diverse and nutritious diets.

### **If small farms have so many advantages, why are so many small-scale farmers poor?**

Much of the discussion around small-scale farming relates to the high rates of poverty and hunger of these farmers and how to reduce this vulnerability. In this context, the significant contribution and further potential of small-scale farming can be lost. However, it is worrying that small-scale farmers are disproportionately likely to suffer from poverty and hunger. Why is this the case?

Although they grow their own food, many small-scale farmers have inadequate access to inputs and assets, and as a result get by with a restricted diet. The seasonality of agricultural production leaves them vulnerable to hunger at certain times of the year, even if they have sufficient food at other times.

On the other hand, for those small-scale farmers who regularly produce surpluses, entrenched market inequalities often limit the profits they are able to generate – and reduced income, in turn, makes it harder to diversify and improve their diets. Indeed, estimates indicate that small-scale farmers receive just 6.5 percent of the price of food, reflecting inequalities in global food systems (Oxfam, 2018).

This brings us to the broader issue of the concentration of power in the trade, processing and distribution of food – large corporations benefitting at the expense of smaller-scale operators – and its negative impact on small-scale farmers. This has been identified by the High-Level Panel of Experts on Food Security and Nutrition (HLPE) as a critical issue for food security and nutrition (HLPE, 2017). Global trade and governance systems shape these inequalities and contribute to the difficulties small-scale farmers in developing countries face in receiving fair and equitable remuneration for their work. A key problem they face, for example, relates to unfair trade practices and the subsidies provided by richer countries for specific commodities that have put producers from lower-income countries at a significant competitive disadvantage in both domestic and international markets. As a consequence, while farmers in some parts of the world benefit from advantageous trade and subsidy arrangements, there is little support for small-scale farmers living in the countries where needs are greatest. To give just one example, in the meat industry a handful of corporations have come to

dominate, having benefitted from generous subsidies from their own governments. In the USA alone, two of the largest agri-food corporations involved in the sector saved an estimated USD 572 million per year thanks to various subsidies from US Department of Agriculture (USDA) (Bene, 2022). In these political economic circumstances, small-scale livestock producers in lower income countries are largely locked out of global trade.

Another issue that makes small-scale farmers vulnerable to falling into poverty and hunger is climate change. Due to the nature of their work and its reliance on the climate and other natural processes, small-scale farmers are among those most vulnerable to the increasingly severe impacts of a changing climate. Despite this, small-scale farmers receive less than 2 percent of global climate finance (Chiriack & Naran, 2020).

Inequality and the disempowerment of small-scale farmers and other people working in food systems represent systemic barriers to the transformation we need – that is, one that gives them a fair chance to be fairly rewarded for their work. These issues are not easily solved and involve tackling entrenched sources of bias. Many are very politically sensitive. But with concerted effort, meaningful change is possible. In the wake of the UN Food Systems Summit – which emphasised that “[t]ransformative action demands the engagement and close participation of the people who drive our food systems, such as farmers, herders, food workers, and fisher folk” (UN, 2021) – now is a propitious time for action.

### **What needs to be done to break down inequalities and ensure small-scale farmers are fairly rewarded for their work?**

Four inter-related priorities are outlined below.

#### ***Redressing power imbalances and biases***

The present concentration of power within food systems calls for a rethinking of regulations and trade arrangements so that food markets can be made to work for today's small-scale farmers. This is a precondition for the realisation of decent food systems jobs that are needed, especially in Africa, for millions of young people entering labour markets. Food markets need to be accessible to them – as well as to other small and medium-scale enterprises (SMEs) involved in food systems – on fair terms. Rebalancing market and trade regulations so they support, rather than discriminate against, small-scale farmers is a precondition for a food systems transformation that is inclusive and equitable.



Examples of priority actions include:

- Implement pro-competition legislation to safeguard against the accumulation of market power. For example, governments may impose regulations against high degrees of market concentration, anti-competitive behaviour and abuse of market power.
- Provide greater support and investment in small-scale farming and give them and their organisations a voice in decision-making processes around the transformation of food systems.
- Reform global trade and governance systems, in particular to ensure that subsidies and other trade arrangements support rather than discriminate against small-scale farmers.

### ***Focussing on people, livelihoods and decent work***

Food systems need to provide decent livelihoods for the people who work within them – especially small-scale farmers and, more broadly, all the women and men who harvest, process, store and market our food. In other words, food systems need to work for the people whose labour they rely upon.

Examples of priority actions include:

- Working with organisations representing small-scale farmers – including farmers' organisations and indigenous peoples' groups – to find solutions for securing their access to land rights and other natural resources, consulting internationally ratified recommendations such as the Committee on World Food Security Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (CFS, 2012).
- Designing and implementing public regulations on decent work conditions, such as minimum wage requirements, human rights, labour laws compliance and social dialogue. Working with, regulating and encouraging investment from the private sector and other partners to implement policies to ensure decent work for all food systems workers, in line with the UN Food Systems Summit Coalition of Action on this topic (United Nations, 2021).
- Investing in social protection programmes as an integral part of the food system transformation agenda, adapting programmes to the needs of small-scale farmers and coordinating initiatives – for example, linking food distribution and production support measures to local employment policies and programmes.

### ***Building climate resilience and adaptation***

Small-scale farmers, whose work is inextricably linked to climate, need support adapting to the increasingly stark impacts of climate change. We need a massive effort and investment in transformative adaptation.

Examples of priority actions:

- Significantly increase climate financing, in line with global commitments, for adaptation generally and for small-scale farming in particular.
- Invest in more and better tools for risk management in agriculture, tailored to the needs of small-scale farmers.
- Shift natural resource management focus to agroecological techniques and prioritise nature-based, farmer-owned and locally informed approaches to food production and climate adaptation.

### ***Supporting local SMEs working with small-scale farmers in food systems midstreams***

The present growth of SMEs operating in the midstream of domestic food systems offers developing countries opportunities for a healthy, inclusive and sustainable food system transformation. SMEs create jobs while also giving small-scale farmers new ways to access both markets and non-farm employment opportunities. Local-level and rural SMEs, as a result of their ability to generate jobs – especially for those most in need (including youth and women) – and their connections with local small-scale farmers, have the potential to drive changes in food systems that will make them more inclusive and equitable. On the other hand, if the midstream becomes dominated by larger enterprises that rely less on local employment, potential benefits will be lost.

Examples of priority actions:

- Make sure that policies and regulations support investment in midstream SMEs, and ensuring appropriate public goods (eg local roads and rural electrification) and institutions (eg rural business associations) are in place so they can work with small farms to get food and other agricultural products to markets.
- Improve the business climate for local SMEs by reducing business start-up costs, ensuring regulations do not discriminate against small and informal operators, and providing technical and vocational training, ensuring availability to youth and women.

- Involve SMEs and the small farms they work with in long-term delivery contracts, especially public procurement and school feeding programmes.

## Concluding remarks

The severity of the challenges facing global and local food systems calls for much more than tinkering. Current food systems need to change dramatically, so that a new food system may deliver available, accessible, adequate, nutritious food for all in a sustainable manner. This article has argued that without changes in prevailing sources of the unacceptable inequalities in today's food systems, the much talked about transformation will surely never arise. Based on this premise, it has provided entry points for large-scale policy reform that should be coordinated across countries and is needed to unleash a transition driven by productive, profitable and prosperous small farms. These entry points call for further elaboration in future literature.

## References

- Bautista RM, Thomas M, 1998. Agricultural growth linkages in Zimbabwe: income and equity effects. Trade and Macroeconomics Division. *Discussion Paper* No. 31. Washington, DC: IFPRI.
- Crowley ML, Roscigno VJ, 2004. Farm concentration, political-economic process, and stratification in the North Central U.S. *Journal of Political & Military Sociology*, **32**(1), 33–155.
- ETC Group (Erosion, Technology and Concentration), 2017. Who will feed us? The peasant food web vs the industrial chain. <https://www.etcgroup.org/sites/www.etcgroup.org/files/files/etc-who-will-feed-us-english-webshare.pdf>. Accessed 9 May 2022.
- FAO, IFAD, 2019. *United Nations Decade of Family Farming 2019–2028. The future of family farming in the context of the 2030 Agenda*. Rome.
- HLPE, 2013. *Investing in smallholder agriculture for food security. A report by the High-Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security*. Rome: Committee on World Food Security.
- HLPE. 2017. 2nd Note on Critical and Emerging Issues for Food Security and Nutrition. [https://www.fao.org/fileadmin/user\\_upload/hlpe/hlpe\\_documents/Critical-Emerging-Issues-2016/HLPE\\_Note-to-CFS\\_Critical-and-Emerging-Issues-2nd-Edition\\_27-April-2017\\_.pdf](https://www.fao.org/fileadmin/user_upload/hlpe/hlpe_documents/Critical-Emerging-Issues-2016/HLPE_Note-to-CFS_Critical-and-Emerging-Issues-2nd-Edition_27-April-2017_.pdf). Accessed 30 June 2022.
- IFAD, 2021. *Rural development report 2021: transforming food systems for rural prosperity*. Rome, IFAD.
- Chiriac D, Naran B, 2020. *Examining the climate finance gap for small-scale agriculture*. Rome, IFAD and Climate Policy Initiative.
- Lobao L, Stofferahn CW, 2008. The community effects of industrialized farming: social science research and challenges to corporate farming laws. *Agriculture and Human Values*, **25**, 219–240.
- Lowder SK, Sanchez MV, Bertini R, 2021. Which farms feed the world and has farmland become more concentrated? *World Development*, **142**, June, art. 105455.
- Lyson T, 2004. *Civic agriculture: reconnecting farm, food, and community*. Medford, MA: Tufts University Press.
- MacCannell D, 1988. Industrial agriculture and rural community degradation. In: Swanson LE, ed. *Agriculture and community change in the U.S.: the congressional research reports*. Boulder, CO: Westview Press, 15–75.
- McKenna P, Smith L, Leake J, 2022. Smallholder farming and productivity: What we know and what really matters. *Agriculture for Development*, **45**, 20–22.
- Ngqangweni SS, Delgado CL, Kirsten JF, 1999. Exploring growth linkages in a South African smallholder farming area. *Agrekon*, **38**(4), 585–593.
- Oxfam, 2018. Ripe for change: ending human suffering in supermarket supply chains. [https://oi-files-d8-prod.s3.eu-west-2.amazonaws.com/s3fs-public/file\\_attachments/cr-ripe-for-change-supermarket-supply-chains-210618-en.pdf](https://oi-files-d8-prod.s3.eu-west-2.amazonaws.com/s3fs-public/file_attachments/cr-ripe-for-change-supermarket-supply-chains-210618-en.pdf). Accessed 30 June 2022.
- Ricciardi V, Mehrabi Z, Wittman H *et al*, 2021. Higher yields and more biodiversity on smaller farms. *Nature Sustainability*, **4**, 651–657.
- Ricciardi V, Ramankutty N, Mehrabi Z, Jarvis L, 2018. How much of the world's food do smallholders produce? *Global Food Security*, **17**, 64–72.
- Samberg LH, Gerber JS, Ramankutty N *et al*, 2016. Subnational distribution of average farm size and smallholder contributions to global food production. *Environmental Research Letters*, **11**(12), art. 124010.
- Sen AK, 1964. Size of holdings and productivity. *The Economic Weekly*, **16**, 323–326.
- Simpfhiwe N, 2001. Prospects for rural growth? Measuring growth linkages in a South African smallholder farming area. *Working paper* 2001-11. Pretoria: University of Pretoria.
- United Nations, 2021. Secretary-General's Chair Summary and Statement of Action on the UN Food Systems Summit. <https://www.un.org/en/food-systems-summit/news/making-food-systems-work-people-planet-and-prosperity>. Accessed 30 June 2022.
- United Nations, 2021. Action area 4: Advance equitable livelihoods, decent work and empowered communities. <https://foodsystems.community/action-area-1-1-2/>. Accessed 5 September 2022.
- Vorley B, Cotula L, Chan MK, 2012. *Tipping the balance. Policies to shape agricultural investments and markets in favour of small-scale farmers*. Oxford: Oxfam International.



