

## KEYNOTE ADDRESS

### Achieving Universal Food Security in an Adversely Changing Climate

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#### Abstract

Achieving universal food security — healthy diets for all, from sustainable food systems — will require a comprehensive investment strategy that increases food supply, enhances distribution and access, reduces food losses and waste, and improves nutrition for all, while addressing and mitigating climate change. Despite increases in agricultural productivity and a sharp reduction in the proportion of undernourished people over the past 50 years, universal food security remains elusive. About 673 million people — 8.2 percent of the world population — are undernourished, and

almost three billion people cannot afford a healthy diet. Our food systems are vulnerable to climate change while contributing one third of greenhouse gas emissions. Conflict and trade disruptions further compound the challenge and undermine past successes. Yet, we are incongruously underinvesting in agricultural improvement and food systems transformation, beginning with woefully inadequate support for international agricultural research: the foundation for more productive and resilient food systems. Food security has emerged as a geopolitical priority across the Indo-Pacific region.

Leaders of China, India, ASEAN nations, the Pacific, and beyond have raised alarms and are looking for actionable policies and investments. In this address, I will outline a set of practical actions that Australia could take to advance food security in the Indo-Pacific region. Stepped-up action and investment by Australia in support of agricultural research and development would be widely welcomed in the region. As a nation, we have exceptional expertise and well-established partnership models in agriculture and food security that, if better supported and deployed, could serve our collective desire for regional peace and prosperity.

#### Introduction

Thank you to the Crawford Fund for Food Security for this opportunity. Let me begin by inviting you to imagine a world without hunger or malnutrition, where the food that sustains us is produced and distributed in ways that are both sustainable and resilient. That vision—what I call universal food security—is at the heart of my remarks today.

Food is a human right, enshrined in the Universal Declaration of Human Rights (1948) and reinforced in global agreements since. The 1996 World Food Summit defined food security as

access to safe, adequate, and nutritious food for all people at all times. The 2015 Sustainable Development Goals went further, declaring that hunger must end, and that no one should be left behind.

Universal food security means ensuring that every person enjoys a healthy diet derived from sustainable and resilient food systems. But how close are we to that goal?

### Global Food Security Challenges

The numbers are sobering. Today, 673 million people go hungry. Around 150 million children under five are stunted, and 43 million are wasted. More than two billion people suffer from micronutrient deficiencies, while 2.5–3 billion are overweight or obese. Almost half the world’s population is not consuming a healthy diet, and 2.8 billion people cannot afford one.

One driver is the rising cost of food. The FAO Food Price Index remains about 60% higher than in 2006, shaped by financial crises, conflict, and pandemic disruptions. These realities underscore that hunger is not just about availability - it is about affordability, equity, and resilience.

**Figure 1 The FAO Food Price Index using real prices, 1961 to mid-2023**



**Fig. 1 | The FAO Food Price Index using real prices, 1961 to mid-2023.**

Credit: [World Food Situation FAO Food Price Index](#).

Source: Denning and Jayasuriya (2023) <https://www.nature.com/articles/s43016-023-00826-6>

Governments and institutions are responding. Indonesia’s school meal program will soon reach 83 million children. ASEAN, the Pacific, Brazil through the G20, and the UN Food Systems Summit all highlight food security as a global priority. Xi Jinping has even described agriculture as a matter of national security. The message is clear: food security is no longer peripheral; it is central.

### Climate and Food Systems

Yet food security comes at a price. Humanity’s footprint is immense—deforestation, water scarcity, pollution, biodiversity loss, and greenhouse gas emissions. One-third of global emissions stem from the food system, with agriculture itself responsible for about half of that share.

This dual role—food systems as both casualties and contributors to climate change—demands a twofold response: **adaptation** and **mitigation**. Farmers have always adapted to survive, but mitigation requires broader support, because the benefits are collective and long-term.

