A Profit in Our Own Country

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Why Should Australia Spend More On International Agricultural Research And Development?

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Aid-funded international agricultural research need not harm agricultural-exporting economies such as Australia's, because the direct effects on farm trade of that aid via the boost to farm production in developing countries can be more than offset by indirect and longer-term effects on both farm and non-farm trade, resulting from the boost to incomes and hence consumption and investment in those countries.

Not only is that aid likely to have a positive effect on Australia's economy, but as well it is likely to be more beneficial to us than aid to the non-farm sectors of developing countries or to spending that money on investments in Australia, the prime reason being the very high returns to international agricultural research investments.

In real terms, bilateral and multilateral aid funding by OECD countries for agricultural research and development in developing countries has fallen about 20% during the past decade.[1] From Australia, official agricultural development assistance has fallen even more, from 14.2 to 10.5% of total aid spending outside Papua New Guinea (Jarrett 1994).

Three reasons are typically given for this decreased emphasis on agricultural assistance. One is the presumption that the problem of feeding the world has been solved. This presumption is not altogether surprising, given the glut of subsidised food stockpiled in Western Europe and the United States—and hence very low food prices in international markets—during much of the 1980s. But it is nonetheless a quite inappropriate view, as it ignores the reality that agricultural research needs to be ongoing if yields are to be even maintained, let alone keep pace with global demand increases due to population and per capita income growth.

The second reason sometimes stated to explain the decline in foreign aid to agriculture is the concern expressed by some environmental groups that the modern agricultural techniques promoted by international agricultural research degrade the natural environment and human health. This claim too is questionable, particularly when the alternative of less food consumption by the poor is considered, but space limitations preclude further discussion of it here.[2]

Thirdly, in food-exporting rich countries such as Australia and the United States, hard-pressed farmers have argued strongly against aid money going to agricultural research in developing countries. The basis of their argument has obvious intuitive appeal: with more farm production in those countries there would be less need for them to import farm products from developed countries such as Australia. Yet it is an empirical fact that countries whose agricultural output is growing fastest are also the countries whose imports of farm products are growing fastest. This apparent paradox can be resolved by recognising that our farmers' argument against such aid focuses only on the direct and immediate farm production effects, and ignores the indirect and longer-term effects that flow from raising incomes and hence consumption and investment in the aid-receiving countries. The first part of this paper traces through the main indirect effects and shows why it is likely that aid-funded investments in international agricultural research would *benefit,* rather than harm, the Australian economy.

It is almost certainly in Australia's narrow economic interest to direct a larger share of its aid budget to international agricultural research.

The remainder of the paper addresses the following question: even if Australia were to benefit economically from aiding agricultural research and development in developing countries, would our economy not benefit more by directing that aid to sectors producing goods which do not compete with Australia's exports? Or, to be even more selfish, wouldn't our economy be better off not giving aid at all and instead directing those aid funds to domestic uses, such as funding more agricultural research and extension in Australia? While it is not possible to give unequivocal answers to these questions, the paper suggests several reasons as to why the answers may well be 'no', especially if a larger proportion of that aid were to be spent on policy research and analysis. The paper therefore concludes that on balance it is almost certainly in Australia's narrow economic interest (not to mention interests in political stability, military security, aiding the poor and other social and foreign policy objectives) to direct a larger share of its aid budget to international agricultural research, including policy research.

Benefits to the Australian Economy from Aid-funded Investments[3]

The conventional argument put forward by farm groups is that agricultural research in developing countries reduces costs of production and raises farm output there, and so causes them to reduce their net imports (or expand their net exports) of food and fibre. If that happens in enough developing countries, the international price of farm products would fall. For both reasons—reduced net imports and a fall in international prices—farmers in Australia and America expect their export earnings to be reduced if more aid is directed to international agricultural research and development.

