

Feeding the mind – and the world

Working in a niche discipline with a big impact, **Professor Calum G Turvey** is helping to make agricultural finance truly international

What prompted your interest in agricultural finance?

As a child, I spent my summers in the tobacco fields of south-western Ontario in Canada and from there studied agricultural economics and business at the University of Guelph. My interest was in farm management, finance and accounting, which I pursued as a master's student. At some point during the MSc thesis work I concluded that academia was for me and then went to Purdue University for my PhD in agricultural economics and finance.

You have held a variety of positions, such as Chair of the Department of Agricultural, Food and Resource Economics and Director of the Food Policy Institute at Rutgers University. What have been the highlights of these posts?

The benefits and challenges of leadership are quite different from those of purely academic and research endeavours. The most difficult part is being able to recognize that moving an idea or a programme forward requires trade-offs and buy-in from many colleagues and stakeholders. With the Food Policy Institute we worked closely with stakeholder groups on many issues, including genetically modified organisms, biosecurity, food safety, mad cow disease and niche marketing of agricultural products. Problems were current and brought forward by stakeholders themselves, which was wonderful. We had to use the mental and physical tools at our disposal to extract the underlying economics in a fundamental way that would make sense to policy makers or businesses. The team included researchers in agricultural economics, extension and outreach, psychology and geography.

Your research involves a multidisciplinary team of people. What are the benefits of cross-disciplinary collaboration and how has this helped inform the work?

As with the technical aspects of research, it does not serve the discipline well to narrow the scope. It should be broadened. Agriculture, economics, anthropology, sociology, psychology, politics, history, etc. combined with mathematics and statistics should all be used in any way that is useful. Without embracing the entirety of the social sciences, progress will be very slow, with many mistakes made along the way.

Could you highlight any major successes to date that you or the agricultural finance community have initiated?

Historically, we would take credit for the entirety of the success of the US and Canadian credit systems. The Farm Credit System was the first government-sponsored enterprise in the US, starting back in 1915. It financed the development of agriculture in a major way and contributed greatly to the development of the economy. Of course I can't take credit for that, but agricultural finance has benefited the economy and promoted the modernization of agriculture in the US, while workers in the discipline continue to support this. Agricultural finance specialists have played major roles in understanding crop insurance, promoting risk management with commodity futures and options, teaching farmers about managing risk and diversification and understanding how agricultural land is valued. In recent years, a great many workers in the field have been using their tools and knowledge to tackle some of the most pressing problems in rural development and in developing economies.

What challenges have you encountered during the course of your research?

The standing challenge is, of course, adequate funding to conduct field research. I have learned that if a project is well thought out and has the right partners in place there are few technical barriers and the data are of good quality. Funding is the limiting factor. And the other challenge is in communicating the findings to other academics, policy makers and stakeholders. Writing is really hard!



Improved credit for better agriculture

Researchers in the Charles H Dyson School of Applied Economics and Management at **Cornell University** are working on financial engineering in agriculture

AGRICULTURAL FINANCE COMBINES the skills, interests and knowledge of financial and agricultural economists to cover production, resources, liquidity, solvency, investment and risk – in a specifically agricultural context, of course. It has a broad remit, encompassing a huge range of activities and approaches, but traditionally the central focus has been on credit, which has been (and will probably continue to be) a fundamental tool in agricultural development.

Indeed, agricultural finance has played a crucial role in establishing developed economies in their current form. Now, at a time of increasing global food pressures and endemic poverty in parts of the developing world, the ability of researchers in this field to help increase both productivity and profitability for farmers is timely and important, addressing some of the most pressing issues facing us today.

One of the leading researchers in this specialist area is Professor Calum G Turvey, W I Myers Professor of Agricultural Finance in the Charles H Dyson School of Applied Economics and Management at Cornell University. Turvey has published more than 130 journal articles on related subjects, as well as contributing a number of book chapters and acting as Editor of *Agricultural Finance Review*. His initial research focus was on Western (specifically North American) finance and risk and, while this continues, he has also expanded his interests. Recent work has looked at the agricultural issues facing developing economies, with an emphasis on credit practices and insurance.

RISKS AND REWARDS

Based at a US university, Turvey naturally feels a responsibility towards the nation's agriculture, always maintaining at least one active developed-economy project. At the same time, he sees developing economies as a rewarding area for research: "Many of the world's poorest people are farmers and it does not take much to move them out of poverty".