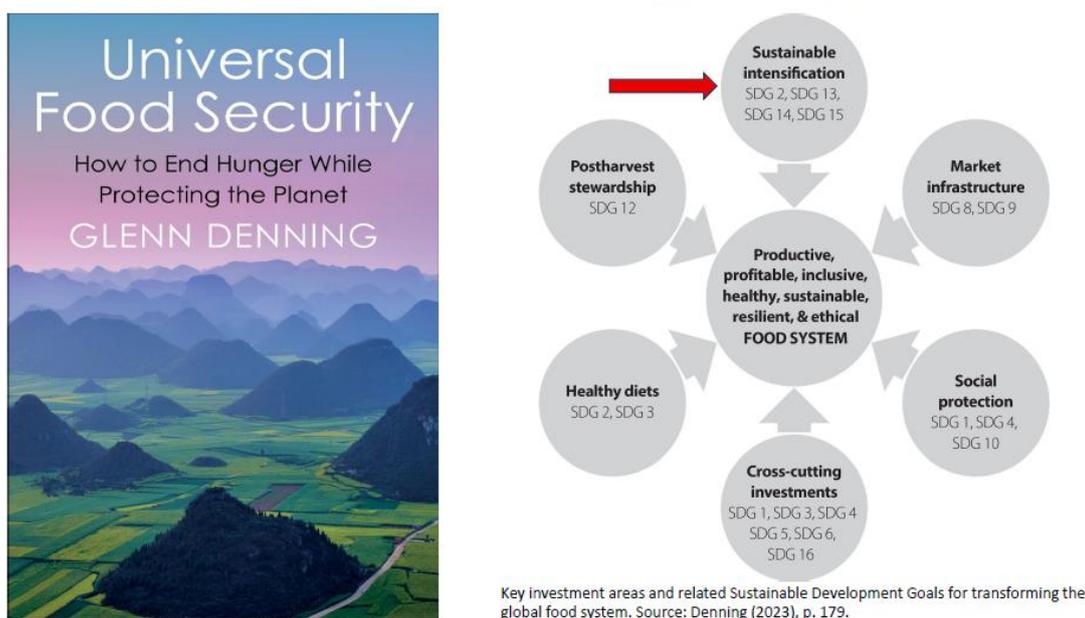
## Pathways to Universal Food Security

After decades of work and research, I see five big investment areas that, together, can transform food systems:

1. **Sustainable intensification** – producing more food while reducing environmental impact.
2. **Post-harvest stewardship** – cutting the one-third of food that is lost or wasted.
3. **Market connectivity** – ensuring farmers can link production to consumers.
4. **Dietary shifts** – promoting healthy, sustainable diets.
5. **Social protection** – ensuring the most vulnerable have access to nutritious food.

These five areas must be integrated, context-driven, and underpinned by good governance, women’s empowerment, and investments in health and education.

**Figure 2: Food Systems Transformation Strategy: The Big 5 Investments**



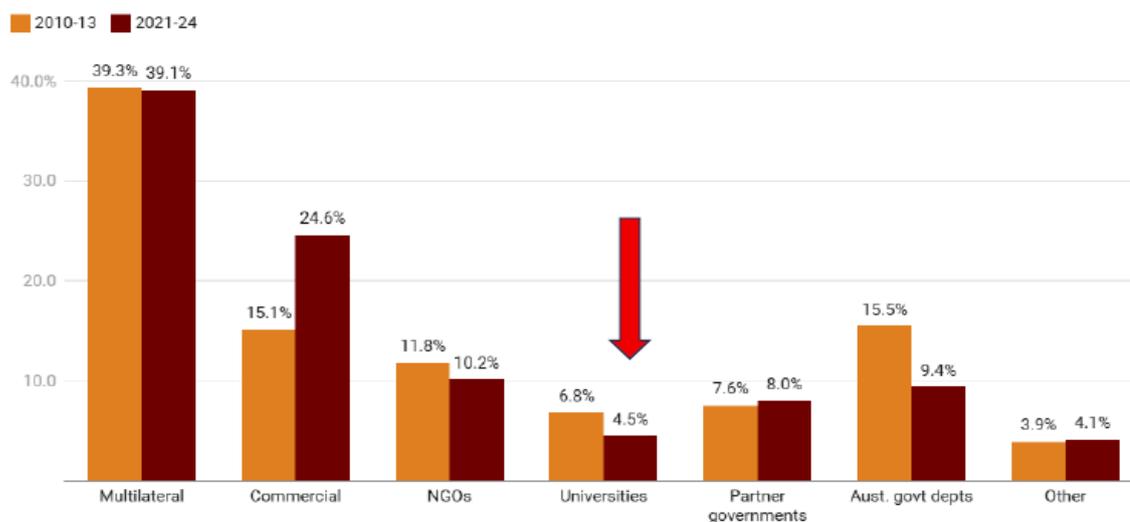
On sustainable intensification, I emphasize this is not about intensifying every plot of land. Rather, it is about tailoring strategies: increasing yields in some regions, maintaining output but lowering footprints in others, restoring abandoned lands, and protecting remaining ecosystems. The “net result” must be more food with less environmental harm.

