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*Agriculture in an Interdependent and Uncertain World:  
Implications for Markets and Prices*

## I. INTRODUCTION

National agricultural markets in the 1950s and 1960s were relatively stable with the principal linkages among countries occurring through international commodity markets. By contrast, the period since 1972 has been considerably more volatile and uncertain and interdependence is characterised by a much larger number of linkages, including through energy prices, exchange rates and capital markets. This greater interdependence means that national agricultural sectors are potentially vulnerable to a much broader set of external shocks.

To state this now may seem to be emphasising the obvious, but we still need to understand better the nature and causes of the increased interdependence and uncertainty. We begin our analysis with the basic premise that increased interdependence can result from: (1) increased integration of the domestic agricultural sector into the national economy; and (2) increased integration of national economies into world markets. The approach is to develop a framework that allows one to look at both kinds of integration simultaneously. This is developed schematically in Section II. Section III of the paper discusses briefly the variety of situations in which agriculture can find itself. Section IV discusses the implications for world markets of increased interdependence and Section V draws out some policy implications for both individual countries and the international community.

## II. THE NATURE OF INCREASING INTERDEPENDENCE

Interdependence for an agricultural sector can come about from two sources: increased integration into the national economy and increased integration of the national economy into the international economy. This is presented schematically in Figure 1. On the horizontal axis is the transformation of the domestic agricultural sector from a traditional subsistence sector to a mature highly integrated part of the economy. The overall process of transformation is well known (Hayami and Ruttan 1985; Mellor and Johnston 1984). Briefly, it involves increased productivity, a greater market orientation, declining relative and then absolute employment of labour, declining contribution to GNP and increased dependence on non-farm sector inputs. The process is, of

		Increasing Degrees of Domestic Integration		
		Traditional Subsistence Agriculture	Transitional Agricultural Sector	Mature Agriculture
Increasing Degrees of International Integration	Autarkic or Fixed Relations*	1	2	3
	Partially Linked**	4	5	6
	Completely Integrated Economy	7	8	9

\*e.g., fixed exchange rates, non-convertible currency and state trading

\*\*may participate in some markets (e.g., commodity) but not all (e.g., capital)

FIGURE 1 Domestic and International Integration

course, a continuum, but for analytical purposes we identify three broad stages: (1) traditional subsistence agriculture; (2) transitional agriculture with partial but not complete integration and (3) a mature integrated agriculture.

On the vertical axis are the degrees of international integration of the national economy. At one extreme, countries may have few if any linkages with the international economy but such an autarkic situation is of limited interest in the present context. Instead, the situation representing the lowest level of international integration is one that would involve limited capital flows, inconvertible currencies and trade managed by the state. A partially linked economy would involve increased participation in commodity markets (with the interface managed or unmanaged), and exchange rate convertibility, but limited or no integration in capital markets. A completely integrated economy would be one where there is heavy involvement in international commodity and product markets and ready capital movements in conjunction with changes in interest rates and exchange rates.

The process of domestic development involves movements from subsistence toward a mature agriculture regardless of the degree of international integration, though its rate and stability may be influenced

by such factors. This transformation occurred in the 'developed' countries over the period from about 1850 to the 1960s with the agricultural exporting nations (United States, Canada, Australia and New Zealand) proceeding more rapidly. One could argue that Europe is only now approaching full maturity and that Japan has some way still to go. The rate and character of the agricultural transformation can be influenced by but not halted by policy. Thus, more and more countries will be moving to the right in the figure though at different speeds.

The process of international integration may not have the same degree of inevitability, but the evolution in the post Second World War period has been to move most countries downwards on the chart. Fundamentally the process involves opening the national economy up to the international economy by liberalisation of trade and of capital markets. However, perhaps more so than with the transformation of domestic agriculture, the rate of change and the nature of the openness is more directly dependent on policy choice (McCalla and Josling 1985).