This argument is incomplete, however, because it focuses only on the developing countries' supply conditions. In particular, it ignores the effects of greater spending and saving by farmers there as they become wealthier. Their higher gross incomes would be spent partly on extra inputs such as fertiliser, pesticides, stud livestock and other modern inputs that are necessary to make the most of the new technologies, partly on household consumer items, and partly on boosting savings (thereby making more funds available for investment).

Extra spending on food would absorb some of the extra farm output, so the net effect on farm trade is less than the effect due to output growth alone. Added to that is the boost in net imports (or reduction in net exports) of farm inputs and non-farm products because of extra spending on those items. In so far as Australia supplied some of those products, so its total export earnings to those countries would fall less than the gross reduction due to reduced earnings from food and fibre exports alone.

An increase in farm incomes boosts the demand for non-tradables, leading to an expansion of non-tradables output and an increase in their price.

But that is not the end of the spending part of the story, because a substantial share of spending in those countries is on products and services which, by their nature, cannot be traded internationally. An increase in farm incomes therefore also boosts the demand for non-tradables. This leads to an expansion of non-tradables output and an increase in their price, which has three consequences for tradables. One is that resources have to be attracted out of tradables sectors, including agriculture, to enable non-tradables production to increase. Another is that domestic demand for tradables that are substitutes for non-tradables, including farm products, rises because of the rise in the consumer price of non-tradables. And the third consequence is that incomes of producers of non-tradables also are boosted, creating a second-round spending effect which adds to the demand for all tradables.

Manufacturing is the sector where natural-resource-poor countries have a strengthening comparative advantage.

Both shifts—in the demand for and the supply of tradables—reduce further the adverse effect of the aid-funded adoption, adaption and/or production of new farm technology on Australia's export earnings. Even though exports to developing countries of some farm products may fall, exports of other farm outputs and inputs and of non-farm products may rise sufficiently to leave Australia's economy better off.

In addition to these immediate effects, there is an important longer-term effect. Higher incomes mean greater savings in those developing countries. Where are those additional private savings of developing countries most likely to be invested? In the case of the relatively densely populated countries (which includes most of our Asian neighbours), the highest private payoffs are likely to be in more and better education (they too want to become cleverer countries), and in the industrial sector and complementary service sectors because manufacturing is the sector where these natural-resource-poor countries have a strengthening comparative advantage.[4] That is, we can expect resources over the longer term to be attracted away from agriculture to industry, and more so because of the boost in rural income resulting from greater aid flows. That would improve Australia's terms of trade and add further to the likelihood of Australia's current account improving as a consequence of giving more aid.

Is there any empirical evidence to support the above notion that agricultural income growth in developing countries could result in growth in their imports, particularly from Australia? Indeed there is. An earlier study (Anderson 1989) examined the correlation between those two variables for the period 1970–84 for the 53 developing countries with populations above one million for which data were available. It found those variables to be positively correlated regardless of whether real agricultural GDP growth is expressed on a per capita or per farm worker basis, whether imports referred to all merchandise or just farm products, and whether those imports were from the world, just developed countries, or just the United States or Australia (Table 1).

Certainly causation cannot be inferred solely from positive correlations, particularly in this case since output in other sectors may have grown even faster than farm output and the income growth from the former may be the main reason for the surge in imports. But equally certainly this evidence does not support the conventional view of some farm groups that agricultural development in poor countries harms agricultural and other exports of countries such as Australia.

Table 1. Coefficients of correlation between developing countries' per-capita growth rates in agricultural output and imports, 1970–1984.

	Growth in real per-capita imports from:			
	World	Developed countries	United States	Australia
Growth in real agricultural GDP				
Total imports				
—per capita	0.34	0.33	0.28	0.23
—per farm worker	0.23	0.22	0.24	0.09
Agricultural imports				
—per capita	0.15	0.07	0.07	0.09
—per farm worker	0.10	0.08	0.10	0.01

Source: Anderson (1989, Table 1), based on World Bank and FAO data.

Table 2. Median social rates of return to further investment in agricultural research, by region and commodity group.