### Australia’s Role

This brings me to Australia. I believe Australia can and should be a regional leader on food security. We have the expertise, the credibility, and the track record—decades of agricultural innovation in harsh climates, extensive development cooperation across Asia-Pacific, and world-class universities and research institutions.

Yet our current investments remain small. Agriculture represents only about 8% of the ODA budget, with universities attracting just 4.5%. The Australian Centre for International Agricultural Research (ACIAR) does excellent work on a modest budget—less than A\$120 million annually. But given the scale of the challenge, surely more is required.

**Figure 3: Share of the aid program allocated to different delivery partners, 2010 and 2024**



Three year averages are used to reduce volatility (2010-11 to 2012-13 and 2021-22 to 2023-24).

Source: DFAT Statistical summaries

Source: Howes (2025) 2025 Australian aid update. <https://devpolicy.org/2025-australian-aid-update>

My actionable recommendations are:

- Raise the profile of agriculture and food security within Australia’s ODA portfolio.
- Support the **G20 Global Alliance against Hunger and Poverty**.
- Rejoin the International Fund for Agricultural Development (IFAD)
- Expand partnerships with multilateral development banks like the Asian Development Bank (ADB).
- Revitalize **university-to-university cooperation** in the Asia-Pacific.
- Strengthen support for the **Crawford Fund for Food Security**, which is unique in the world.

Source: M S Swaminathan Research Foundation

## Conclusion

Universal food security is achievable—but only through an integrated, multi-level, cross-sectoral approach. We cannot simply produce our way out of hunger; we must transform food systems holistically. That requires investment, innovation, and leadership.

As Professor M.S. Swaminathan once wrote, *“If synergy can be created among scientific know-how, political do-how, and farmer participation, it should be possible to achieve the goal of overcoming chronic and hidden hunger.”*

I believe Australia, working in partnership across the region and the world, has both the responsibility and the opportunity to help make that vision a reality.



Source: M S Swaminathan Research Foundation

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Glenn Denning is Professor of Professional Practice and founding Director of the Master of Public Administration in Development Practice (MPA-DP) at Columbia University's School of International and Public Affairs (SIPA). Prior to joining SIPA, Denning held senior management and research positions at the

International Rice Research Institute, the World Agroforestry Centre, and Columbia's Earth Institute.

Denning contributed to the design and establishment of the Global Agriculture and Food Security Program (GAFSP) and served on GAFSP's Technical Advisory Committee (2010-14). He also served on the founding board of the Institute of African Leadership for Sustainable Development (UONGOZI Institute). Denning has advised the Asian Development Bank on aligning its strategy and operations to the 2030 Agenda and the SDGs.

In 2000, Denning was recognised by the Government of Cambodia as Commander of the Royal Order of Sahametrei. In 2014, he received the Columbia University Presidential Award for Outstanding Teaching. He won the Global Australian of the Year Award for 2023, recognising his efforts to end global hunger and promote sustainable development. And in 2024, Denning was honoured as Alumnus of the Year by the University of Queensland.

Denning obtained his BAgSc and MAgSc from the University of Queensland, his PhD from the University of Reading, and his MPA from the Harvard Kennedy School.

Denning is the author of *Universal Food Security: How to End Hunger While Protecting the Planet* (Columbia University Press, 2023).

## KEYNOTE Q&A

### Chair: Su McCluskey FCPA FTSE

Member of the Crawford Fund for Food Security Board of Directors  
and Former Special Representative for Australian Agriculture

#### Chair:

I might kick it off with a question for Professor Denning. I was really fascinated by what you talked about. Neighbours seeking support is something that I saw in my last role, and that Australia can really be a global leader. Picking up on the comments around soft power and diplomacy, the one thing that I saw when I went around to many different countries and markets was that there is no one-size-fits-all solution.

