

## **Agricultural Research: Current Status and Challenges**

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### **ABSTRACT**

The global food crisis of 2008, precipitated by a combination of factors, once again brought the issue of food security to the forefront of public policy debates. Population growth and constraints on food production with environmental degradation, key resource limitations, the anticipated affects of climate change and shifting supply and demand patterns represent increasing challenges. These trends must be balanced by improved and sustainable agricultural yields.

The track record of agricultural research is outstanding, notably evidenced by the Green Revolution in Asia which provided food for up to one billion people. Within the development context agricultural sector growth is vital to catalysing economic growth and achieving against the multilateral agenda, particularly the Millennium Development Goals. Estimates show that GDP growth originating in agriculture is twice as effective in terms of poverty reduction in developing countries, as growth in other sectors. Agricultural productivity reduces poverty, raising farm incomes and resulting in price reductions from increased food supply.

Increased productivity is closely linked to successful research and development. Despite this, investment in agricultural research and development has fallen over time. Only recently has this trend started to be reversed, having gained further momentum following the recent food crisis.

The crisis also served as a reminder that gains from past successes have not been shared across the developing world, with Africa in particular falling behind. This has prompted calls for a Green Revolution for Africa, and increased the pressure on agricultural research to achieve this.

Such calls, however, will not result in the improvements necessary unless the unique range of factors, constraints, and environments – biophysical, policy, market and investment – are understood, and the best minds are recruited to design targeted responses to help smallholder farmers and other participants throughout supply chains.

What is necessary is a new approach that leverages intellectual capital to understand the interaction of factors within a local environment and design a series of responses to spark a range of mini-revolutions in productivity. These approaches must also focus on regional similarities, linkages, complementarities and structures to address transboundary issues and opportunities. Regional research partnerships should focus on boosting productivity to help create market opportunities and facilitate access.

The Australian Centre for International Agricultural Research, part of Australia's aid program, delivers projects and programs that use this targeted approach. Australia is a world leader in agricultural research, and shares the range of environments, and associated problems, common to many parts of the developing world.

ACIAR's mandate is to help developing countries to help themselves, by enhancing spillovers between Australia and developing country research, by brokering research partnerships across the spectrum of public and private spheres, and by providing intellectual capital to agricultural researchers in developing countries.

ACIAR is focused on addressing the challenges of raising farm productivity, sustaining market integration and access, and institutional and human capacity building, through research partnerships. These challenges are fundamental to the goals of the Australian aid program; achieving lasting food security, rural development and economic growth across the Asia-Pacific region and Sub-Saharan Africa.

## **KEYWORDS**

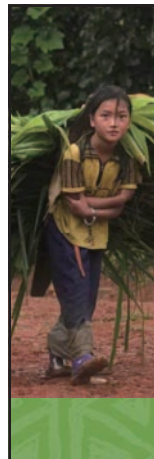
Food security, intellectual capital, productivity

## Agricultural Research

### Current Status and Challenges

Nick Austin  
ACIAR

AUSTRALIAN CENTRE FOR INTERNATIONAL AGRICULTURAL RESEARCH



"The number of mouths to be fed will have no limit; but the food that is to supply them cannot keep pace with the demand for it; we must come to a stop somewhere, even though each square yard, by extreme improvements in cultivation, could maintain its man."

Reverend Thomas Malthus, 1798

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### The Challenge

- Feeding 1 billion hungry people today
- Feeding 9 billion people in 2050
- Food and financial crises
- Climate change
- Supply of land, water & energy resources
- Less agricultural research
- Achieving the Millennium Development Goals

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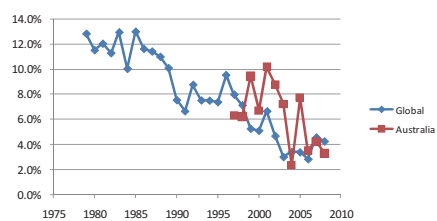
### Agricultural Research