The interaction of both processes has moved more and more countries southeastward towards the combination of a mature agriculture and a fully integrated national economy. With increased interdependence, both in domestic agriculture and because of macroeconomic integration among countries, agricultural commodity markets are subject to a much wider variety of shocks, including weather (the traditional source of instability), from other markets (capital and foreign exchange, for example) and from policy (not only agricultural but monetary, fiscal and exchange rate). The failure to adjust domestic agricultural policy instruments to an interdependent world environment can exacerbate instability as more and more exogenous shocks hit the domestic agricultural sector.

### III. THE NATURE OF THE TRANSITIONS

To get the flavour of the various stages of interdependence in this section we characterise the various combinations of the degree of integration, nationally and internationally, in terms of the 'boxes' labelled 1 to 9 in Figure 1. In some cases we risk debate by giving potential examples of countries that seem to fall into a particular category but no formal attempt is made to quantify these criteria.

#### *Case 1*

Countries whose agricultural sector is traditional and whose economies are weakly, if at all, linked to international markets would meet the most recurrent description of low-income developing countries: a high proportion of the population in agriculture; heavy emphasis on subsistence food crops with low levels of commercial marketing; the absence of national product and input (particularly credit) markets; near self-sufficiency in food crops at low levels of nutrition; and a relatively small non-agricultural sector in terms of employment and GNP creation. The

international linkages, if they exist, would be highly managed. If export crops are produced they would not be closely linked to the food crop sector and their marketing would most often be managed by state trading agents or parastatal marketing boards. There could be concessional food aid and limited commercial food trade. There would be few if any direct macro and monetary linkages with world markets. Typical would be a fixed exchange rate for inconvertible currencies (or currencies linked to that of a previous colonial power) with most capital movements managed by the public sector. Many countries in sub-Saharan Africa would meet this general description.

### *Case 2*

A country in transition agriculturally but still not linked internationally would exhibit some or all of the following characteristics: the development of national markets for both food and cash crops; a developing but still incomplete distributional sector; improvements in biological technology but still low levels of mechanical technology, resulting in high levels of labour employment; public sector national credit markets; growing inter-sector linkages through product and input markets; a developing national labour market as evidenced by heavy rural to urban migration; more commercial food imports; and declining cash crop exports as rising population and income put pressure on land to produce food. Countries such as Egypt, India and Bangladesh seem to fall in this category with a transitional agriculture but still largely closed macroeconomic markets and policies.

### *Case 3*

Full integration would involve high levels of productivity resulting from biological, mechanical and chemical technology; a well developed distributional sector including sophisticated processing and informational markets including futures trading; declining relative and absolute employment in production agriculture; full integration of agriculture into national capital, labour, product and input markets; high dependence on purchased inputs; most production sold off-farm; declining numbers of commercial farmers and rising numbers of part-time farmers; but with an international interface small and managed to dispose of periodic surpluses or cover occasional shortages. This case seems somewhat rare in practice. Agricultural integration may require the stimulus of international linkages to reach its maturity. Europe in the 1960s during the formation of the European Community seemed to meet most of these conditions: economic integration among Western countries, in particular through the capital market, has moved EC agriculture down at least to case 6.

### *Case 4*

Increasing the degree of international integration for a still traditional agriculture sector would involve greater flows of international goods either as food aid or government purchases for distribution; the development of

the cash crop sector selling on international markets perhaps with some private marketing alongside marketing boards; the deliberate use of trade policy to create conditions to stimulate either cash or food crops; capital inflows both public (e.g., World Bank) and private (multinationals) but incomplete international integration as characterised by fixed and inconvertible currencies and often multiple exchange rates. This case would essentially capture those situations where there are strong international commodity market linkages but these coexist with a large traditional agricultural sector imperfectly integrated in the domestic economy. At the risk of debate, Thailand, several Central American republics and Malaysia seem to fit here.