So, how do you build a flexible, outcomes-based food system that is actually fit for purpose for different markets? And how do we help those countries? By listening to what they want rather than trying to tell them there's only one way. We have to listen. We have to listen and listen to the priorities.

#### Professor Glenn Denning:

I think we have great ideas. We have great concepts. We have great tools, we have expertise. But wherever it is, it needs to be adapted and made appropriate to local circumstances. The best way to do that is the model that ACIAR developed. It's to do it in partnership with national researchers.

Having that relationship, especially at the policy level, I'd really like to see more of that. I think as I've travelled around the region engaging researchers at the policy level, that's not easy to do, and you need help in getting that done. The second thing is building local capacity.

At the end of the day, what you want is a strong national system of research and development. My work in Cambodia was exactly to do that, as Cambodia was recovering from war. Building national institutions was part of it. It wasn't simply getting rice seeds and technologies and so on. For the farmers. It was about building national capacity, and we worked for almost 20 years, trying to build that up, supported by ACIAR or others. So, building local capacity, I think, provides that local nuance. That's important.

#### Unknown participant:

I've come from Geneva for this event with colleagues from around the world, in Africa, Asia, Australia and in Europe. We've worked with the Club of Rome to redesign the business models and the financing modalities. But I've heard very scant reference to that from any Australian representatives in Geneva over the last 15 years. It's certainly not visible in any of the impact investing events, of which there are many that I go to.

So my question is: How do we bring organisations into the room and move on from the discussion to where the money is, and we can only do that if we present investible proposals. We have an initiative which we call Advance Australia Fair, because underneath all of the

discussion so far is our having resiled over the years from this fundamental commitment that all life on the planet deserves respect.

**Professor Glenn Denning:**

Thanks for that point. I didn't talk about the partnerships with businesses. I threw that under the umbrella of multisectoral approaches. The idea is that all hands need to be on deck to achieve what we're talking about here. Partnership with businesses often doesn't come easily from researchers. It doesn't come in many countries, and it doesn't come easily from governments. They distrust the private sector.

I've made this argument at the level of the UN. I've sat around tables at the UN headquarters with the Secretary General at the top of the table, all of the UN agencies talking about food security and hunger and not a business in sight. It struck me as odd because it seems that the sorts of understanding of markets, delivery mechanisms and the like could be harnessed to do a better job of delivering food security across the world. So, I mentioned in the book that a structural change at the level of the UN, but also at the country level, bringing groups together is needed.

It's not just about bringing all the ministries together around a table, but about what businesses can we bring to the table, and nonprofits and others to contribute a voice, not just to share their opinions, but to actually help with implementation?

**Maximus Pollard University of Sydney, studying agricultural economics:**

My question is: how can young people like myself and the other scholars push the government into taking more practical steps? And how can we push agriculture more in the mainstream of things, these young people?

**Professor Glenn Denning:**

Well, it starts with being better informed. I think the first thing is to make a commitment to being better informed. There's so much rubbish out there about the world, about understanding how it works, how agriculture works, the importance of nutrition and so on, and getting through that and appreciating the role of agriculture, the importance of sustainability and resilience, and the like is important.

It's hard work because it's easy to just follow the loudest voice and say everything must be regenerative. The first question you should ask is, What do you mean by regenerative? Can you just lay that out? Of course, good farming should be regenerative, right? We want it to be regenerative.

So I think understanding is number one. Number two is clearly the extent to which you can become active, as we see a lot of young people are active in the climate agenda. I think they need to be just as active in the food agenda as well. Food security and linking it to the climate agenda.

Being politically active, influencing your political leaders, your local leaders, your politicians and volunteering your support to organisations that are doing good work in this area. But the ultimate, of course, is to pursue a career in this area. And that sounds like that's what you've

you've planned to do.

We need to make agriculture more attractive. There's no doubt I've been talking to universities and they're struggling with the numbers, particularly at the undergraduate level within Australia. I think more of us need to work hard to understand how interesting it is to work in food systems transformation, with all of these great innovations around digital agriculture and artificial intelligence is going to play a massive role going forward.