# Opinion 3

## Reflections on developing truly dynamic global agricultural innovation systems: the case of One CGIAR

**Shantanu Mathur**



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This Opinion piece is meant to speak directly to the true spirit of *Ag4Dev* – the journal which seeks to advocate for agriculture for development. The international agricultural research *and* innovation system has increasingly sought to promote the need to support research not merely for its own sake but with the explicit aims of achieving development outcomes (and impact) through agricultural research.

The international agricultural research system has achieved some outstanding successes with benefits far outweighing costs (even by 200% in some instances). These achievements are predominantly those of CGIAR (currently comprising 15 international 'centres of excellence'). Despite the high impact of many of these successes over time, they have become fewer and far between. Many powerful voices associated closely with international agricultural research over the decades – most recently in South Asia and Africa – have felt that the System as a whole has struggled to develop an organisational culture in which collaboration with partners in the global agricultural research system happens naturally and spontaneously, if not systematically and in a structured way.

In my view, a successful Agricultural Innovation System (AIS) requires a structured and systematic multistakeholder engagement and a partnership architecture that is conducive to the achievement of multilocal development outcomes, particularly at the national and local levels. A successful AIS would typically represent a dynamic coalition of partners in a food system – including development practitioners and civil society but also advanced scientific institutions – operating in an interactive innovation process characterised by the centrality of the primary agricultural

producer. Indeed, with the integrated reform proposals made under the CGIAR Reforms of 2008. The CGIAR System was already seen to be well positioned to incorporate key elements of an AIS (World Bank, 2012).

At the outset, I believe that in its current incarnation and under the (still evolving) latest round of reforms, the System remains short of the requisite features that could make it truly a part of an inclusive innovation process rather than a system that seeks a linear innovation-induced rural transformation pathway to develop its stated results and development outcomes. However, I do believe there is considerable scope to get there, eventually.

### Changing the architecture of doing business

Against this backdrop, I wish to reflect on some issues and options relating to the above-referenced ongoing reform of the international agricultural research system, which is transitioning to the One CGIAR architecture. The transition is, essentially, one in which the centre-based business model is being replaced by one with 'science groups' operating within a matrix structure involving a geophysical dimension and thematic platforms.

This was seen as a departure from the previous CGIAR Reform of 2008 in that the former led to the advent of CGIAR research programmes that cut across several CGIAR centres around a common research agenda involving a large number of stakeholders in the research programme delivery. It was primarily considered a *programmatic reform*.

The move to One CGIAR is predicated on a *structural reform*, which appears to have been prescribed

without a prior review of the research portfolio in place, how it can be managed and delivered and what the key local stakeholders and partners believe needs to change – in other words, not sufficiently demand-driven. Yet, it is considered to be the most sweeping system-wide reform to date – and at a grand scale with implications that cut across the entire global agricultural research system.

This Opinion seeks to briefly explore whether the promise of these reforms can be delivered or even further enhanced *by developing a strong, new culture of meaningful and effective partnerships in the organisation, its ways of working and in its operations* – a necessary process and agenda that must go well beyond the extensive consultative process put in place so far in the current reforms. Extensive critical discussion is continuing (Voegelé, personal email communication).

One key question for me is that when these reforms are concluded, could One CGIAR truly become an integrated and coherent pro-poor AIS platform at a global scale? I believe there is scope for that to happen, but it would require some prerequisites to be met and the residual and unfinished agenda from the previous reforms to be adequately delivered.

## Some antecedents

Historically, the ‘good science’ pursued by CGIAR-led research programmes over the decades, has consistently responded to the ‘technology’ needs of hundreds of millions of farmers around the developing world – often, with outstanding results and impact. Given its global and multi-locational presence and thanks to the vast range of partners it works with already, the System is well positioned to play a significant role in addressing the challenges and opportunities for the resource-poor people in rural areas who depend on agriculture – today and in the foreseeable future.

The predominant CGIAR research strategy was a reasonably safe bet and considered effective in the aftermath of the initial green revolution successes. It was predicated on the straightforward presumption that upstream research alliances will help identify new, cutting-edge solutions to biophysical technology challenges faced by farming communities in a spectrum of conditions. The technology shelf was rich, with a wide array of important crops and commodities and associated technologies.

However, in a large number of the more difficult agroecosystems and socio-economic circumstances the technologies developed in the CGIAR System did not always move off the shelf and onto the fields of resource-poor family farmers. Technology

adoptability and adaptability often remained elusive in these marginalised contexts where the poorest rural communities resided. These geographies were also fraught with weak institutional structures of the national agricultural research and extension systems (NARES). Among the lessons learned, clearly the ‘technologies’ had been developed ‘elsewhere’, outside local farming systems, and the bolder early adopters had suffered from the failure of the ‘promising’ technologies coupled with a weak agricultural advisory service complement.

Until relatively recently, the CGIAR System’s work was predominantly focussed on translating the prototype-products of formal science institutions, mostly through (upstream) adaptive research into products to meet the technology needs of poor people in favourable high potential areas. This might be an oversimplified characterisation of the ‘research’ strategy but there was much criticism of the insularity within the System and its limited outreach, certainly until the mid-1990s.

With the advent of the Global Forum on Agricultural Research (GFAR) and its regional fora-led processes of institutionalisation in the mid-1990s, new opportunities emerged to develop strategic partnerships beyond the walls of the international agricultural research centres. Initially, engaging the national agricultural research system (NARS) leaders and later, increasingly, the broader NARS (Lele & Mathur, 1994).

The establishment of GFAR was thus, itself, a product of early CGIAR reforms in the mid-1990s. The very process which led to the establishment of GFAR infused greater awareness and a new culture of strategic alliances and partnerships as an intrinsic part of the business of the global agricultural research system. There was a recognition of the importance of more actively engaging key constituencies, including the farming communities and other relevant partners, by international agricultural research centres, moving in the direction of a participatory multistakeholder innovation system.

The 2008/09 CGIAR Reforms (involving Rod Cooke and various colleagues) put in place a structured participatory approach to planning and defining the international agricultural research agenda (CGIAR Change Steering Team, 2008). The Reforms proposed biennial Global Conferences on Agricultural Research for Development (GCARDs) which brought together all partners and stakeholders to discuss and define the design and implementation of CGIAR Research Programmes (CRPs) with a clear Strategy and Results Framework. They enabled CGIAR institutions to play the role of honest broker. They stimulated interaction with partners who could contribute to priority setting and whose competencies were clearly useful in achieving the System’s broad goals and mandate for delivering



international public goods geared to reducing poverty. The multistakeholder CRPs which emerged exhibited the promise of a range of effective working relationships with NARS, with agricultural universities, with civil society and with the private sector, including the advanced research institutions (ARIs).

The 2008 Reforms envisaged close and effective stakeholder engagement and extensive partnerships across the global agricultural innovation systems (including the NARS, ARI and development partners). The delivery mechanisms for the results-oriented CGIAR Reforms explicitly envisaged a revitalised GFAR. In leading the organisation of what became GCARDs, GFAR was meant to build on the CGIAR System's convening power within the global research system and play the leading role in providing a platform for interaction among all constituencies to develop a strategy and results framework for the research portfolio which would deliver on well-defined development outcomes (Khetarpal & Lingnau, 2022).

In the event, GFAR managed to bring in the insights and contributions of producers and consumers, national programmes, policy makers, civil society and universities, and of CGIAR scientists themselves. Achieving the collective product of multistakeholder CRPs was a daunting task but it was successful in putting in place a formidable set of critically important research programmes with hundreds of stakeholders from across the globe, ready to engage in the innovation process. These face-to-face episodes were, however, considered too cost-intensive although arguably they greatly helped in improving the fit between CGIAR and other constituencies (particularly end-users) in the innovation system and their collective ownership of the agenda. New insights are required on how these important priority-setting and planning exercises could be replicated in a more cost-efficient manner, in the future.

Another important initiative – the Institutional Learning and Change (ILAC) within CGIAR also contributed much to the shedding of the conventional top-down transfer-of-technology approaches and towards a more interactive, interconnected technology development approach based on continual learning. Some of the *avant-garde* research teams in CGIAR have embraced such an approach. It requires multistakeholder engagement and an interdisciplinary approach to become more mainstream to address the new adversities posed by climate change and other emerging challenges that are not merely biophysical in nature, especially when placed in the broader context of food systems transformation as discussed at the UN Food Systems Summit and presented in the works of Professor Robert Chambers.

## Revisiting an unfinished agenda

A staggering level of investment in time and resources has gone into the CGIAR reforms over the past three decades. The process of the transition to One CGIAR is dubbed by many to be one of the most far-reaching reforms that CGIAR has undertaken during this period. However, given the scale, complexity and scope of the exercise (and the consequent changes entailed by the structural and architectural reform with the associated governance) the process of the transition alone has generated a fair degree of tension and anxiety among many observers and stakeholders.