#### *Case 5*

The combination of growing international linkages and internal agricultural linkages is perhaps more typical of middle income developing countries. It can be characterised by strong international linkages through cash crop exports; productivity increases in the food sector but not rapid enough to meet rising demands resulting from income and population growth; consequent rising of concessional and commercial food imports but with prices still generally managed, limiting the impacts of world price changes on agriculture; rising employment in the non-agricultural sector resulting in rising wages and labour migration. Thus in this case both non-agricultural sector and world market linkages are partially developed, but impacts on agriculture come indirectly through policy change often forced by fiscal or foreign exchange constraints. Potential examples here include many of the Centrally Planned Economies of Eastern Europe, the USSR, South Korea, the Taiwan area of China and possibly Brazil. It is in this stage that agriculture may become subsidised rather than taxed.

#### *Case 6*

This case is one in which full integration of a commercialised agricultural sector has preceded the development of linkages through capital and trade markets. Therefore, domestic macro but not international shocks hit agriculture. It is plausible to place a number of developed countries in this category particularly members of the EC, where the Common Agricultural Policy has had some success in preventing the opening of the European economies from impinging directly on agriculture.

#### *Case 7*

A traditional agriculture with low levels of agricultural productivity but full international integration is another variant. International events have an importance for agriculture, as capital flows influence exchange rates and interest rates. There may be direct foreign investment in the export sector or import competing sectors but few domestic linkages with the non-farm sector. Although examples here are less easy to find,

some of the characteristics appear in the relatively open economies of Argentina, Mexico and Kenya.

• *Case 8*

This case involves full international integration and partial domestic integration. Therefore, exchange rate, world price and interest rate fluctuations impact directly on the commercial export-oriented sector of agriculture. Domestic impacts come through the labour markets. Canada and Australia might fall into this category: world market conditions impact directly on the export grain sector but domestic policies for other commodities partially isolate those producers from domestic macro instability. Japan would also possibly be an example of this situation.

*Case 9*

This is the ultimate degree of integration both domestically and internationally. Agriculture competes with a huge non-agricultural sector for capital, industrial inputs and labour. Internal market linkages are well developed. Internationally a relatively open economic policy subjects agriculture to international changes in exchange rates, interest rates, and capital flows. There are well developed linkages between commodity and capital markets. Here the full range of shocks, both domestic and international, impact on agriculture. Clearly the United States is a candidate for this category. The tendency clearly will be for more and more developed countries to move towards it.

#### IV. IMPLICATIONS FOR STABILITY IN WORLD MARKETS OF INCREASED INTERDEPENDENCE

It is apparent that the general movement of many countries in the 1960s and 1970s was to greater degrees of integration. The implications of this for agricultural commodity markets appears to have been an increase in instability. Increased domestic integration means that domestic macroeconomic policies which influence interest rates and inflation impact on agricultural costs and the demand for food. It seems clear that most nations experienced greater instability in macro prices – interest rates, wage rates, the general price level and exchange rate – in the 1970s and early 1980s than in previous periods. These destabilise agricultural prices more with higher degrees of integration.

Simultaneously, much greater integration and interdependence evolved internationally because of the rising importance of trade relative to GNP, flexible exchange rates and a rapidly growing and highly integrated capital market (Schuh, this volume). Therefore, open economy agricultural sectors could be buffeted both from international sources and domestic sources. Further, in many countries domestic-international macro linkages through money supplies, interest rates, and capital flows reduced the ability of individual countries to attempt to maintain domestic monetary and fiscal stability. In fact, attempts to do so may have

exacerbated the international transmission of inflation and recession (McKinnon 1982). These international swings impacted more on agriculture both through domestic and international linkages the more integrated an agriculture was. United States agriculture's roller-coaster ride in the 1970s and early 1980s was much more pronounced because of its highly integrated character.

The implications for international agricultural commodity markets seem clear. Integration leads to a much larger set of sources of external shocks. If domestic policies for agriculture are unable to adjust to external shocks, countries may be less able to prevent the import of international instability than they would be in a world of stable exchange rates, interest rates, and commodity prices. Agricultural policy instruments which fix internal prices and manage trade at the border would be less able to prevent macro impacts from influencing farm prices.