And as was mentioned, you don't necessarily only end up as a researcher. You can be in the business sector, or you can be an entrepreneur. There are many places in the ecosystem where you can work. And underpinning all of this is an understanding of how important, as our speakers have already mentioned, how important food security is for human security.

Remind people that it's not just about farming. It's a much bigger picture. It's about our security, our national security and our regional security. Thank you. Great question. Quite often, I say we speak to rooms of the converted, and we need to get mainstream on board.

**John Anderson:**

Congratulations, Glenn. It's great to see you here. Great speech, great book, and congrats on all your contributions over the decades. I've got one comment and one question. The comment is, we really need to keep in the front of our minds how to unbundle these generic universal food security challenges across very different environments, different farming systems, different policy and institutional settings.

Irrigated lands are totally different from arid lands, and what can be achieved. That's the first comment, but second, the question, the really important question is, how do we unbundle the messages to different key actors? How do we talk differently to federal politicians, to state politicians, to the private sector, to district-level officials and to farmers' groups? How do we unbundle all of that?

Because they have different interests, different reasons to improve the systems and different incentives. So that's what we don't do often enough; unbundle the messages. And to the first point, the unbundling and the disaggregation and understanding of the variation across ecosystems, the fantastic work you've done over the years - we need to do more of that.

**Professor Glenn Denning:**

I think we've got tools to do things much better and much faster than we have ever had. So hopefully that will be something that the next gen can work on, the messaging. The problem here, I think, is that many of us grew up and worked and studied in science areas, but weren't necessarily good messengers of our own stories.

I don't know how many of you who are taking ag science have also taken courses in communications, political science and other relevant disciplines. That will give you the capability to be able to understand the political economy of what we're all trying to do.

You're thinking, well, who's going to buy into this? And who's upset by this? Who's going to walk away from the table if we present this? So having that political savvy, and you can study

that and you can learn that. It needs to go side by side with all the wonderful digital approaches that we're all learning now.

You're going to have to have people who can translate those great ideas into something that's important for political leaders, for the general public to buy into this idea. And I think the messages I heard this morning, which I fully support, are that the kind of work that ACIAR does and the Crawford Fund for Food Security does in the region is actually critically important for national security here.

Having peaceful, healthy, secure neighbours is important for our own security. It's in our self-interest to understand that as we go out and do our best to change the food system. Nuanced communication, I think, is the key

**Sam Coggins Anu Agri Food Innovation Institute.**

My question really builds on John's question and Max's question. The quote you gave got me really excited about clarifying the need for synergy of policymakers or politicians, as well as researchers and farmers' participation. Curious to hear more of your reflections on the common mistakes that you see researchers make in trying to engage in these collaborations with farmers and policymakers? And on the flip side, you've already partially answered this question, but what do you see the most savvy researchers doing in terms of engaging effectively with all these different actors?

**Professor Glenn Denning:**

You know, I when it comes to engaging with farmers we could probably pull out a few of the old books that came out in the 60s and 70s, Robert Chambers and others who I'm not sure if that's read these days in ag science, but the idea is that it starts with the farmer. I remember reading a few books from the AVRDC that was called "Why Do Farmers Do What They Do"? More of us need to be engaging with farmers, understanding why they're doing what they're doing.

I wrote something about 30 years ago called Farmers as Customers, a new way of thinking about research institutions drawing on service management from the business sector, the idea from the Harvard Business School service management, where you focus on the customer. So who are your customers? What do they value? As a researcher, your question should be: what will these farmers value, what does that person value? What is useful to him or her? I think starting with that approach, wherever you are working in that ecosystem, is extremely important.

It's not what I can do for you, here is the wonderful tool I have. But how can I help you? What are you interested in? What's your vision? What's your goal? Why haven't you adopted these fantastic varieties that we've had all these years?

**Harry Campbell Ross, Federal Department of Agriculture and ANU student**

You've mentioned institutions a couple of times, and you mentioned in your address that you feel that institutions aren't fit for purpose. I'm just wondering if you can unpack that a little further and mention which sort of institutions you're talking about and how they're not fit for purpose.