It is not self-evident how the current One CGIAR reform should have been undertaken, especially at such a global scale: with thousands of scientists and staff in some 90 countries across the globe and many more stakeholders in the global South and North who stood to be directly affected – ostensibly without adequate representation or engagement in the reform process. In the event, it appears to have been driven (and supported) by a handful of donors aimed more sharply at improving governance, accountability and operational efficiency.

Without a compelling rationale and adequate engagement of the key stakeholders the One CGIAR reform appears to have sought to undermine the independence of the CGIAR centres of excellence and erode their identity. At the same time, the protagonists appear to have been oblivious to the need to build greater ownership at the national and regional levels on the research priorities and specific needs of national agricultural innovation systems.

The 2008 reform promised a revitalised CGIAR: the way forward was predicated on an integrated reform proposal that built on the analysis of multistakeholder working groups and an independent review – and set forth a vision, principles and drivers. The One CGIAR reforms would do well to revisit these and build on the spirit of multistakeholder engagement in the reassessment and realignment in the global agenda for agricultural research.

Among the many ways forward, it would be opportune to resurrect the GFAR-led GCARD in an efficient template allowing for more bottom-up and inclusive reflection on national priorities matched with what the international agricultural innovation system can offer towards institutionalising a more credible multistakeholder AIS approach to its operational content. This should involve a structured and formal engagement of all relevant partner constituencies in the innovation process – from conception, design and, very importantly, also in the technology development/innovation process itself and eventual scaling up of the most promising innovations in agri-food systems.

It requires a shift from a multidisciplinary process to an interactive inter-disciplinary approach within a process of co-innovation by all partners, within a dynamic AIS approach. In other words, CGIAR should be working more closely with local and national systems and regional partners and those platforms and organisations that represent them (De Leener & Meschinelli, 2001).

The process and content should be coherent with and responsive to national development plans and should thus be led from the country level and not be top-down. Linkages with the development portfolio of international financial institutions such as International Fund for Agricultural Development (IFAD) and the regional development banks would place the CGIAR research within a development context – improving ownership, adoptability and scaling up prospects with development outcomes and impact. Such a strategic partnership would also ensure adequate support for capacity strengthening of the NARES complement, for more effective AIS partnerships in the agri-food system.

The CGIAR Council have now set up an ‘independent’ High-Level Advisory Panel (HLAP) comprising some of the key players and influential resource persons in the global agricultural innovation system, including the GFAR and its Regional NARS Fora. The HLAP is commencing a refreshingly new process of consultations on applied research *vis-à-vis* global agri-food systems; how the ongoing One CGIAR reform will support this; and how we can in this context renew (and transform for greater impact) our partnerships with national agricultural research and innovation systems, governments, and regional organisations also in the global South. This development is opportune, with a promise to put One CGIAR Reform on the right track.

In conclusion, among the prerequisites for the current reforms to succeed, they must step beyond the impressive and extensive consultative process that has followed the recent push back from NARS (especially the host country partners of CGIAR Centres) and other powerful regional stakeholders on the initial governance and institutional architectural change proposals that now fortuitously appear to have been discarded.

CGIAR has often demonstrated that it can be dynamic and agile as a broker that brings the best of science and blends it with local knowledge, to generate context-specific solutions – increasingly, also in marginal agroecosystems. Indeed, the aims of CGIAR were always fundamentally people-centred and the goals that have driven it are essentially oriented towards the reduction of poverty and the protection of the environment. Climate change has brought new challenges, the need to address context-specificity and the need to forge stronger partnerships with stakeholders at the local level.

I do believe in the promise of an inclusive and meaningful engagement of all constituencies and stakeholders, within one coherent global agricultural innovation system which would be eminently capable of rising to the global challenges. The One CGIAR would do well to make a qualitative shift in its portfolio aimed at building synergies with other constituencies who have the comparative advantage of complementing the CGIAR research and developing the context-specific solutions, which are truly pro-poor and built around the aspirations and engagement of the poor in the food system – from the farm to the fork. For this to happen a shift in mindset is required along with a better definition of the complementarity which other partners can bring to the table. Fortuitously, this is beginning to happen.

## References

- CGIAR Change Steering Team, 2008. A revitalized CGIAR – a new way forward: the integrated reform proposal. Co Chairs Change Management Team CGIAR.
- De Leener P, Meschinelli A, 2001. Enhancing co-research capacities among international and national partners in the Sahel. In: Hurni H *et al*, eds. *Enhancing research capacity in developing and transition countries: experiences, discussions, strategies and tools for building research capacity and strengthening institutions in view of promoting research for sustainable development*. KFPE, Swiss Commission for Research Partnerships with Developing Countries, July. Arbeitsgemeinsch, Geographica Bernensia.
- Khetarpal R, Lingnau H, 2022. The Global Forum on Agricultural Research and Innovation (GFAR): revived and rebooted. *Agriculture for Development*, **45**, 8–13.
- Lele U, Mathur S, 1994. Towards a NARS’ vision of international agricultural research. The foundation document for the NARS’ Declaration on A Vision for International Agricultural Research at the International Conference, Rome. December.
- World Bank. 2012. *Agricultural innovation systems: an investment sourcebook. Agricultural and rural development*. Washington, DC: World Bank.

## Mailbox

# Insights on land use, agriculture and food security in Bangladesh: way forward with climate change and development

The legend of Figure 2 in this wide-ranging and informative article (Article 6, *Ag4Dev44*) tells the reader that the green areas west of the red built-up area of Dhaka are “Green Vegetation” (true but uninformative), further specified as “Forest, Fallow Land”.

However, almost all of these green areas are in fact agricultural land, as are the smaller yellow areas. They have lines and clusters of homesteads with intensive mixed horticulture, including vegetables, fruit trees and other perennial crops, and they are intensively farmed with two or three crops per year including wetland rice, jute, some wheat and other crops.

An inspection of the relevant area on Google Earth, adequately enlarged, will show the interested reader the dense pattern of arable field boundaries, the contrasts between fields, and the pattern of homesteads: small houses surrounded by orchard trees and bushes. No forest, very little fallow land; some fields are harvested and not yet planted or recently sown with the next crop. The authors may have lacked input from an agronomist familiar with Bangladesh or similar South Asian lowland areas during the interpretation of their remote sensing images.

**Robert Brinkman**

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## ***How to End Hunger in Times of Crises* by Ignacio Trueba and Andrew MacMillan (2nd edition, 2013), now available as a FREE e-book**

Dear Editor,

After retiring from FAO in 2005, I continued to take a lot of interest in hunger-related issues, particularly in relation to Brazil’s Zero Hunger Programme as it evolved after its launch by President Lula at his inauguration in January 2003. At the international level, there was still a widespread assumption that hunger was a consequence of lack of food and therefore the world needed to produce more: food aid, provided by food surplus countries, was seen as the main tool for addressing the problem.

In contrast, Zero Hunger was based on the reality that people were hungry mostly because they could not afford to buy the food that they needed for a healthy life. Its core component was a social protection programme that provided cash grants to all of the neediest families in the country. One consequence of this was that it created an expanding market for foods that helped to stimulate the development of small-scale farming

Talking about this and many of our other experiences in developing countries, Ignacio and I decided to write a short and easily readable book in which to summarise what we had learned about ending hunger. We published a first version in Spanish in 2011 and then updated it several times until a final version was

produced in Spanish, English, French and Italian for EXPO Milan 2015, which focussed on food issues.

In 2012, I was invited by the Tropical Agriculture Association to deliver the Hugh Bunting Memorial Lecture under the title ‘The future of agriculture through a hunger eradication lens’. Naturally the book was my main point of reference.

Last year, by chance, I met an American couple who were revisiting Italy for the first time since they had honeymooned here 50 years ago. Anna talked about the work she has been doing for an NGO-run nutrition programme in South Sudan that relies heavily on US food aid. I gave her one of my few remaining copies of the book, and the next morning she asked if she could have ten copies to give to colleagues as ‘essential reading’.

This was impossible, but it led me to decide to have it reprinted as an e-book that could be downloaded by anyone free of charge. I was tempted to update it but then on revisiting it, felt that much of what we had written in the 2013 second edition is as applicable now as it was then. New lessons have certainly been learned since it was published, but they would be better expressed by younger people who have been directly engaged in the recent developments.



One small problem for readers is that the links to references do not function, but hopefully readers will bear with this!

The book can be downloaded free of charge from the Got Matar website home page ([www.gotmatar.org](http://www.gotmatar.org)) in two different forms. For reading on 'normal' computers, I suggest that you use the PDF version which you will find at: [www.gotmatar.org/blog/wp-content/uploads/How-to-End-Hunger-in-Times-](http://www.gotmatar.org/blog/wp-content/uploads/How-to-End-Hunger-in-Times-)

[of-Crises.pdf](#). For reading on iPad, Kindle, etc you may find it easier at: [www.gotmatar.org/How-to-End-Hunger-in-Times-of-Crises.epub](http://www.gotmatar.org/How-to-End-Hunger-in-Times-of-Crises.epub). It can be opened by using *Books* or similar programmes.

You are free to copy the book and to share either version with anyone, free of charge.

**Andrew MacMillan**

(TAA Member)



Photo: courtesy of Musfiqur Rahman

# News from the field

## The imperative of food systems transformation in rescuing the SDGs: what role will the United Nations Food Systems Coordination Hub need to play?

**Stefanos Fotiou and Jamie Morrison**

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*Jamie Morrison is Senior Policy Advisor at the Global Alliance for Improved Nutrition. He is an international development economist with more than 25 years of experience in the provision of research, capacity development and technical assistance in relation to the impact of trade and economic policy reform on food security. He was previously Director, Food Systems and Food Safety Division at FAO. He holds a PhD in agricultural economics from the University of London (Wye College).*

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### Context

The 2021 Sustainable Development Goals (SDGs) report (United Nations, 2021) reflected the dramatic impact of the COVID-19 pandemic in halting, and in many cases reversing, progress that had been made towards the 17 SDGs. The negative impacts of the pandemic on levels of poverty, on levels of inequality, and on the food security and nutrition status of individuals across the globe, exacerbated a situation in which progress had already been slowing and which, in the case of some indicators such as the number of hungry people, had already been deteriorating for a number of years (FAO *et al*, 2021: 1). To some extent, the feared magnitude of increases in the number of hungry as a result of COVID-19 was alleviated by the resilience of food systems to economic restrictions, in large part due to less stringent restrictions on activities connected with the production and distribution of food as an essential good, and the success in maintaining relatively open agricultural trade.