	Number of studies	Median marginal rate of return on research expenditure (%)
By region		
Africa	10	41
Asia	35	57
Latin America	36	46
United States	44	50
Other OECD countries	24	40
International agricultural research centres	4	81
By product group		
Cereals	69	55
Oilseeds	16	64
Livestock	20	43

Source: Huffman and Evenson (1993, Tables 4 and 6).

Agricultural research is an area for further investment in developing countries that has an exceptionally high rate of return.

Wouldn't Foreign Aid to Non-farm Sectors be More Likely to Help Australia?

Again it might appear to be intuitively obvious that if our foreign aid to developing countries is to be made sector-specific, then directing it towards sectors producing goods we import would be more beneficial to us than directing it towards sectors competing with our exports. But that need not be so for several reasons—and one that overrides all others has to do with the fact that *agricultural research is an area for further investment in developing countries that has an exceptionally high rate of return. Indeed it is difficult to imagine any other large investment area where further spending could yield a higher return.*

According to the latest compilation of empirical evidence on this matter by Huffman and Evenson (1993), summarised in Table 2, social rates of return to further investment in agricultural research are still around 50% per annum in developing countries, despite massive investments since the 1950s. Even more spectacular is the estimated marginal rate of return for further investments in the CGIAR international agricultural research centres, at around 80% per annum. Furthermore, the new technologies in prospect suggest these high returns can be expected to continue well into next century (Crosson and Anderson 1992).

Despite these high social returns, sufficient private-sector money cannot be expected to flow into this area. This is because private returns typically are less than half the social returns to agricultural research, the reason being the difficulty in capturing more than a small proportion of the gains. Biological research on crops is especially problematic in this respect (notwithstanding plant variety rights legislation), since once a new crop variety is released, seeds can be readily multiplied.

Why don't national governments of developing countries overcome this market failure by subsidising this activity? They in fact do, but at very inadequate levels. They are loathe to invest heavily in this area partly because of the long time it takes (on average, seven years) before the beneficial results from agricultural research manifest themselves in higher farm incomes. Political leaders there, even more so than in rich democracies, typically have much shorter time horizons than seven years. Another part of the explanation is that farmers in poor countries are politically weak compared with other groups, because of the relatively high costs of getting together to act collectively—not least because of the free-rider problem when the group size is so large (Anderson 1981; Roe and Pardy 1991).

For these reasons the very high rates of return to further investment in developing-country agricultural research will continue to fail to attract sufficient investment from within these countries or from the private sector of richer countries. Thus a large boost to developing-country and global income can be expected per dollar of aid funding channelled specifically into agricultural research. Moreover, Table 2 suggests the returns would be especially high if more of that aid funding was channelled through the CGIAR international agricultural research centres.[5] In part that even higher return is because much research is equally applicable to several countries in a region, and economies of scale in research can more easily be reaped by organising its production beyond the national level (Fischer, these proceedings).

Types of Agricultural Research with the Highest Payoff

Table 2 suggests additional investments in agricultural research would have a higher payoff in crops than livestock. This is not surprising because it is easier to capture the gains from livestock research through the selling of bloodlines from registered studs than through trying to police plant variety rights legislation, hence private-sector funds are more forthcoming in livestock research. The same is true of farm machinery research, and it also applies to the development of farm chemical inputs such as fertilisers and pesticides.

Policy is one other relatively neglected area of agricultural research in developing countries.

But there is one other relatively neglected area of agricultural research in developing countries that has received scant attention. It has to do with policy. Ministries of agriculture in poor countries typically have very few well-qualified economic policy analysts. One consequence is that the farm policy regime often distorts resource use within the sector more than it otherwise would. Even more important is that the sector overall tends to be discriminated against through the setting of artificially low domestic prices, the taxing of farm exports (including via exchange rate overvaluation) and especially, albeit indirectly, the assisting of the industrial sector via protection from import competition (Bautista and Valdes 1993).