- Track record of success
- Collective insurance
- Agricultural productivity improvements closely linked to R&D
- Estimates show that GDP growth originating in agriculture is twice as effective in terms of poverty reduction in developing countries
- Agricultural productivity reduces poverty by raising farm incomes and consumer price reductions
- Rates of return on R&D and Extension and investments in developing countries average 43% per annum (World Bank)

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### Agriculture's share of ODA

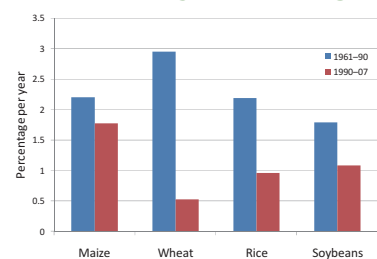


Source: OECD DAC

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### Productivity plateauing



Source: Alston et al. (2009)

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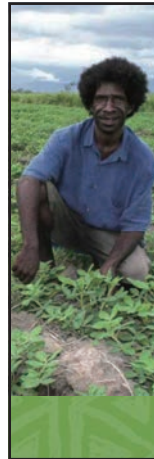


## CGIAR

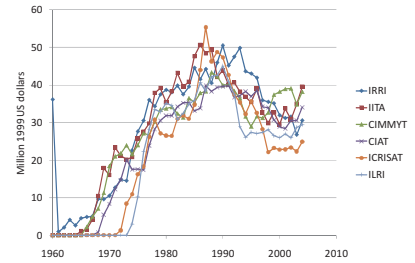
The Consultative Group on International Agricultural Research

- A microcosm of trends in agricultural R&D
- Reduced investment
- Expectations of high returns maintained

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## CGIAR investment



Source: Alston et al. (2006)

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## A turning point

- The global food crisis of 2007-08
  - Shortages in a number of countries
  - Sharp rises in prices
  - Estimated 100 million people pushed into poverty
  - Multiple causes
- Food security on top of aid agendas
  - Critical role for agricultural R&D

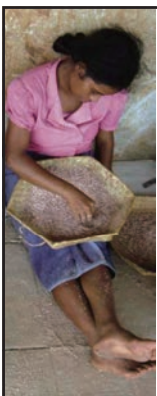
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## A new approach

- Public support essential
- Country and situation-specific responses
  - A series of mini green revolutions?
  - Understanding the environment
  - Leveraging intellectual capital
- Bilateral country partnerships will increasingly be supplemented by regional research programs
  - Scope for regional research partnerships particularly with emerging economies to address transboundary agricultural opportunities
  - Value adding and post-harvest research becoming more essential to achieve market access

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## Australia's Role

- World leader in agricultural research
  - Expanding food security program
- ACIAR**
- Research to help developing countries to help themselves, by contributing to solving agricultural problems and building research capacity
  - Links Australian expertise to needs and priorities of developing country agriculture
  - Enhances spillover of research outcomes and flow of public good benefits

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## ACIAR: Future Challenges

- Future focus on:
  - raising productivity at farm level
  - sustaining market integration and access
  - strengthening agricultural research through human and institutional capacity building
- Necessary to address above challenges cohesively to achieve sustainable research outcomes for development

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## Food Security

- Food security will remain as a dominant driver of the aid agenda for the next decade
- Australian government has initiated a new A\$464 million program for food security and rural development
- Research funding is expected to increase as a central component of rural development
- ACIAR emphasis on Asia-Pacific and Sub-Saharan Africa

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## Early Action : Research Themes

- Examples of early action themes for ACIAR include:
  - Safeguarding food security in rice-based farming systems of Mekong-South Asia
  - Adaptation to climate change for rice-based systems in the Mekong Delta
  - Developing high-value agriculture, forestry and fishery products in the Pacific region
  - Sustainable intensification of maize-legume cropping systems in eastern and southern Africa
  - Increasing financial support to the reformed CGIAR

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## QUESTION and ANSWER

**Akio Takenaka:** Great. Thank you very much, Dr. Austin. And we would like to have some questions from the floor. Okay, does anybody have a question or a comment on this presentation? Okay, Dr. Koyama.