However, as many countries began to take the initial steps towards recovery during mid-late 2021/early 2022, supply chain restrictions combined with significant latent demand to stoke inflationary

pressures, reducing the affordability of essential energy and food products, particularly for vulnerable groups. With the disruptions resulting from Russia's invasion of Ukraine, a major agricultural exporter, and the associated economic sanctions imposed on Russia, a major exporter of food, energy and fertiliser, there is now a significant threat to global food security and nutrition. This will inevitably push countries further, not just from the target of ending hunger, but from a range of developmental goals, as strategies and programmes are put on hold or modified in the face of the immediate crisis.

Against this backdrop, the imperative of food systems transformation in achieving the SDGs is clearer than ever. We have known for some time that food systems transformation holds one of the keys to putting us back on track. Indeed, in 2019 the Global Sustainable Development Report (United Nations, 2019) identified food systems as one of only six entry points for achieving the Sustainable Development Goals – not just SDG1 and 2, but all 17 SDGs. The direct links of food systems with all SDGs are highlighted in Figure 1.

The critical role that food systems must play in delivering the Decade of Action<sup>1</sup> was recognised in the United Nations Secretary-General's decision to

<sup>1</sup> Recognising that the SDGs were unlikely to be met with existing actions, the United Nations Secretary-General called, in September 2019, for a Decade of Action (2020–2030) for “accelerating sustainable solutions to all of the world's biggest challenges – ranging from poverty and gender to climate change, inequality and closing the finance gap”.





**Figure 1. How the SDGs are linked to food systems.** (Reproduced with permission. Image source: FAO. See [www.fao.org/fileadmin/user\\_upload/codexalimentarius/photo-archive/Infographics/SDG-Wheel.jpg](http://www.fao.org/fileadmin/user_upload/codexalimentarius/photo-archive/Infographics/SDG-Wheel.jpg))

convene a Food Systems Summit in 2021, which set out how food systems transformation could help to accelerate delivery across the 17 Sustainable Development Goals and how the agenda can be taken forward through work at all levels of governance.

While governments will need to lead processes of change, all food systems stakeholders will need to commit to aligned action and to forge partnerships that allow countries to deliver on their pathways. These partnerships will be critically important in advancing the means of implementation, including appropriate innovations, the provision and effective use of data, and the more accessible finance required for countries to deliver on their transformational pathways.

## What is the United Nations Food Systems Coordination Hub and how will it work?

The United Nations Food Systems Summit reinforced the need to focus on a food systems thinking approach as an accelerator of the 2030 Agenda. One of the main achievements of the Summit was the commitment demonstrated by national governments through the high-level statements issued and the setting of national transformational pathways.<sup>2</sup> Overall, 163 Member States made statements at the Summit speaking to the importance of food systems in advancing the 2030 Agenda, nationally and globally. Convenors were appointed by 148 Member States to

<sup>2</sup> An analysis of the characteristics of the pathways and the actions being taken towards their implementation is provided in UN Food Systems Summit Member State Dialogues Synthesis Report 4 (United Nations, 2022).



lead national dialogues, and 111 have so far submitted National Pathways for food systems transformation that offer a basis for realising the vision of the 2030 Agenda at country level. Many national pathways include concrete actions to mainstream food systems transformations for the acceleration of the SDGs:

- Samoa plans to use traditional knowledge of the food system, eg natural farming, food preservation and cooking, for improved health and nutritional security.
- Cambodia aspires to the expansion of 1000 days health counselling and services for mothers and children under 2 years of age, with a focus on promoting exclusive breastfeeding and improving infant and young child feeding and mother's dietary diversity.
- Ghana plans to strengthen inclusive farmer groups and women-led community-based organisations to promote 'modern' agroecological practices (through sustainable agricultural intensification methods) and solar-powered farmer-led irrigation practices.
- Honduras will establish or strengthen public policies to improve financial inclusion and technical assistance to small-scale producers and micro, small and medium-sized enterprises.

To keep up the momentum of the Summit, the United Nations Secretary-General committed the United Nations to host a Food Systems Coordination Hub to support countries implementing food systems transformations towards the achievement of the 2030 Agenda.

The Hub, hosted by the Food and Agriculture Organization of the United Nations (FAO) on behalf of the UN System, and managed by the FAO Office of Sustainable Development Goals, is staffed by colleagues from a number of United Nations agencies. FAO provides overall administrative and programmatic support for the operations of the Hub. Oversight of the Hub is with a Steering Group comprised of the Principals of FAO, International Fund for Agricultural Development (IFAD), World Food Programme (WFP), United Nations Development Coordination Office (UNDCO) and United Nations Environment Programme (UNEP). The Oversight Group will engage with the Executive Office of the Secretary-General (EOSG) and the United Nations Sustainable Development Group (UNSDG) on the Hub's work.

The Hub will act as an independent, critical nexus point inside the UN System in relation to food systems and the 2030 Agenda. To this end, the work plan of the Hub will cover six Key Functions.

1. **Facilitate implementation of National Pathways.** Upon request, the Hub will support countries to translate the aspirational character of their National Pathways and other transformative policies into actionable plans to achieve SDG-based food systems transformations. In doing so, the Hub will leverage the UN System (at the country, regional and global levels) and work closely with the Ecosystem of Support (a large group of entities that supported the Food Systems Summit [FSS] process as well as entities that emerged from the Summit).<sup>3</sup> The Hub will facilitate the identification of support services while the implementation of these services will be done by the United Nations agencies supporting the Hub and other actors.
2. **Strengthen strategic thought leadership.** Building on emerging issues identified in the Summit, the Hub will contribute to strengthening capacities for systems thinking, sense-making and anticipating persistent, emerging and novel drivers of, and obstacles to, food systems change, conceptualising the value of transformative innovations to shape desirable futures where food systems deliver on health, value chain development, etc. In these efforts, the Hub will harness futures thinking and strategic foresight tools and techniques, such as scenarios and games, to explore possible futures and their implications for present actions and strategies to respond to complexity and change.
3. **Engage the Ecosystem of Support.** The Hub will strengthen peer-exchange and learning between countries, the UN System, and other actors. The Hub will connect coalitions and help to identify overlaps, complementarities and opportunities for joint action. It will also connect coalitions with countries to accelerate food system transformative actions.
4. **Leverage Means of Implementation (MOI).** In the first two years of its work, the Hub will focus on the MOI-Finance with the overall aim to mobilise governments, public organisations, private business and civil society for a global shift towards a new Food Finance Architecture.<sup>4</sup> The specific

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<sup>3</sup> The 'Ecosystem of Support' includes both UN and non-UN entities with demonstrated added value that will provide support to the countries' efforts to implement their own pathways. The Ecosystem of Support includes, but is not limited to, the active coalitions and initiatives that emerged from the FSS, stakeholder groups, the UN Food Systems Task Force, science and knowledge communities, food system think tanks and others.

objectives of this work are to: (i) foster standards, norms and incentives to finance food systems differently; and (ii) optimise and mobilise public and private finance for profitable, equitable, sustainable and resilient global and national food systems.

5. **Communicate and advocate a food systems approach.** The Hub will increase awareness, shape the narrative and drive collective mobilisation around the role of food systems transformation to deliver the SDGs. In doing so, the Hub will continue to refine, curate and elevate a common United Nations voice on food systems through multiple traditional, digital, social media and information channels, as well as other communication platforms.
6. **Prepare for the 2023 Stocktaking Moment.** The Hub will manage the preparations of two-yearly Stocktaking Moments until 2030 with the first one to be organised at the end of 2023 to drive continuous progress on national, regional and global food systems transformations. These events will be utilised to showcase progress made on implementing pathways from governments as well as from coalitions of actions and other actors of the Ecosystem of Support.

### How can countries and stakeholders engage with and support the Hub?

The Hub is a 'One-UN initiative' that draws on the collective assets and expertise of the United Nations agencies, funds and programmes that support its operation. It works directly with the United Nations Resident Coordinators and Country Teams to ensure that the delivery of support services to the countries

will happen through the existing United Nations structures. The Hub will also connect coalitions by keeping a publicly available repository of up-to-date information on each of the coalitions; it will be a client-oriented rapid response connector and a credible source of information for the Ecosystem of Support and will help to identify overlaps, complementarities and opportunities for joint action. It will also engage widely with stakeholders through the establishment of a Stakeholder Engagement and Networking Advisory (SENA) Group comprising self-nominated focal points of constituencies as defined in the United Nations Secretary-General's Statement of Action, particularly youth, Indigenous Peoples, producers, women, the scientific and technological community, and the private sector.

### References

- FAO, IFAD, UNICEF, WFP, WHO, 2021. *The state of food security and nutrition in the world 2021. Transforming food systems for food security, improved nutrition and affordable healthy diets for all*. Rome: Food and Agriculture Organization of the United Nations. <https://doi.org/10.4060/cb4474en>.
- United Nations, 2019. *Global sustainable development report*, New York: United Nations. [https://sustainabledevelopment.un.org/content/documents/24797GSDR\\_report\\_2019.pdf](https://sustainabledevelopment.un.org/content/documents/24797GSDR_report_2019.pdf). Accessed 8 August 2022.
- United Nations, 2021. *The sustainable development goals report 2021*. New York: United Nations. <https://unstats.un.org/sdgs/report/2021/The-Sustainable-Development-Goals-Report-2021.pdf>. Accessed 8 August 2022.
- United Nations, 2022. *Food systems summit dialogues, March 2022, member state dialogues synthesis Report 4*. <https://summitdialogues.org/wp-content/uploads/2022/03/Member-State-Dialogue-Synthesis-Report-4-March-2022-EN.pdf>. Accessed 8 August 2022.
- World Bank, 2021. *Food finance architecture: financing a healthy, equitable and sustainable food system*. <https://www.worldbank.org/en/topic/agriculture/publication/food-finance-architecture-financing-a-healthy-equitable-and-sustainable-food-system>. Accessed 8 August 2022.



Photo: courtesy of Musfiqur Rahman

<sup>4</sup> The Food Finance Architecture is a policy brief that lays out the building blocks for how banks, investors, development institutions, companies, farmers and governments can shift capital out of high-carbon, unequal, extractive food assets and into inclusive, climate-smart, circular business models that benefit the people and the planet (World Bank, 2021).