These policy choices ensure that agriculture contributes less to GDP and its growth than would be the case with a more neutral policy regime. However, as an economy develops its policy mix tends to gradually move away from taxing agriculture and towards assisting farmers, for reasons to do with the changing political power of farm and other interest groups (Anderson et al. 1986; Tyers and Anderson 1992).

Providing more information on the extent, causes and effects of these distortionary policies would help reduce their incidence. Again, this might be done more effectively through the economics divisions of the CGIAR's international centres and, especially, via its International Food Policy Research Institute (since national ministries tend to build up allegiances to agricultural industries and so are less likely to argue against assistance boosts to agriculture as the economy develops). As discussed below, this would have clear benefits for Australia in so far as it reduces the probability of newly industrialising countries following the lead of the more advanced industrial economies in increasingly protecting their agricultural sectors from import competition.

Areas of Agricultural Research that Benefit Australia Most

Where to direct such assistance is not easy to determine, even if one were to leave aside broader foreign policy concerns and focus only on the narrow economic benefits such aid might have for Australia. Several considerations need to be kept in mind. For example, avoiding countries with industries similar to ours, simply because agricultural aid to such countries may make them more competitive with our farmers, ignores the fact that Australian agribusinesses supplying inputs to modernising farm industries might boost Australia's export earnings enough to more than compensate for any reduction in exports of farm products. It also ignores the externalities that such aid generates in providing contacts and lowering information costs which boost exports of farm and non-farm technologies, of teaching and research training services, and of various consulting services in addition to merchandise.

It is the most densely populated, natural-resource-poor developing countries whose comparative advantage will increasingly complement Australia's as their incomes and capital stocks grow.

Another consideration worthy of attention relates to the fact that it is the most densely populated, natural-resource-poor developing countries whose comparative advantage will increasingly complement Australia's as their incomes and capital stocks grow (Anderson and Garnaut 1985). Hence the savings share of the income boost from aiding agriculture is more likely to be invested in non-farm industries in such countries than in more land-abundant countries. It happens that most of the Asian countries (and numerous sub-Saharan African countries) are extremely densely populated. Hence if all other things were equal, our agricultural aid might be directed more towards such countries. And since the propensity to save and invest profitably is unusually high in East Asia (including now Indo-China), that provides a further economic reason for focusing aid on those countries.

A third consideration has to do with the under-supply of economic policy analysis in these countries. If more and better policy analysis and advice were forthcoming from, for example, the economics departments of international agricultural research centres, *and heeded*, GDP growth would be faster. Initially that might result in greater farm output in countries where the underpricing of farm products was reduced. But in the long term it would lead to less risk that the drift towards overpricing of farm products would occur as those economies grow. And it is that over-pricing tendency that has caused farm export revenue for Australia to grow only slowly, not just in Europe but also in East Asia.

As Figure 1 shows, Korea and Taiwan followed Japan in raising their agricultural protection levels in the course of their industrial development, with their transition to high-protection status being even faster than Japan's. More high-quality agricultural economic policy research and analysis at early stages of economic take-off could reduce such tendencies in other countries, to the benefit of traditional farm-exporting economies such as Australia's.

Australian Aid versus Investment in Our Own Economy

Apart from the usual reasons for giving aid (building familiarity and trust between rich and poor countries, reducing the risk of military conflict, helping the most needy, etc. (see Dillon, these proceedings), and the fact that the income boost from more aid raises incomes in and hence imports by developing countries, there are several other sound economic self-interest reasons for Australia continuing to expand aid to agriculture in developing countries rather than selfishly investing that money at home.

One additional reason is that other OECD countries are doing it, so if Australia were to withdraw then it would reduce its chances of securing commercial sales with developing countries in the future. We have seen in the past a clear link between food aid and subsequent commercial sales, whereby large concessional sales at early stages of development often translated to large commercial sales as those poor economies became richer (e.g. U.S. PL480 shipments to Korea and Taiwan from the 1950s). A similar tendency is bound to operate with technological aid in the form of agricultural research personnel and funds. This is particularly so for Australia, given that its comparative advantage in that area is well known, because we would be perceived as being especially selfish if a substantial portion of our tied aid was ***not*** in that form.