**Professor Glenn Denning:**

I won't name any specifically. I could start from the top with the United Nations, but what I am getting at is that I don't think there's a clear institutional framework for achieving universal food security. There are lots of pieces of that puzzle being implemented, but bringing the stakeholders together should be part of the UN Security Council. It's not on the agenda. Every now and then, there is a special one-day event on food security at the UN Security Council. But this should be part of the Security Council because of the strong connection between food and human security and political stability in the world.

I also think it's important that there's coherence at the national level. In many of the countries that I work in, the kinds of activities that could improve food security are managed by many different ministries and are very focused on their own budgets and how those budgets are protected and how they're implemented.

So new mechanisms to bring them together are needed. High-level leadership is important. I'd love it if the Prime Minister and the foreign minister would speak about food security more often. We've got to make that happen somehow. So again, without going into great details, I think the one thing I probably would say is that getting research institutions to engage more concretely with development partners, be they development banks, aid or normal aid agencies, or the private sector is key. Working more in ways that hold ourselves accountable for the delivery of impact. I think more of that would be useful, including at the level of the CGIARs and national research institutions. That was the basis of my recommendation about ACIAR for example, really developing some strong partnerships with regional development banks like the ADB.

**Tim Reeves Crawford Fund for Food Security Board.**

I just wanted to make a comment and then a question, relating to listening to farmers and to working with farmers. If you ask me what the greatest agricultural innovation in Australia has seen in the last 50 years, a lot of people would say zero till, mulch and better ways of moisture conservation, AI technologies, all of those sorts of things. Now, I think the greatest innovation in Australian agriculture in the last 50 years is that we have just changed the model from top down to bottom up. The prevalence and the importance of the farming groups in Australia are absolutely critical, but not unique. But it is certainly a great example. So my question is, with cultural differences, what are you saying about that sort of approach with farmers, and then them being able to drive the priorities?

**Professor Glenn Denning:**

I think historically that's been fairly weak in many of the low-income parts of the world. Simply because of basically poor communications infrastructure and limited capacity, which was then taken on as being: Well, we'll have to do it for you. Governments know best, right? So this idea of farmers as customers is something that I truly believe in.

I think now, with the spread of social media and access to mobile phones and so much better communication capabilities, there are more opportunities whereby farming groups and individuals can have a stronger voice, politically, and get their representatives in front of the decision makers so that budgets are allocated and programs are planned according to their

needs. Much more could be done. Aid agencies, development banks all go and have consultations at the highest level of government, and they all agree on things. And there's sometimes a token farmer and or farmers organisation in the room. I think as development professionals, we have to just keep insisting and asking: are we really reflecting the needs of those in most need? The smallholder farmers, women farmers, and indigenous communities that may not be in the face of the political leaders.

We've all got to work harder to make that happen. And again, I say go back and read some of Robert Chambers' work in the 60s and 70s.

**Name unknown, University of the Sunshine Coast.**

Thank you very much for the great presentation. I just have one question regarding private sector engagement. We often see public funding for agricultural research and activities about the food security effort. But we rarely see private sector investment for agricultural research. People often say it's very difficult to find the same interest between the research institute, researchers and private sector actors because they may have several different standpoints. Do you see any actionable recommendations or potential approaches to find the same interest between the 2 or 3 parties if we involve the government as well?

**Professor Glenn Denning:**

So it's about finding the common interest between them and to engage the private sector more in agricultural research for development.

I think the best investment that could be made to support the private sector is coming from government funds. We've got to think about the public good. We've got to think about research as a great example of that. Investing in research in ways that would open opportunities for the private sector to expand and market and have an impact, I think, is important. The second thing is infrastructure. And especially as I look around the region, one of the greatest constraints to functioning agribusinesses is infrastructure. So it's roads, it's energy, it's telecommunications.

Once you support that, and there's an important role, particularly in terms of transport and energy infrastructure, governments can create a much better environment for the private sector, along with regulatory policies that make it easier for the private sector to appropriately take advantage of the R&D investments. Thank you for your questions.

**Chair**

Thank you, Professor Denning. What a marvellous way to start the conference today with that keynote. Food security is a national security issue. It's a global security issue, and it should be front of mind for all of us. Would you please join me in thanking Professor Glenn Denning.