# Obituary

## Dr Matthew Dagg (1931–2022)



Matthew (Matt) Dagg was born on 15 July 1931 in Washington, County Durham, UK. Initially, Matt was trained as physicist and earned his BSc degree in physics and PhD in upper atmospheric physics and radio astronomy from Manchester University. His PhD research was done at Jodrell Bank Observatory. For the next 37 years he spent most of his professional career working overseas in the tropics in agricultural research and research management in developing countries. Matt died on 10 January 2022 at home in Bramhope, Yorkshire.

From 1956 to 1969 Matt worked as Scientific Officer with the East African Agricultural and Forestry Research Organization (EAAFRO) based at Muguga, Nairobi, Kenya, where he conducted experiments on soil and water regimes of a variety of crops and commodities, and on natural resource management issues in Eastern African countries. His soil physics work focussed on the particular effects of land management practices on soil structure; catchment area experiments of effects of land use changes on water balance of catchment vegetation and surface run-off; water requirements of crops and irrigation schemes; and estimation of evaporation rates.

Matt stayed on at Muguga after independence and became Head of the Physics Division in 1964. He directed research of the Division in catchment area experiments on hydrological effects of land use changes; estimation and mapping of evaporation rates in East Africa; crop water use; micro-meteorological and energy balance studies; and effects of cultivation practices on water regime of crops.

In 1969, Matt moved to northern Nigeria to accept the position of Director of the Institute for Agricultural Research (IAR), Samaru, at Ahmadu Bello University, Zaria, a post which had been held previously by Harry

Darling. Matt was responsible for the management and administration of IAR and of research on crops, livestock and farming systems for agricultural development in the savanna areas of Nigeria. At the time, IAR was Nigeria's largest agricultural research institute with a network of outstations: in 1976, even after devolving responsibility for sub-degree level training, extension-research liaison and livestock research, IAR still had 138 research staff, some 1200 supporting staff and an annual budget of USD 10.4 million. IAR maintained close liaison with the Faculty of Agriculture of the University, and most faculty staff conducted their research within IAR's programme. Matt was a member of the University Council, Senate and all the major policy committees, and also maintained a close relationship with the ministries of agriculture of the Federal and northern states.

During his time at IAR, Matt transformed and modernised IAR's research and development capacity, and added new scientific staff, recruiting them from Nigeria and more widely from other parts in Africa, and from Asia, Europe and North America. He provided vision and fostered collective leadership and team spirit. Together with John Davies, Deputy Director, and Alhaji Ahmed Jarma, Secretary, he provided direction and created an enabling environment for good quality scientific research for agricultural development relevant to smallholders in particular. He strengthened IAR's research collaboration with institutions in developed countries including the UK and USA, and hosted several UK Overseas Development Ministry and United States Department of Agriculture funded projects and teams including from the Cotton Research Corporation, Rothamsted Research Institute, Reading University and Kansas State University.

Matt gave high priority to research and extension activities in natural resource management, agricultural economics and rural sociology, and hence the early days of farming systems and on-farm research, in addition to agronomy, crop improvement, agroecology, crop protection, soil science and agricultural engineering. IAR's Library and pest diagnostic facilities were accessed internationally. IAR's national Annual Cropping Scheme Meetings became well known for their rigorous participatory process of reviewing and approving the instituted-wide annual workplans. Matt paid serious attention to the need to publish research results promptly in scientific journals and books, and encouraged staff to participate in



national and international conferences. All this led to establishing a strong and vibrant national agricultural research and extension programme for development of the savanna that was internationally respected. This resulted in IAR attracting many international visiting scientists and research students to undertake their field work in Nigeria. Much of this was a result of the culture created and fostered by Matt amongst his fellow administrators and the personal and professional interest that he took in staff at all levels.

During Matt's time, IAR was an exciting and stimulating place to work and live. He ensured that the Samaru Sports and Social Club was always well stocked and staff and their spouses and children made full use of the Samaru sports facilities, including squash for which Matt was the team leader. For those, like me, who were fortunate to work at IAR under Matt, their work and social experience at Samaru left an indelible mark in their collective memories, and many retained fond and affectionate recollections of their time at Samaru for a long time afterwards.

After his time at IAR, Matt spent four years in the New Delhi office of the Ford Foundation as a Programme Officer, from 1977 to 1981. He was responsible for grant development and administration in technical agricultural research aspects of the food production programme. He was closely involved with agricultural research and irrigation management projects and served as Liaison Scientist between the Indian Council for Agricultural Research (ICAR) and the International Rice Research Institute (IRRI). His dealings with ICAR headquarters, several agricultural universities and major institutes, provided Matt with a solid understanding of the governance and management of the powerful Indian agricultural research system, which served as a model for several Asian countries.

Matt joined the International Service for National Agricultural Research (ISNAR), The Hague, Netherlands, as Senior Research Officer in 1981, soon after its creation, to focus full-time on providing advisory services to national agricultural research systems (NARS) in developing countries. In particular, Matt took part, often as leader, on the invitation of governments, in diagnostic reviews of research systems of Kenya (1981), Papua New Guinea (1982), Somalia (1983), Sri Lanka (1984), The Gambia (1985), Pakistan (1987), Ethiopia (1987), Uganda (1988), the Philippines (1988), Ghana (1989) and Namibia (1992). Most of the reviews led to research-planning exercises, and preceded major national projects aimed at reorganising and strengthening the national research system with substantial donor support, especially by the World Bank. At the request of governments, Matt also participated in mid-term reviews of projects (eg Ethiopia and Kenya). When ISNAR was restructured in 1992,

Matt was designated Regional Coordinator for ISNAR's programme in anglophone Africa, with responsibility for maintaining primary contacts with 15 countries.

While at ISNAR, Matt also participated in management research and in the synthesis of ISNAR experience and activities with special reference to the complex processes involved in formulating research programmes. He also participated in the working groups on monitoring and evaluation, priority setting, and structures and organisation. Matt contributed to a number of internal and conference papers on these topics as ISNAR's corporate understanding of these processes developed. Matt retired from ISNAR in July 1993.

While working mainly with NARS, Matt maintained continuous contact with the international centres of CGIAR after his arrival in Nigeria in 1969, just as the International Institute of Tropical Agriculture (IITA) was being set up at Ibadan. IAR had close links with the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad, India, from its inception in 1972, and Matt supervised a project to strengthen Andhra Pradesh Agricultural University's links with ICRISAT.

From 1975 to 1981, Matt was a member of the Board of Trustees of International Centre for Tropical Agriculture (CIAT) in Cali, Columbia, and served as Chairman of the Board's Programme Committee from 1978 to 1981. Matt was also effectively a part-time member of IRRI's staff from 1977 to 1981. From his position with the Ford Foundation in New Delhi, Matt was involved in early conceptual work that led to the creation of the International Irrigation Management Institute (IIMI). In October 1981, Matt was appointed a member of CGIAR's Technical Advisory Committee (TAC) Study Team charged with examining the proposal to establish IIMI. In 1994–1995, Matt served as a panel member of the External Programme and Management Review of the International Potato Center (CIP) in Lima, Peru.

Matt will be remembered by many of his colleagues around the world as a collegial and caring leader and an effective multi-cultural team player. He mentored and helped young scientists who worked with him. He was at ease with everyone in any country he visited and always found it possible to be useful and make a positive contribution to science and development. Matt was a dedicated and committed scientist and worked hard to ensure that good quality and relevant science was at the base of development. He was a kind and unassuming person and because of his humility and low-key nature, Matt remained an unsung hero, but his colleagues knew well the many contributions Matt had made to development in overseas countries during some very difficult times.

Throughout his overseas career, Matt was always ably assisted and supported by his wife Elaine. After retiring, Matt continued to devote his time to playing squash, tennis and golf and travelling with Elaine. His last years were spent working as a volunteer with his wife in providing social service support to the local community and church in Bramhope where Matt and his family had lived since 1975. Matt is survived by his

wife Elaine and three daughters, Belinda, Jennifer and Susan, and three grandchildren.

## Amir Kassam

(TAA Member)

(with inputs from Elaine Dagg, David Andrews, David Norman, Peter Beeden, John Deeming, Willem Stoop)

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## David Trotman (1937–2022)



David Trotman passed away peacefully after a short illness on 5 May 2022.

Colleagues will remember David for his professionalism, quiet determination and commitment to agricultural education, rural development and improving rural livelihoods in a career spanning 40 years. We will also remember his wife, Patricia, who sadly predeceased him and who always made a home wherever they were posted; she helped build communities, and entertained and welcomed new arrivals and visitors.

A former colleague, Jonathan Lingham, has written: *"It was a chance meeting with David which steered me towards my career in ODA/DFID [when] I applied to join the civil service, I had no hesitation in ticking the 'ODA' box. I am sure that David touched the lives of many people in a similar way during his long career."*

David was born in Bolivia, where his parents were missionaries. After his studies in the UK at Harper Adams Agricultural College, and later at Reading University, he worked in agricultural education in Uganda, Botswana, Solomon Island and Lesotho, before becoming an agricultural adviser back in the UK. He served in three Development Divisions in Africa and South Asia before taking up one further appointment in Mauritius and finally retiring to Wiltshire in 1997.

## Andrew Bennett

(TAA Member)

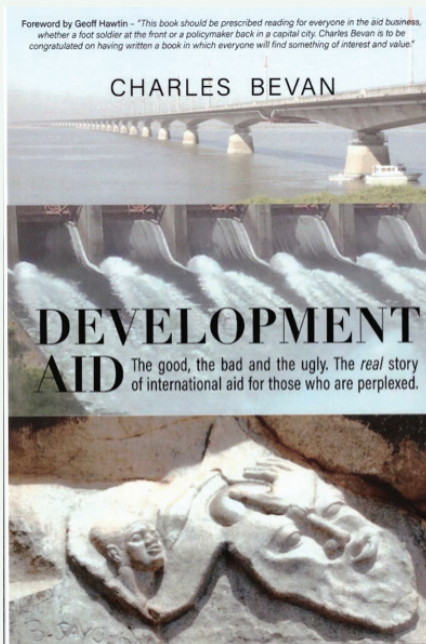
(A fuller appreciation of his life can be found on the TAA website at [https://taa.org.uk/obituaries/.](https://taa.org.uk/obituaries/))



Photo: courtesy of Musfiqur Rahman



# Bookstack



***Development aid: the good, the bad and the ugly. The real story of international aid for those who are perplexed***

**Charles Bevan (2021)**

**Compass-Publishing, UK, 357 pages**

**Paperback, £15.99 (Available from Amazon)**

**ISBN 978-1913713720**

TAA Member Charles Bevan is an experienced agricultural development professional. His career extended over 45 years, from 1972 to 2017, much of it working on large agricultural investment project design and evaluation with the World Bank, Food and Agriculture Organization of the United Nations (FAO) and others. Having worked in more than 40 countries, Charles is ideally positioned and qualified to assess the performance and impact of development aid. The book's title is clear: this is the real story of aid, some of which has been 'good' (successful), some 'bad' (unsuccessful) and some 'ugly' (corrupt). It is not an easy read, especially for those of us whose own careers have been in

development aid, but if we have had our eyes open, then this book confirms some of our worst suspicions.