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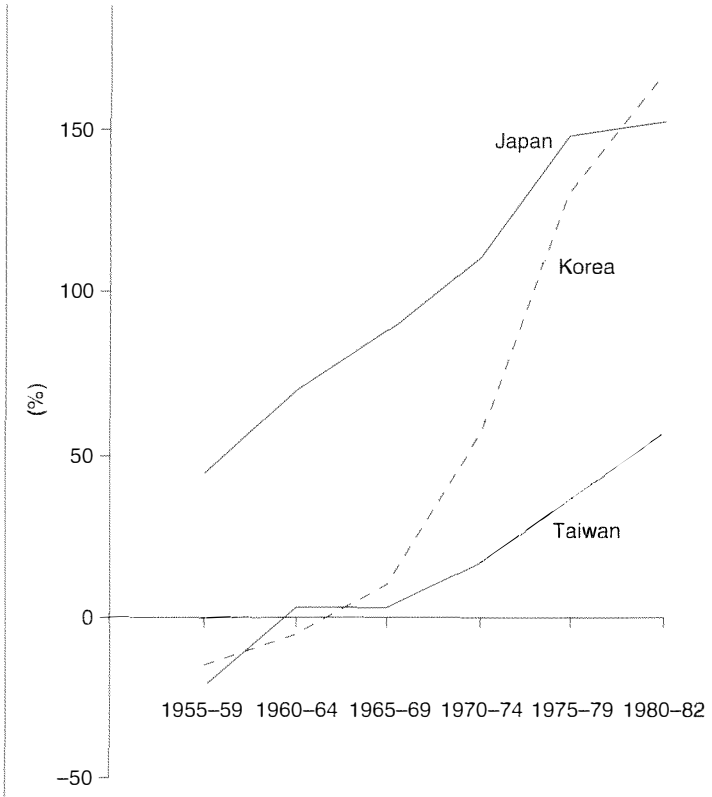

Source: Anderson and Hayami (1986 p. 22)

Figure 1. The percentage by which domestic food prices exceed international prices in East Asia, 1955–82.

More than that, the biases that emerge in price and trade policies in developing countries are not always independent of the interests of donor countries. A case in point is US influence in Northeast Asia. There the domestic prices of foodgrains are set much higher (relative to prices in international markets) than those of feedgrains and oilseed products used by livestock producers in those countries. That is, the rhetoric of food self-sufficiency which is used to justify import restrictions is applied less strictly to products exported by the U.S. (feedstuffs) than to other farm imports. An important effect of this is an artificial encouragement to the livestock industries in East Asia, thereby harming Australian exports of meat and milk products (Tyers and Anderson 1992).

There is also the possibility that the strength of preferences for food and fibre depends in part on the products first being home-grown. To the extent this is true, the long-term demand in East Asia for exotic goods such as dairy products would be enhanced by initially aiding the development of local dairy

herds. It may be even more true in the case of wool in a country such as China: once textile mills establish wool-processing capacity and downstream clothing factories develop markets for woollen products based on local wool, then as those markets and the capacity to supply them expand, so too will the demand for raw wool—a demand that local graziers in densely populated China would be incapable of satisfying so that imports would become increasingly necessary (as has already become evident—see Anderson 1990).

Furthermore, there is the distinct possibility that agricultural research abroad can be of benefit to Australian agriculture directly. Brennan (1989, and these proceedings) notes, for example, that the wheat breeding program at CIMMYT in Mexico, to which Australian scientists have contributed, has boosted Australian wheat yields to an extent that far outweighs the financial contribution Australian aid has made to CIMMYT's budget. A similar conclusion can be drawn from many other studies, including a recent one by Davis and Lubulwa (1994) concerning Australian aid to tropical fruit research in developing countries.[6] Such 'reverse technology' flows are especially likely to occur from the international centres in the CGIAR system because of their focus on 'broad adaptation' technologies that can be readily adapted to and adopted in a wide range of circumstances, including Australia's. A striking example during the past 25 years is research on germplasm (Fischer, these proceedings).