**Osamu Koyama:** Thank you very much for your comprehensive explanation of ACIAR activities. My name is Koyama. I'm with JIRCAS. I have one question about the CGIAR reform. You stressed the importance of CGIAR in agriculture research and development. My question is what was the major influence on ACIAR activity brought about by the reform of the international agricultural systems, such as the CGIAR reform and the establishment of GCARD, a new initiative? Thank you.

**Nick Austin:** Thank you for that question. It's a timely question in that I've just returned from Washington for the 3<sup>rd</sup> meeting of the Fund Council for the CGIAR, which was held last week. Obviously, the reform process is a significant one for the CG system. And it's a process that is still very much in the middle of trying. Moving the focus from centers into themes of work is a significant shift, and one that allows a stronger focus on, more strategically high level outcomes. Australia's contribution to the CG System goes back for many, many years. Both in terms of bilateral and core funding and also in terms of Australian research expertise into the respective CG centers.

Under ACIAR's legislation, we have a mandate for funding into the CG system. And our contribution is increasing over the next three years to effectively double on the basis of satisfactory progress with the reforms. We find great value from our engagement with the CG system both at a project level bilaterally with the centers, but increasingly as we move to mega-programs, or more recently termed CGIAR Research Programs or CRPs; we see prospects for increasing our core funding into these endeavors. We're particularly pleased to see the Global Rice Science Partnership being the first CRP or mega-program approved and I think many would be aware was approved last week. So too was the Climate Change for Agriculture and Food Security Program.

There are a number of mega-programs coming behind. At this stage, fifteen in total and in that respect, the reform process is very much still a work in progress, but we are pleased by the significant achievements to date. Looking forward to having the strategy and results framework signed off in the near future as the last significant plank in allowing the reforms to move to a conclusion.

**Akio Takenaka:** Thank you. Next is Dr. Ganesan Balachander. Okay?

**Ganesan Balachander:** Thank you Dr. Austin. My name is Ganesan Balachander. I'm a board member of the Consortium of the CGIAR. So thank you very much for some of the statements you made. I mean, not because you are saying that ACIAR or the Australian government is going to increase the funding, but the question I have is one of the challenges, the radius centers--- the lead centers of the CRPs, are facing in the uptake of the research results into outputs and outcomes on the ground. And there isn't sufficient funding or hardly any funding for the capacity building of the NARS and the extension agencies within the developing countries. Now can you see whether it could be something that you could take up as topic during the fund council or the funders' forums to try to address this issue? Because I think this is a major challenge if we're going to translate some of the results from research into actual action on the ground. Thank you.

**Nick Austin:** An excellent question. I thank you for it. And I recognize that I didn't address the second part of the previous question in relation to GCARD and I think that's very pertinent to this question.

Achieving uptake of research results is a very important motivation for the reform process of the CG system. And the role that the NARS will play is increasingly important as we move to the mega-programs. What we've seen with the GRiSP, for example, the Global Rice Science Partnership proposal that was approved; it's a program that genuinely builds up strong partnerships, including those with NARS. And when we look particularly at the emerging economies and the powerhouses of agricultural research that's emerging in institutions like Embrapa in Brazil, ICAR in India and CAS in China, respectively, that's where we can find some enormous opportunities, but by no means the only places we should be looking at. And one of the challenges with the reform of CG is exactly what we touched on---how to ensure that the mega-programs are directly connected and focused at results on the ground. Our anticipation and our hope is that the strategy and results framework provides the high leverage for that to happen. But clearly, each of the programs needs to focus specifically on those on-the-ground objectives. I think it's an important role for both the funders and the consortium of centers and more broadly interested stakeholders through the GCARD process to remain engaged in ensuring that happens and to take the system to task as the reforms progress to ensure that that it is happening. Certainly, that's one of the motivations and intents of the reforms, but it's going to take vigilance to ensure that it does achieve the research results on-the ground.

**Akio Takenaka:** Okay, next.

**Ryotaro Suzuki:** My name is Ryotaro Suzuki. I'm a government official from the Ministry of Agriculture. I was very much impressed by your presentation, Dr. Austin. I understand the agenda and priorities of ACIAR. It's very much in sync with the CGIAR system and agenda setting as well. My question is a bit technical, but I want to know about the government funding sources. I understand that contribution to CGIAR system in general is regarded as a role development assistance budget under the OEDC-DAC definition. Does your funding source come from ODA budget or other government research budgets? That's my question, thank you.