In the Foreword, Geoff Hawtin, TAA member and winner of the 2021 Development Agriculturalist of the Year award, says *"Charles Bevan highlights the hypocrisy, self-interest and failure associated with much of the official development assistance, or foreign aid, provided to low- and middle-income countries. The ... provision of such assistance is far from being purely altruistic, and is one of the key soft-power policies of the USA and its allies."* The failure of many of the West's aid programmes has *"handed to others, notably China, a golden opportunity to elicit support from developing country leaders by implying ... that they do things differently and better"*.

The content of the book will come as no surprise to many 'old hands', but it will no doubt shock those who focussed on the technical aspects of projects rather than the politics and policies behind them. The detailed Contents, extending to four pages, partly compensates for the lack of an index. With five pages defining key abbreviations/initialisms, more than 200 references and further reading, and 14 pages of appendices, this is a textbook for current students of development sciences and a handbook for those recently employed and still working in development aid.

The Introduction provides the stated aim of the book, it is: *"to shed some light on official development assistance (ODA), often just called 'aid', based on my personal experience ... an increasing number of people do now want to know whether their aid dollars ... have been used wisely ... the time is right to put it on record"*.

Chapter 1, Historical Background, is an excellent overview of aid since the end of the Second World War. It provides a brief but convincing history of the origins of development aid as part of the effort to win the Cold War. This is followed by an analysis of development aid policy changes following the fall of the Berlin wall in 1989, and how there is still no clearly agreed right and wrong way to help poor countries develop their economies. Even after 70 years of aid, some economists say the important thing is simply to get the money into the hands of the poor, while others say the important thing is for an economy to grow and provide more and better jobs, and that simply giving charity does not work. Helpful references to the key papers, reports and books are provided. Chapter 2, Aid Infrastructure, describes the major international organisations involved with aid: the UN agencies (International Fund for Agricultural Development [IFAD] and FAO in most detail), the World Bank and other regional development banks, bilateral aid agencies, CGIAR, the private sector and large NGOs.

Chapters 3 and 4 provide the core of the book: more than 50 case studies describing programmes, projects and technologies that were fundamentally flawed in concept or execution, or in some cases both. There are examples of cynical decisions based on Cold War realpolitik, or independence politics, rather than need; a tolerance of corruption; the pressure to lend frequently far exceeding the wishes to borrow; too much faith in Western democracy working in many developing countries; misuse of trade and aid; manipulation of feasibility and evaluation findings; inappropriate technologies; jobs



for the boys; deception; misuse of funds and equipment; and of course, well-meaning naivety. It all makes for depressing reading and reaffirms Peter Bauer's observation that *"aid is often a tax on poor people in rich countries and a gift to rich people in poor countries"*.

The author has strong opinions and does not mince his words, being critical of several well-known approaches (integrated pest management [IPM], Training and Visit [T&V] or 'Touch and Vanish', the System of Rice Intensification [SRI], low external input technology [LEIT]); agencies (Codex Alimentarius); and technologies (biogas digesters, wood-burning stoves, treadle pumps, vetiver grass). He also highlights the management weaknesses of FAO, citing examples of patronage, self-interest, nepotism, electioneering and misuse of funds. The misbehaviour of certain individuals is described, although they are lightly disguised by pseudonyms such as 'Mr Good', 'Mr Magnificent', and 'Ali and Ali'.

The author concedes that it is not quite as bad as it sounds. In practice, the *"foot soldiers and their bosses were just doing as they were told"*. The focus of the case studies is on large projects, often infrastructure or multi-sectoral agricultural development projects, but there were many other smaller projects that were successful. At the end of the day, aid was used to buy allegiance from governments that might have been tempted to look to Russia or China – and as the author says, *"the west had to win that war"*!

To help reset the balance, Chapter 5 considers what does work, although only 26 pages are dedicated to this. Examples of success include: infrastructure such as dams (although their problems are acknowledged,

*"the era of big-dam building may be coming to an end"*); dwarf rice and wheat (*"probably the biggest single agricultural initiative since the demonstrations of the benefits of adding nitrogen fertiliser to crops by Sir JB Lawes in 1891"*); hybrid rice; mechanical cultivation; fertilisers and agrochemicals; conservation agriculture; livestock (at least Operation Flood in India: *"from serious milk shortage to the world's largest producer"*); disease control in people and livestock (smallpox, yellow fever, polio, malaria, HIV/AIDS, rinderpest, etc); microfinance; and large-scale farming in developing countries (some dramatic failures but a high proportion of successes).

Chapter 6 takes a thoughtful look forward at development aid in the coming years and concludes that there will almost certainly be a need for aid for many countries, particularly emerging economies, failed states and fragile states. Africa still has the greatest need, and enormous potential, but the failure of democratic governance, the dominance of autocratic leaders, failure of the rule of law and widespread corruption limit the effectiveness of aid. Western aid is therefore likely to fall rather than to rise in Africa and will focus on a dozen or so countries with a semblance of good governance (such as Botswana, Ghana, Ethiopia, Kenya, Namibia, Senegal, Benin and South Africa, and maybe also Malawi, Tanzania, Uganda, Sudan), probably in competition with China. Of the Islamic countries, the West will focus on those previously colonised (such as Bangladesh, Egypt, Indonesia, Jordan, Nigeria, Pakistan, The Gambia and Senegal). Although most of Latin America is still eligible for aid, no significant increase in Western aid is expected, due to a history of failure, ongoing difficulties and a lack of reliable opportunities. India, the world's third largest

economy, still needs some aid for specific problems such as climate change, air and water pollution. Climate change is already one of the most important issues facing all countries, and so mitigation and adaptation will account for increasing amounts of development aid.

Changes to the institutional environment of aid will certainly take place, particularly within the Bretton Woods and UN institutions. Budget support will continue to be scaled back, to be replaced by a growing focus on the private sector. There will be less government-to-government support, and greater use of NGOs. Western aid will be directed at countries making progress with liberal democratic government; to countering Islamic terrorism; and to fragile states (predicted to contain half of the world's poor, 1 billion people, by 2030).

As far as aid in the coming decades is concerned, China is the main story. Although theoretically still eligible for aid, most Western aid to China has already been phased out, and China is now a massive giver of politically motivated aid – in fact it is already the biggest global source of lending. It wants to promote its statist model, expand its markets and gain access to the natural resources of developing countries. Developing countries may be more attracted to the successful Chinese autocratic model than to the liberal democratic model of the west, particularly since it would 'legitimise' the autocratic regimes in many African countries. However, the Chinese model of state-sponsored free enterprise very much depends on Chinese culture for its success, and this is not easy to replicate elsewhere. The Belt and Road Initiative, for example, involves 115 countries and is by far the biggest aid initiative ever conceived; but it is unlikely to ever be completed.

Some countries are already having second thoughts, and a wave of defaults is predicted. The USA is already beginning to think about countering Chinese influence in developing countries, and this may prove to be a catalyst for future aid from the West.

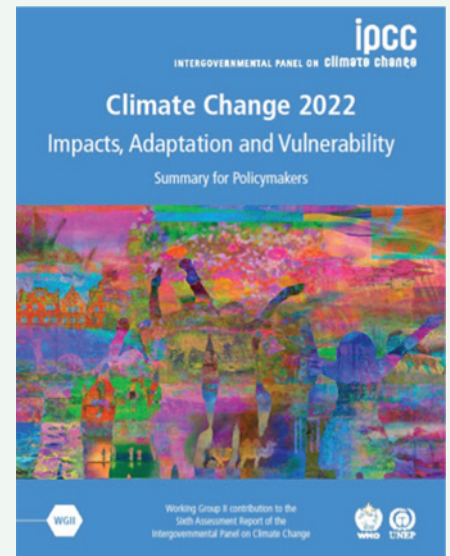
The chapter concludes that there will be a need for aid for poor countries in the coming years, but the main motive will still be politics. The focus will be on *“encouraging the adoption of liberal democracy and governance, containing terrorist threats, responses to emergencies, climate change, illegal immigration, and competing with China”*.

The final chapter of the book is the Epilogue, written after the COVID-19 epidemic. Five key questions are asked that summarise the book:

- **What has aid achieved?** Not as much as hoped. The successes of China, South Korea and Malaysia are more due to culture than aid. The rest of Asia has *“hardly made any progress”* or is *“struggling”*; Africa, with very few exceptions is *“a shameful economic disaster”*; Central America, with the notable exception of Costa Rica, is *“little more than a disaster”*; Latin America is *“a mixed bag”*; and the Middle East is *“pretty dire”*.
  - **Why has it taken so long for failures to be recognised?** Deliberate deception, but it did help to win the Cold War.
  - **Why did so much aid fail to generate economic growth?** Aid was a new concept so there was little practical experience available; much of the aid was inappropriate; national politics and governance failed in recipient countries.
  - **How important is culture?** It is now accepted that culture or *“social trust”* is a very useful indicator of where best results to aid might be expected.
- **Can more aid be justified, and if so, what are the priorities?** Aid can still contribute to addressing global problems, such as poverty and the achievement of poverty reduction, disease control and reducing carbon dioxide emissions, based on charitable reasons and self-interest in providing global public goods. It will focus on fewer countries, especially those with *“active or nascent liberal democratic systems of government”*. Loans will be provided for essential infrastructure, in competition with China. Increases in agricultural production are still needed to feed a growing population, especially in Africa. World security will continue to be a key reason for aid, sometimes used covertly to provide military assistance. Funding for multilateral programmes such as UN agencies, the International Development Association (IDA) and the World Bank will continue, but in competition with China, which is seeking to increase its influence. International Monetary Fund (IMF) loans will continue, again in competition with Chinese loans. There will probably be a reduction in overall aid, with few countries meeting the 0.7 percent gross domestic product (GDP) target. There will be fewer job opportunities in aid agencies for Western nationals. It is sad, but not surprising, to see the author advising *“against any Westerner planning to make a career out of aid”*. The recent transformation of the Department for International Development (DFID) into the Foreign, Commonwealth and Development Office – combining foreign affairs with development – only confirms that *“to a large extent, aid is about politics not charity”*.