There is the distinct possibility that agricultural research abroad can be of benefit to Australian agriculture directly.

An increasingly important example in the years ahead will be research aimed at reducing soil and other environmental degradation. As Ryan (these proceedings) puts it, agriculture in Australia 'is based very largely on exotic species, fragile land systems, and low-fertility soils, ... [and] ... without continual international transfusions of genetic resources and scientific technology, Australian agriculture is simply not sustainable'. Past experience suggests both the extent and the speed of such transfers of technology appropriate for Australia's very diverse ecological circumstances are likely to be highly correlated with the extent of financial and personnel involvement by Australia in international agricultural research.

Conclusion

In short, there are numerous reasons for expecting Australia to benefit economically from aiding agricultural research in developing countries, apart from the usual ones such as helping the needy and promoting peace and understanding between rich and poor countries. A major reason we would gain is because those recipient economies would grow faster

Recipient economies would grow faster with more aid, and fastest if that aid were tied to the grossly under-invested area of agricultural research.

with more aid, and fastest if that aid were tied to the grossly under-invested area of agricultural research. With their higher incomes would come more trade, including import trade from Australia. The boost to our export earnings is likely to be especially great if that research aid (a) is channelled to densely populated Asia (since there a large share of the higher incomes is likely to be invested in non-farm production which will improve our terms of trade), and (b) is directed towards economic policy research in addition to the usual scientific areas.

'Free riding' on the aid contributions of other high-income countries is simply not a sensible option. By not being there as a significant donor and participant, we would run several considerable risks—of becoming aware of new technologies less rapidly than others, of having less influence on the international research agenda, and of having less influence on agricultural policies in developing countries. Meanwhile other donor countries would take the opportunity to persuade recipient countries to bias their price and trade policies in favour of trade with the donor—as has already happened in Korea and Taiwan, for example, where feedstuffs attract low import duties to further boost the highly protected livestock sector, thereby boosting US farm exports but harming Australia's and New Zealand's.

Fortunately, there are many other reasons in addition to narrow economic ones for Australia assisting the rural sectors of our poorer neighbours, and they will be sufficient for many Australians to vote for such aid. But the good news is that there are also sound economic reasons for boosting that aid. It remains to make more use of arguments such as those presented at this conference to convince our more sceptical and less generous citizens that by doing good for others we are very likely to end up also doing well for ourselves.

End Notes

[1] According to Braun et al. (1993), the amount of bilateral and multilateral assistance to agricultural development in the third world fell from $12 billion p.a. in the late 1970s to $10 billion in 1990 (expressed in constant 1985 US dollars).

[2] A more appropriate response to those concerns of environmentalists that have legitimacy is to further invest in research aimed at developing more-sustainable farming systems, rather than returning to old, less-productive methods (Ryan, these proceedings).

[3] This section draws on an earlier, more technical paper by the author (Anderson 1989), as well as on papers given from a U.S. perspective at conferences in the latter 1980s such as de Janvry and Sadoulet (1986), Kellogg et al. (1986), Paalberg (1986), Falcon (1987) and Purcell and Morrison (1987).

[4] For more on why such countries are becoming increasingly the suppliers to the world of manufactured goods, see for example Balassa (1979) and Brown and Julius (1993). China is an especially clear example of this: during the past 15 years, investment in and output from the industrial sector has far outpaced that in agriculture, and most notably in rural areas (Anderson 1990; Findlay et al. 1994).

[5] As well, channelling aid funds through the CGIAR system reduces the likelihood of aid to national research systems simply displacing domestic spending on agricultural research.

[6] That study estimated the net present value of a $6 million aid-funded investment in research in Southeast Asia was over $230 million (in 1990 Australian dollars), of which $45 million accrued to Australia.