A sizable part of Turvey's research now concerns agricultural finance in China, India, Kenya, Mexico and the Dominican Republic. He is looking at existing phenomena, such as informal credit relationships between friends and relatives, assessing credit demand and considering specialized credit and insurance products for future use. While the wider economic circumstances can differ considerably between these countries, with China in particular undergoing powerful industrial growth and becoming increasingly wealthy, it remains the fact that farmers often live in very poor conditions.

Moving away from the well-laid ground of agricultural finance – and specifically credit issues – in developed economies means a move towards resolving quite different questions, and using new tools. Turvey admits that this involves breaking down some barriers: "As you would expect, development economists have long addressed development problems, and often with a different set of tools than the trained agricultural finance specialist, while the traditional agricultural finance specialist is not often trained in development economics. This has been

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INTERROGATING AGRICULTURE AND FINANCE

Before financial engineering or other practical applications can be attempted, a great deal of preparation is required. This preparation is a branch of applied economics and operates using mainstream methods from the field. Specific issues or questions are identified and then a variety of techniques, in particular field surveys and econometric assessments, are used to formulate responses. Turvey explains: “There is a push to use more randomized control trials and we have had significant success in running experiments and looking at behavioural economics.” Indeed, Turvey prefers not to rely on only a few methods, valuing the freedom to use whatever seems best suited to the particular subject in hand. He also mostly employs (and favours) primary data.

changing, with differences in discipline coalescing into meaningful and synergistic developments.” He cites work on agricultural insurance as being a good example of this new approach, and one that he actively researches.

Turvey’s most recent project expresses much of what he is aiming to do, blending financial engineering with agriculture to effect improvements and benefit everyone involved. The principal means for this is ‘risk-contingent credit’, in which loans have what Turvey calls “built-in insurance contracts”. The insurance will typically relate to risk factors like weather and commodity prices; if crops are adversely affected, or drop in price, then the insurance will either meet the cost of the loan repayments or reduce the amount being repaid. Turvey and his colleagues are also extending this idea into the realm of catastrophe bonds, where investors take on a portion of a loan’s risk in exchange for the possibility of profit. The potential to use these bonds to help agriculture in sub-Saharan Africa, which is particularly vulnerable to weather fluctuations (i.e. the occurrence or not of the ‘right’ amount of seasonal rain), is being investigated.

SIMULATING RISK

Turvey strongly advocates using risk simulations as a powerful teaching aid: “They can reduce complex variables to simple dimensions and provide the basis for experimental mathematics to examine how a particular model or economic complex will behave under seemingly random factors.” He adds that risk simulation is not taught on many undergraduate business courses and that there is currently no suitable text available for teaching it.

MORE OF THE SAME

Turvey firmly believes that constructing innovative financial products that meet the requirements of both borrowers and lenders is the future of agricultural finance in the developing world. “By reducing business and financial risks,” he says, “lenders will increase the supply of credit and farmers will borrow more, thus increasing agricultural efficiency.” He argues that the result is likely to be increased profit and yield, which will help lift farmers out of poverty while benefiting the market and wider populace through increased supply of food. This is not wholly dissimilar to what has happened previously in parts of the developed world, where credit has helped to foster agricultural advances for many decades.

It is hardly surprising that Turvey sees financial product innovation – especially micro finance and micro insurance – as providing major opportunities for agricultural finance. He is certainly confident, concluding that, overall, the discipline of agricultural finance will do well. “This is especially true in development and we (meaning the community) will make great strides,” he says. “Financing agriculture presents great challenges, perhaps the greatest challenges, and we are poised to address them.”

AGRICULTURAL FINANCE

RESEARCH INTERESTS

- Agricultural finance
- Credit practices and insurance
- Developing economies
- Financial engineering

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CALUM G TURVEY received an MSc at the University of Guelph and his PhD from Purdue University in 1988. Since

then he has held positions

as Director of the Food Policy Institute at Rutgers University and Professor at University of Guelph. He joined Cornell University in 2005 as the W1 Myers Professor of Agricultural Finance. Additionally, Turvey is Editor of Emerald’s *Agricultural Finance Review*, the only journal dedicated to publishing agricultural finance research.