**Paul Harding**

(TAA Member)



**Climate change 2022: impacts, adaptation and vulnerability. Summary for policymakers**

**Working Group II contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change**

**Intergovernmental Panel on Climate Change (IPCC), Switzerland**

**PDF, 40 pages**

**Free download:**

<https://www.ipcc.ch/report/sixth-assessment-report-working-group-ii/>

**ISBN 978-92-9169-159-3**

This is a summary document of the contribution of the IPCC's Working Group II to the Sixth Assessment Report (AR6). It assesses the impacts of climate change, looking at ecosystems, biodiversity and human communities at global and regional levels. It also reviews vulnerabilities and the capacities and limits of the natural world and human societies to adapt to climate change. The three main sections deal with: (i) observed and projected impacts and risks; (ii) adaptation measures and enabling conditions and (iii) climate resilient development.

**Observed and projected impacts and risks**

The report is unequivocal when it concludes that human-induced

climate change has caused widespread adverse impacts and related losses and damage to nature and people beyond natural climate variability. The manifestations of climate change are described in detail and reflect what we constantly read about in global news reports. These include: heat-related human mortality; coral bleaching; tree mortality; wildfires; cyclones; sea-level rise and permafrost thaw.

However, as is to be expected, the report drills deeper into the subject and records severe problems related to damage to terrestrial, freshwater and marine ecosystems; species loss; migration and extinctions. There is also reduced food and water security, which is hindering efforts to achieve the UN's Sustainable Development Goals (SDGs): half of the world's population experiences severe water scarcity and agricultural growth has slowed. Climate change is also adversely affecting human mental and physical health with increased incidences of diseases and zoonoses. There are also increased problems associated with displacement and involuntary migration. As you can see, there is a wealth of information, compiled by a global network of dozens of scientists. The report is a rewarding source of clear thinking and careful analysis, but limited space here will allow for only a short summary of other themes explored.

### **Vulnerability and exposure of ecosystems and people**

Some 3.3 to 3.6 billion people are highly vulnerable along with a high proportion of other species. Current unsustainable development patterns are increasing the exposure of ecosystems and people to climate hazards.

Risks in the near-term (2021–2040) include reaching a 1.5°C rise in global temperatures (above pre-industrial levels in the period 1850–1900) which is likely to cause unavoidable increases in climate hazards with multiple risks to ecosystems and humans. For 127 identified risks, the mid-to long-term impacts (*ie* from 2041 to 2100) are assessed as being multiple times higher than currently observed.

The impacts and risks associated with climate change are becoming increasingly complex and more difficult to manage. Interactions and simultaneous occurrences will have consequences that will cascade across sectors and regions. The impacts of a temporary overshoot (of 1.5°C) will be severe and often irreversible and will affect low-resistance ecosystems (*eg* in polar, mountain and coastal regions) most severely.

### **Current adaptation and its benefits**

To date, adaptation efforts have been mostly via the adjustment of existing systems and implementation has been heavily dependent on governance. Progress has been observed across all sectors and regions and has generated multiple benefits, but at the same time progress has been uneven and goals short term. The effectiveness of adaptation options decreases with increasing warming.

Soft limits to adaptation have been reached in some locations, but these can be overcome by careful investment. Many natural systems are near the hard limits of their natural adaptation capacity (*eg* coral reefs, coastal wetlands, rainforests, and polar and mountain ecosystems).

Although progress has been made, there is also increasing evidence

of maladaptation since AR5 (see: 'Climate change impacts and mitigation: a review of prediction and reality', *Ag4Dev*, **22**, pp 29–31, 2014). These are mainly due to a concentration on short-term gains and a focus on reducing sector risks in isolation; examples are fire suppression in fire-adapted ecosystems and hard flood defences. There are severe risks with solar-radiation modification schemes which, in any case, won't stop increases in CO<sub>2</sub> production or ocean acidification (see the review of Elizabeth Kolbert's Book *Under a white sky* in *Ag4Dev* **43** pp 34–35, 2021). Planning has to be long term and enabling conditions are essential for adaptation: these include political commitment and follow-through and access to adequate financial resources.

### **Climate resilient development**

Worldwide, the need to implement climate resilient development (CRD) has become much more urgent since AR5. There is a rapidly narrowing window of opportunity to enable CRD and the pathways are progressively constrained by every increment in warming. CRD is enabled when governments, civil society and the private sector make inclusive development choices and pathways result from cumulative societal change. The global trend towards increased urbanisation can offer opportunities for CRD with integrated, inclusive planning and investment.

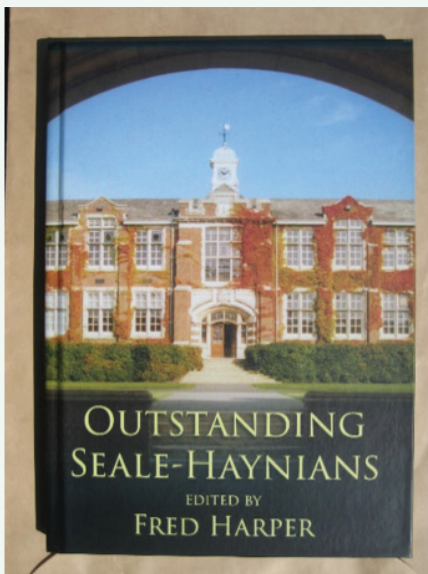
Safeguarding biodiversity and ecosystems is fundamental to CRD and the urgent need is for effective and equitable conservation of approximately 30–50 percent of Earth's land, freshwater and ocean areas. The final section of the report deals with achieving CRD and carries some potent words and warnings. It is unequivocal that climate



change has already disrupted human and natural systems. CRD is already challenging and will be further limited if warming exceeds 1.5°C and may not be possible over 2°C. It will require increased international cooperation, including mobilising and enhancing access to climate finance (for mitigation and adaptation). The cumulative scientific evidence shows clearly that climate change is a threat to human wellbeing and planetary health. We are responsible for the breakdown of our planetary climate system and so, surely, it falls to us to stop and repair the damage in the rapidly closing window of opportunity that remains. On current evidence, however, it seems that we as a species are about to destroy our unique habitat and ourselves with it.

## Brian Sims

(TAA Member)



### ***Outstanding Seale-Haynians***

***Fred Harper, ed, 2020***

***The Seale-Haynians Club***

***Hardback, 137 pages, £12, incl. p&p***

***ISBN 979-1-5272-6588-2***

***Available from:***

[https://seale-hayne.com/?page\\_id=1588](https://seale-hayne.com/?page_id=1588)

This beautifully produced and well-illustrated hardback book celebrates Seale-Hayne Agricultural College which gained a strong international reputation. It sat strategically at the heart of southwest England and covered agricultural, food, technological and environmental studies/research at diploma, degree and postgraduate levels – from field to plate and beyond into catering and tourism management. No other UK agricultural education provider then covered that whole range. Southwest England produces some 25 percent of the output of British agriculture and thus many, including those in rival establishments of agricultural education provision, were much saddened by its ‘merger’ into what became the University of Plymouth – and its subsequent sale. Its alumni and those awarded its honorary degrees continue to represent the sound foundations for their careers gained at Seale-Hayne. This book celebrates some of them and was edited by Dr Fred Harper, the last Principal of Seale-Hayne College and First Dean of Faculty at Plymouth. He was ably assisted by a small panel, and by two stalwart supporters of their alma mater, Raymond (Ray) Bartlett, Chairman of The Seale-Haynians, and Ian Goodwin, Chairman of the Seale-Hayne Future Group, both rightly persuaded to feature in the book.

The first 16 pages are devoted to a brief history of the college and two key figures in its establishment – Rt Hon Sir Charles Seale-Hayne (whose GBP 100 000 bequest in 1903 seeded the project) and Viscount Lambert as the first Chairman of Governors from 1909, who continued his active support until his death in 1958.

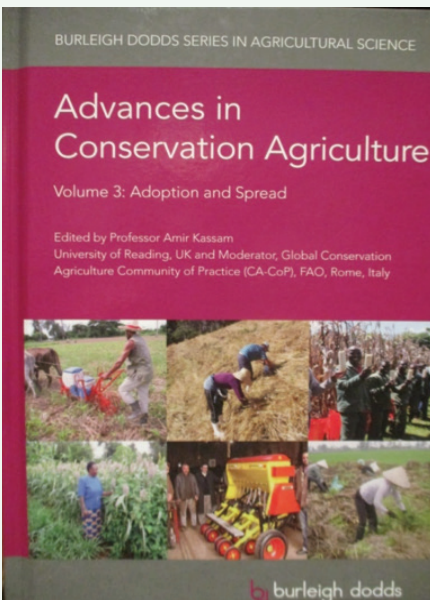
Owing to the First World War, the College began teaching agricultural courses from 1920. Dr H Ian Moore CBE, Seale-Hayne’s long-serving Principal from 1948 to 1971, features in the book, as does alumnus Dr AG (Tony) Harris CBE who was the distinguished Principal and CEO at rival Harper Adams Agricultural College from 1977 to 1994.

In all, illustrated portraits of 30 outstanding alumni are presented in alphabetical order. In addition, there follows a chronological presentation of the citations used at the time of their awards for 20 recipients of honorary degrees at Seale-Hayne from 1993 to 2004. Pages 126–130 provide a reflection on the wide range of people and disciplines described, which is followed by acknowledgements, and a piece on the Seale-Hayne Education Trust. Pages 133–136 portray the editor Professor Fred Harper, who resigned his Plymouth professorship in protest at the sale of Seale-Hayne. The book ends with a list of references and more photographs.

I am aware of some outstanding Seale-Hayne alumni who declined to feature, and others who perhaps were not approached. I count among my friends a number of those featured, but that bias apart, my academic links are with rival institutions who relished past competition with this great College whose alumni continue to do it credit. Anyone associated with Seale-Hayne will find this book a fascinating record, as will all those interested in agricultural education worldwide. The compilers are to be congratulated for their initiative, ably edited by Fred Harper.