References

Anderson, K. 1981. Politico-economic factors affecting public agricultural research investment in developing countries. In: Bellamy, M.A. and Greenshields, B.L., eds, The Rural Challenge. London, Gower, 162–168.

Anderson, K. 1989. Does agricultural growth in poor countries harm agricultural-exporting rich countries? Agricultural Economics 3(4), 309–321.

Anderson, K. 1990. Changing Comparative Advantages in China: Effects on Food, Feed and Fibre Markets. Paris, OECD.

Anderson, K. and Garnaut, R. 1985. Australia's trade growth with developing countries. The Developing Economies, 23(2): 121–137.

Anderson, K., Hayami Y. and others 1986. The Political Economy of Agricultural Protection. Boston, London and Sydney: Allen and Unwin.

Balassa, B. 1979. The changing pattern of comparative advantage in manufactured goods. Review of Economics and Statistics, 61(2), 259–66, May.

Bautista, R.M. and Valdes, A. eds. 1993. The Bias Against Agriculture: Trade and Macroeconomic Policies in Developing Countries. San Francisco: Institute for Contemporary Studies Press for ICEG and IFPRI.

Braun, J., Hopkins, R.F., Puetz, D. and Pandya-Lorch, R. 1993. Aid to Agriculture: Reversing the Decline. Food Policy Report, International Food Policy Research Institute, Washington, D.C.

Brennan, J.P. 1989. Spillover effects of international agricultural research: CIMMYT-based semi-dwarf wheats in Australia. Agricultural Economics 3(4), 323–32.

Brown, R. and Julius, D. 1993. Is manufacturing still special in the new world order? In: O'Brien, R., ed., Finance and the International Economy, 7. London: Oxford University Press.

Crosson, P. and J.R. Anderson 1992. Resources and Global Food Prospects: Supply and Demand for Cereals to 2030. Technical Paper No. 184, The World Bank, Washington, D.C., ch. 9.

Davis, J. and A.S.G. Lubulwa 1994. Evaluation of postharvest research: results for an application to tropical fruit research projects. Paper contributed to the 38th Australian Agricultural Economics Society Conference, Victoria University, Wellington, New Zealand, 8–10 February 1994.

de Janvry, A. and Sadoulet, E. 1986. The conditions for harmony between Third World agricultural development and U.S. farm exports. American Journal of Agricultural Economics, 68(5), 1340–46.

Falcon, W.P. 1987. Aid, food policy reform, and U.S. agricultural interests in the Third World. American Journal of Agricultural Economics, 69(5), 929–35.

Findlay, C., Watson, A. and Wu, H.X., eds 1994. Rural Enterprises in China. London: Macmillan (in press).

Jarrett, F.G. 1994. An Economic Evaluation of Australian Aid. Canberra: Australian Development Studies Network, p. 40.

Huffman, W. and Evenson, R.E. 1993. Science for Agriculture. Ames: Iowa State University.

Kellogg, E., Kodl R. and Garcia, P. 1986. The effects of agricultural growth on agricultural imports in developing countries. American Journal of Agricultural Economics, 68(5), 1347–52.

Paalberg, R.L. 1986. Farm development in poor countries: the disputed consequences for U.S. farm trade. American Journal of Agricultural Economics, 68(5), 1353–57.

Purcell, R.B. and Morrison, E., eds 1987. U.S. Agriculture and Third World Development: The Critical Linkages. Boulder: Lynne Rienner.

Roe, T.L. and Pardy, P.G. 1991. Economic policy and investment in rural public goods: a political economy perspective. In: Pardy, P.G., Roseboom, J. and Anderson, J.R., eds, Agricultural Research Policy. Cambridge: Cambridge University Press, ch. 1.

Tyers, R. and Anderson, K. 1992. Disarray in World Food Markets: A Quantitative Assessment. Cambridge: Cambridge University Press, ch. 4.