## V. DOMESTIC AND INTERNATIONAL POLICY IMPLICATIONS

We sum up this brief discussion by considering the policy implications of the above analysis and posing a conundrum for agricultural policy. The first implication of our approach is that the way in which countries were impacted by the turbulent international events of the last decade depended very much on where they were in the process of two-way integration. Countries in category 1 were the least impacted by events, whereas countries in category 9 were very vulnerable to the full range of international shocks. With greater domestic integration these shocks came from two directions – international commodity markets *and* domestic macro instability. Thus, one conclusion that necessarily follows is that not all countries suffered the same fate from instability.

The related policy question which arises is to ask what could countries have done to reduce the uncertainty and instability. Here the policy options are not symmetrical between domestic and international options. Countries would have a better chance of arresting (or even rolling back) movements towards international integration than they would have of managing domestic integration. This seems obvious. Border instruments – quotas, variable tariffs, licences, multiple exchange rates, state trading etc., – on a limited range of commodities are easier to manage than the full range of agriculture-non-agriculture interactions in an integrated economy. In fact traditional instruments in the latter case may be counterproductive. For example, the United States by fixing target prices and particularly loan rates in domestic currency terms increased agricultural stress when macro events caused a major appreciation of the US dollar.

The second implication of the analysis is that a country's range of options for the support of agriculture change with both kinds of integration. Historically, countries have had two broad options. The first is the attempt to assist the adjustment of a dynamic agriculture to



changing conditions. The second is to try to isolate agriculture and prevent integration and, if that is not possible, to prevent the impacts of external policy shocks. But if the isolation is ineffective, agriculture in fact may be worse off. Thus, international turbulence may render the option of domestic isolation less operable and force countries to move towards adjustment policies (Schuh, this volume). Traditional agricultural lobbies and policy officials, used to managing their own affairs in their water-tight compartments, are not generally accustomed to dealing with dynamic adjustments forced by events elsewhere in the national and/or global economy. The events described here alter the set of policy options open to national policy makers. How they respond individually could either move the world towards more isolation or more open markets.

The third implication, for international agricultural policy, is similarly ambiguous. The conventional wisdom has been that trade liberalisation, by the reduction of tariff and non-tariff barriers to agricultural trade, would lead to greater global market stability and international and national food security. But what seems to have happened in the 1970s and 1980s has resulted in both greater integration *and* greater instability. The extent to which a policy of trade liberalisation would reduce instability is now an empirical issue rather than an article of liberal economic faith. Economic theory would suggest that the more integrated markets are (i.e., the greater the number of markets involved in adjustments) the more stable they ought to be. This is one of the standard arguments for flexible exchange rates. Yet exchange rate instability appears to have increased since the demise of the Bretton-Woods agreement. However, it is also true that greater integration *increases* the number of potential exogenous shocks that could impact on a particular sector. This seems to have been the fate of agricultural markets since 1972. The crucial question is which tendency will prevail. Will, in the long run, greater integration and trade liberalisation lead to more stable markets? If the answer is yes, the adjustment policies are appropriate to assist agriculture in moving southeastward towards full integration. If the answer is no, then countries will seek to isolate themselves from both domestic and international shocks. The implication of this, unless complete autarky results, will be further destabilisation of world commodity markets and ever greater uncertainty for both exporters and importers.

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## DISCUSSION OPENING I – GERALDO CAMARGO BARROS

The papers presented by McCalla and Josling and Ulrich Koester deal with the basic question of uncertainty or lack of security resulting from world-wide market integration. An interesting complementarity of these papers should be emphasised: the first one approaches the question from a macroeconomic point of view while the second one from a microeconomic standpoint.

Wonnacott and Wonnacott (1981) elaborated the microeconomic setting needed to show that in a world in which tariffs and other obstacles to trade (such as transportation costs) exist, a country can achieve gains from a customs union which are not possible with unilateral tariff reduction. Koester displays some objective conditions under which a specific co-operation scheme (SADCC countries) could be more beneficial than world-wide integration. As pointed out by the author, a major difficulty to be overcome by co-operating countries is of a macroeconomic and political nature: countries should agree on harmonising their monetary and exchange rate policies. This is not an easy task especially among neighbouring countries which tend to be affected more strongly by elements of nationalism.