## John Wibberley

(TAA member)



**Advances in conservation agriculture, Volume 3: Adoption and spread**

**Amir Kassam, ed, 2022**

**Burleigh Dodds, Cambridge, UK, Series in Agricultural Science No.104, 600 pages**

**Hardback, £150**

**ISBN-13: 9781786764751**

Conservation agriculture (CA) is an expanding and hopeful approach to sustainable agricultural management requiring full appreciation by researchers, policy makers, and especially farmers and farmland managers internationally, based as it is on key factors of reduced cultivations and consequent water conservation, plus soil cover using mulches and

cover crops, and growing well-diversified crop rotations. In a total of 17 chapters (with Preface, Foreword and Index), this third volume is again most ably edited by Professor Amir Kassam of the University of Reading, UK, who is Moderator of the FAO-based Global CA Community of Practice. (Volumes 1 & 2 were reviewed in *Ag4Dev* 40: 44–46 [2020].) It represents a true *magnum opus*, contains copious references and represents a distillation of the experience of scores of farmers, researchers and extension practitioners. This hardback volume, albeit well-produced, costs GBP 150, which is surely a huge barrier to adoption and spread of its contents, which is ironic in view of its ‘adoption and spread’ theme, and the extremely useful information it contains. It also has much up-to-date content on agroecological conditions globally, with some excellent figures, tables, maps and photographs of equipment and farming systems.

A future edition would benefit from another chapter offering a comparative digest of the pros and cons of the different extension approaches used to seek to promote CA. There is much useful comment on this topic such as the excellent, comprehensive Table 5 on pages 211–212 covering barriers and drivers for CA adoption in North Africa. Within Africa, Eastern

and Southern countries have led adoption and it has been smallholder farmers often on less than 1 hectare who have led adoption, frequently educated and urged on by NGOs.

Adoption of CA has been exponential since the turn of the millennium. Leading adopter countries are the USA, Brazil, Argentina, Australia, Canada, China, Russia, India, Paraguay, Kazakhstan, Pakistan and Iran. The 2050 stated goal that “CA must become synonymous with sustainable farming for the future” is somewhat questionable given other successful approaches and that field circumstances may require occasional insertion of treatments or field operations normally eschewed within purist CA practice – such as some types of subsoiling and periodic, albeit very infrequent, ploughing in particular cases.

Despite its welcome improvement on the toxic paraquat it replaced, and notwithstanding its slower rates of use than in some conventional cropping systems, repeated glyphosate usage to sustain CA systems in leading adopter countries – notably in North and South America – raises food chain issues of both ruminant and human health. This glyphosate issue needs fully addressing in CA discussions, and developments in research need to be covered in

Its contents are shown in the box below.

Global adoption and spread of CA	Lessons in adoption of CA in South Africa
CA in west and central Canada	CA in West Asia
CA in the USA	Adoption of CA in Central Asia
CA in Central America, Caribbean and Mexico	CA in Eurasia
CA in South America	CA in South Asia
CA in Europe	CA in Southeast Asia
CA in North Africa	Adoption and spread of CA in East Asia
CA in West and Central Africa	CA in Australia and New Zealand
CA in Eastern and Southern Africa	

future editions; it is good that this edition points to development of biological systems of CA adoption, including towards organic farming, the use of more complex crop rotations with cover crops, and encouraging the integration of livestock and of trees. A notable tree in CA systems in Eastern and Southern Africa is *Faidherbia albida*. The issue of herbicide-resistant weeds is addressed, especially in North America, as is the role of mechanical scratch weeders.

A challenge to adoption of CA in many countries centres around the need for mulch for the fields and yet still providing fodder for the livestock. System-based thinking on this matter has offered compromise solutions to satisfy both requirements through careful management.

The Global CA Community of Practice advocates pursuit of the following six themes:

1. Catalysing formation of CA farmer groups;
2. Accelerating invention and mainstreaming of CA-based sustainable technologies;
3. Embedding the CA community in global efforts towards sustainable food systems;
4. Assuring CA farmers are rewarded for their provision of public/environmental goods;
5. Mobilising government and global institutional support for good-quality CA expansion;
6. Raising public awareness of CA's contribution to sustainable food production.

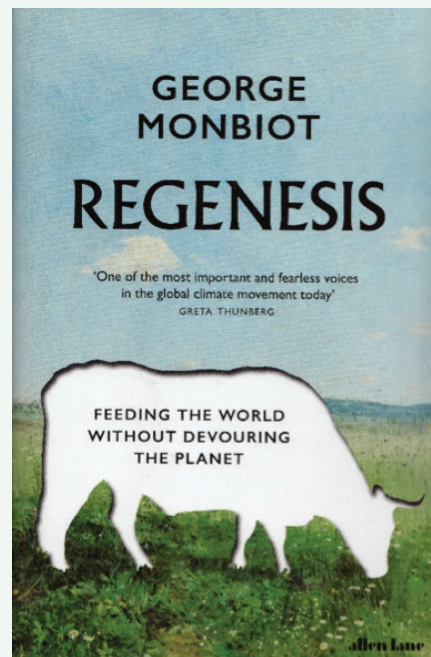
Already, many more smallholder farmers are practising CA than large-scale farmers. The availability of suitable equipment for direct seeding is a common barrier to adoption. The existence of good tools and systems is well illustrated in some chapters but the opportunity is missed elsewhere.

Overall, the work highlights the role of farmers as intuitive innovators, and integrated realists whose skills enable them to be the greatest influencers of their peers to attempt CA and learn its key features. A positive policy environment and continued, applied research is also well indicated.

To find such a wealth of practically rooted experience on the adoption and spread of CA in this single Volume 3 of the series on CA is a triumph of hard work and wise collation which deserves widespread perusal by farmers and their organisations, researchers and policy makers. At a time of such global challenge environmentally and in terms of ecosystem security, this book is timely indeed. May it achieve its aim to persuade and inform more adopters of CA.

### John Wibberley

(TAA Chairman)



### ***RegenesiS: feeding the world without devouring the planet***

**George Monbiot, 2022**

**Allen Lane (Penguin Random House, UK)**

**Hardback, 337 pages, £20.00**

**ISBN 978-0-241-44764-2**

George Monbiot uses his orchard as a barometer for climate change, noting the impacts of extremes of drought and rainfall. However, when he delves into the soil beneath the trees, he finds an extraordinary diversity of life encompassing thousands of species of microarthropods, bacteria and mycorrhizal fungi acting, symbiotically, to produce the sources of nutrients to satisfy plants' needs. Damaging soil, for example by ploughing, causes a dysbiosis and ultimately our own health depends on the health of the soil. He discusses the intricacies of soil structure, the cascades of habitats and organisms, and explains that the more complex a system is across space and time, the greater the diversity that it can support. George extends this analysis to the planet's current food system and concludes that it has both declining resilience and increasing vulnerability to external shocks.

Just-in-time delivery (think Ukraine), using half our grown calories to feed livestock (inefficiently) and the misuse of crops for biofuels, all lead to increasing fragility and increasing numbers of hungry people who cannot afford to eat. He calculates that climate breakdown will push half of the world's food production out of its safe space by 2080; fertile land will turn to dustbowls (again). Agricultural sprawl is one of George's nightmares as he documents the pollution of rivers, converting them into filthy gutters. Ecosystems are being destroyed (eg but not only, in the Amazon and Cerrado of Brazil) to produce the soya to feed the animals that destroy habitats thousands of kilometres away. One of his constant gripes is the way that sheep farming sprawls in the UK – destroying regenerating forest with



a grossly inefficient production system. Eliminating beef and dairy farming would reduce the area needed for global food production by 76 percent (and reduce food production greenhouse gas emission by 60 percent).

Innovative and regenerative farming systems that work with nature, rather than against it, focus on the importance of biodiversity both above and below ground. George discusses these systems enthusiastically but draws attention to their limitations and sustainability. One of his conclusions is that the most effective means of removing carbon from the atmosphere is by rewilding agricultural land and restoring wetlands and forests. The chapter on agroecological farming describes practices that will be very familiar to *Ag4Dev* readers: no-till for soil health and carbon sequestration, the elimination (or non-creation) of plough pans, a

reduced need for pesticides and fertilisers and fuel consumption per hectare slashed. Conservation agriculture is resistant to climate breakdown, less susceptible to storm damage, more drought-resistant and can allow two crops a year. He discusses weed control and reasons that glyphosate causes much less damage than ploughing and that integrated weed management, including by biological and mechanical means, is the way forward.

The future could (should, George suggests) include protein and fat production by bacterial fermentation – farm-free food. Solar and wind energy can be used, there is no need for grazing land and ceasing destructive farming will not only sequester carbon but reduce our alarming species extinction rate. The technology is already available and produces delicious high-protein flour. At the same time, plant-based,

eco-friendly meat substitutes are already on the market. The transition is under way and will be slow at first, then fast; why should we continue to eat products of cruel, dangerous and ecocidal livestock production systems when we don't need to? We need to re-purpose our agricultural subsidies to promote eco-friendly systems, such as rewilding, and recognise that farming is the most destructive human activity ever to have blighted the earth.

Averting global catastrophe will require a focus on soil ecology, the further development of perennial crops (especially grain crops) and a farm-free revolution for producing protein. This will create a profound transition and allow us to make peace with the planet which we have abused mercilessly for far too long.

**Brian Sims**

(TAA member)



Photo: courtesy of Musfiqur Rahman

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If you would like to join, or would like to encourage or sponsor someone to join the Association, please visit our website at <https://taa.org.uk>

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- **Payment.** This appears at the foot of the page. A PayPal button will be visible if you selected PayPal at stage 1 above, or a bank standing order form if that was your preference.

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PUBLISHED BY THE TROPICAL AGRICULTURE ASSOCIATION (TAA)

ISSN 1759-0604 (Print) • ISSN 1759-0612 (Online)

TAA, Montpelier Professional Services, 1 Dashwood Square, Newton Stewart, Wigtownshire DG8 6EQ  
Website: <https://taa.org.uk>

TAA is a registered charity,  
No. 800663, that aims to advance  
education, research and practice in  
tropical agriculture.

**Editing, design and layout:**  
Green Ink  
<http://www.greenink.co.uk>

**Printed by:**  
Cambrian Printers Ltd,  
Aberystwyth, UK  
<http://www.cambrian-printers.co.uk>