**Nick Austin:** Thank you for that question. ACR's budget, in large part, comes from the official development assistance or ODA as defined by the OEDC-DAC. As I mentioned in my presentation, the government has committed to a target 0.5% of GNI, Gross National Income, by 2015 – 16. That translates effectively from an aid program in Australian Dollars of 3.8 billion last year, 4.3 billion this year, up to somewhere around 8.5 billion by 2015. A significant growth and within that is the growth that I mentioned in relation to the CG system. So traditionally or historically, ACIAR's contribution to the CG system has been in the order of 11 million a year, and that's projected to increase to around 25 million a year by 2012 – 13. So all of that increase is considered within the ODA as defined by OEDC-DAC.

**Akio Takenaka:** Okay.

**Kenji Iiyama:** Thank you very much, Dr. Austin. My name is Kenji Iiyama, President of JIRCAS. You pointed out very clearly that the ACIAR policy or the agricultural development in developing countries, such as country specific response and bilateral partnership, regional research partnership, and also the role of ACIAR is raising productivity at farm level. Asia Pacific and Sub-Saharan Africa are the target areas. These policies are quite similar with JIRCAS policies. And this morning, we discussed CGIAR's present policies. So your policy is quite similar with both JIRCAS and CIRAD. So

now, we should continue toward closer future collaborations for agricultural research and development in developing countries. Thank you very much.

**Nick Austin:** Thank you for that comment, Dr. Iiyama, and I very much endorse your comment about the alignment from my understanding of JIRCAS' priorities and I think we've renewed focus on food security and agriculture and prospect of increased resources. We're very interested in looking for opportunities for stronger and more strategic partnerships and so very enthusiastic around continuing the discussion with you following the conclusion of this symposium. And to redirect my comments, at the outset of my presentation I very much regret that I'm not able to be present in person to join in with the discussions. Thank you.

**Akio Takenaka:** Okay, so time is considered, one last question. Okay, Dr. Singh, please.

**Ram Badan Singh:** Dr. Austin, my name is R.B. Singh. I used to be the external secretary, the Executive Secretary of APAARI. As a matter of fact, at this meeting I am representing GFAR. And I also noticed the GCARD process you mentioned of. But the most important point is that ACIAR has been an active partner, supported many programs, APAARI one of them, as a matter of fact. And you have been a very active participant in several of the decisions and priority setting programs of APAARI. My question to you is that you mentioned that regional forums like APAARI should play a leading role for research coordination. Now I wish to know precisely from your side how ACIAR could contribute to this regional forum to really coordinate research, regional development and go down to the level of the farmers' fields. Thank you, Dr. Austin.

**Nick Austin:** Thank you and thanks for those comments around ACIAR's support for the regional forum. In particular, but not exclusively to APAARI. And we very much value the direction and guidance we receive from APAARI and from other regional organizations. ACIAR's priority setting is very much dependent on the priorities that are identified by our partner countries, by the governments, by the national research systems, and many of these parties sub-regional or regional. So institutions, such as APAARI, play a key role in providing guidance to ACIAR for better targeting areas of investment. And as with any aid programs around the world, in times of tightening financial circumstances, efficiency and effectiveness of aid expenditures get to be under increasing scrutiny. So we look to the regional organizations such as APAARI to achieve better targeting of our programs and insuring that our focus is addressing the regional and sub-regional needs as well as those that are identified in particular countries. We also look, as with ACIAR's broader mandate, in enhancing spillovers as to how we can play a role within a region, for example. So we greatly value the role that APAARI and like organizations play in allowing us to focus our research and ensuring that we have capacity to access scale-up and scale-out from the outputs of the research that we support to increase the impact on the ground.

**Akio Takenaka:** Okay. So the internet connection will be cut soon, thank you again very much Dr. Austin for your presentation. Thank you

**Nick Austin:** Thank you.