McCalla and Josling present a bi-dimensional framework where the degree of integration of agriculture into the national economy interacts with the degree of integration of the national economy into the world markets determining the degree of exposure of agriculture to the effects of domestic and international macroeconomic events, including uncertainty. McCalla (1982) and Schuh (1984) discussed the growing interdependence and uncertainty experienced by the international commodity markets and related them to international monetary linkages. The income effects of world-wide growth and recessions, the exchange rate and interest rate effects upon agricultural trade were stressed.

As pointed out by McCalla and Josling, the fundamental question is: 'Will, in the long run, greater integration and trade liberalisation lead to more stable markets?' On one hand, the greater the number of markets integrated the more stable they tend to be under flexible exchange rates. On the other hand, great integration tends to increase the number of potential shocks to agriculture. If the dominant effect turns out to be the second one, a tendency towards isolation, or even autarky, will be observed. Some arguments showing that this late hypothesis is less probable are presented next.

Consider the case dealt with by Koester. Countries characterised by a traditional or transitional agricultural sector and by a low degree of international integration (case 1 in McCalla's and Josling's paper) would be less vulnerable to external shocks and would not have much to gain (in the present context) from isolation.

Other Third World countries, contrary to that observed in the developed countries, have had the integration of their agricultural sector induced and sustained by policy instruments, including monetary and fiscal policies. Plagued by high inflationary levels it is doubtful if these instruments will continue to be used with the same intensity as before. Then, it is to be expected that national agriculture integration will not proceed at the same speed and, therefore, the effects of exogenous shocks upon agriculture would not be aggravated in the future.

Another stronger argument favouring world-wide as opposed to regional integration is associated with the so-called world food equation. Mellor (1983) projects a total deficit of 75 million metric tons of major food crops in the Third World in year 2000, which is nearly three times the deficit of these countries in 1977. Between 1961 and 1978, net imports of food staples by developing countries increased at an annual rate of 13 per cent. The poorest countries in the world, most of them located in sub-Saharan Africa, presented the highest growth rates of imports. Mellor also presents projections of up to a 196 million ton surplus in the developed countries. All these facts clearly favour the expectation of growing world-wide trade.

Mellor (1985) argues that major markets for developed country cereal surpluses are in the developing countries. Schuh (1984) points out that more free trade will be needed in order to create importing capacity by developing countries. This will include fewer trade barriers to increase both agricultural and labour-intensive manufactured products imported from less developed countries.

Finally and perhaps more important, the foreign debt accumulated by Third World countries – around 866 billion dollars in 1985 according to the IMF – will require a sustained trade balance surplus to provide for the needed strong, convertible currencies. This naturally implies more trade among developed and developing countries, since these currencies would not be obtained through regional Third World trade arrangements.

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## DISCUSSION OPENING II – GUY DE VISSCHER

Regarding the paper by Ulrich Koester, there is little with which one can

disagree. Economic theory is seen to have practical application but there are political inhibitions, which lead to a less than full exploitation of the potential benefits. Africa is not alone in suffering from this. The job now is to encourage the SADCC\* countries to pursue the advantages more vigorously.

On page (101) it was pointed out that regional integration was easier to achieve than world-wide integration; but the effect may be less beneficial (to consumers).

Parity prices are referred to in Table 1; but I am not clear what exactly is meant – is it parity with *internal* prices or parity with *world* prices?

Towards the end of the paper the terms ‘producer surplus’ and ‘consumer surplus’ are used. Does this mean welfare satisfactions or what? To what does the ‘surplus’ refer?

I have five points to make on the paper by McCalla and Josling.

1. The simplicity of the presentation of the evaluation of the degree of agricultural integration implies that each country or group of countries can easily regain its place and determine the level of change needed to attain a future objective, fixed or not.  
Viewed in this way, the assertion on page 116 takes on a completely new meaning, as it assigns a secondary role to policy, i.e., agricultural policy. Nevertheless, from the previous paragraph one realises that the degree of change is a function of political choice. Should we see a contradiction in this, or does the author see an increasing role for policy as countries move towards the position illustrated in Case 9 of the diagram?
2. There is no doubt that agriculture is affected by exogenous constraints and that regional and international integration increase the economic risks to agriculture. The authorities are therefore bound to take measures to reduce the harmful effects of disasters, and this is precisely what the developed countries are increasingly doing, since food self-sufficiency is regarded as a vital factor for the rest of the economy. Should not therefore greater significance be attached in future to all development programmes especially when the economically strong countries propose to help the developing ones?
3. Even if the basic criteria for classifying countries can be determined so precisely, the speaker hesitates to classify, with a few exceptions, the states and their respective positions in the diagram. Should one conclude from this that few countries respond to all the constraints, or is the writer avoiding discussion of this subject? In this context the major question arises of whether the USA can be considered as a candidate for Case 9, when in terms of one of the basic elements, i.e., the opening up of its markets, the USA is characterised by the limited

\*Southern African Development Coordination Conference

range of its imports (beef, milk, sugar, cereals ... etc.) and inversely, the EL is the largest importer of agricultural products.

4. On page 120, the last phrase of Section IV 'Agricultural policy instruments ... farm prices' contains so many implied elements that there appears to be, without any other definitions, a basic contradiction. Control of trade at frontiers clearly has as its objective to avoid macroeconomic impacts on agricultural prices.
5. Throughout the paper a basic feature has been left out, the cost of market integration. No country once it reaches a certain level of development can forget this item. It is probably the increasing costs of liberalising markets and ensuring a better level of integration which explains (page 121) the growing level of instability during the 1970s and 1980s.

This is the economic phenomenon which governments need to tackle, particularly to know whether they want to move towards the right hand side of the diagram. But even if the replies were positive, certain factors, such as social factors, cannot be omitted from the integration process.

#### GENERAL DISCUSSION – RAPPORTEUR: P. ALASSANE SOW

Summary of the discussions following the presentations of Dr Ulrich Koester and of Dr Alex F. McCalla and Dr Timothy E. Josling.

##### *Comments on Koester's paper*

Unlike political commitments, three major causes have inhibited the success of agricultural integration among the Andean countries: (a) the products produced by the different countries are very similar; (b) none of the countries involved is self-sufficient; (c) the countries needed hard currencies to import necessary capital goods.

Regional integration may increase the degree of instability in world wide commodity markets. Regional co-operation among LDCs may be unfeasible when EEC countries dispose of large surpluses in agricultural goods.

Dr Koester replied, to comments from the floor, that the degree of protection among LDCs had increased largely due to the CAP of the EEC. This makes the political will of African countries in sub-Sahara very important for the implementation of economic integration. Furthermore, most of those countries are small. Their integration will not damage world-wide market commodities.

To the Opener's remarks he replied that parity prices were hypothetical prices. They were based on export and import prices. The consumer surplus was a concept borrowed from Welfare Economics.

##### *Comments on McCalla and Josling's paper*

Available evidence does not support the move from box 1 to box 9. As economic development proceeds, protection of agriculture is almost

inevitable. Also, the diagram does not suggest any identifiable situation beyond box 9.

The authors replied to comments from the floor that they did not argue that countries should move from box 1 to box 9. However, there were welfare gains associated with free trade although countries opened to world trade might incur costs associated with externalities flowing from other countries.

Beyond box 9 we reached a situation of 'world unification'.

To the opener's remarks they replied that although strong political forces (agricultural protection, etc.) might keep a country from moving west to east in the diagram, a country bears important budget costs when it avoids such a move.

One way of measuring the degree of protection of a country was to compare national wages with those prevailing in world markets. Domestic and world price differentials were also another indicator of the degree of protection.

Participants in the discussion included E. L. Casa, G. Schmitt, McColly, Jones, J. Berthelot, S. Tarditi, R. Saint-Louis and J. V. Remenyi.