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Rethinking public policy in agriculture: lessons from history, distant and recent

Ha-Joon Chang

This article reviews the histories of agricultural policy in 11 of today's developed countries between the late-nineteenth and the mid-twentieth century and in 10 developing and transition economies since the mid-twentieth century. After discussing the theoretical limitations of the prevailing orthodoxy, the article discusses the history of a wide range of agricultural policies concerning issues like land, knowledge (e.g., research, extension), credit, physical inputs (e.g., irrigation, transport, fertilizers, seeds), farm income stability (e.g., price stabilisation measures, insurances, trade protection), marketing, and processing. The article ends by discussing the policy lessons that may be learned from these historical experiences.

Keywords: history of agricultural policy; critique of orthodox agricultural policy; lessons from history

Introduction

During the last quarter of a century, a large number (although definitely not all) of the policy and institutional frameworks adopted by developing countries have followed the so-called 'Washington Consensus', which emphasises the role of market forces in the economy as the main mechanism for resource allocation and proposes to reduce the role of the public sector.

However, the application of the Washington Consensus policies to countries where markets are often yet to emerge, are underdeveloped even when they exist, and frequently fail, has produced mixed social and economic results. Compared to the policies that were applied during the immediate post-colonial period in developing

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countries (roughly from the 1950s through the mid-1970s), the Washington Consensus policies have performed poorly and have resulted in the slowing down of economic growth, rising inequality, and persistently pervasive poverty (McKinley 2004). At the same time, some developing countries in Asia that have followed more calibrated and sequential approaches to economic liberalisation have had much superior (if not perfect) results.

This has resulted in the emergence of the so-called post-Washington Consensus, which claims to be less fundamentalist than the Washington Consensus (e.g., it accepts that overly rapid reforms may not work) and more sensitive to the institutional foundations of policy success. However, the post-Washington Consensus is more of a defensive window dressing by the advocates of the Washington Consensus than a genuine shift in thinking (Chang and Grabel 2004). The core policy proposals of the Washington Consensus still remain at the top of the post-Washington Consensus agenda (e.g., strict inflation control, trade liberalisation, privatisation), while the policy practices of the Washington institutions have changed relatively little.

The failure of the Washington Consensus recipe has been particularly severe in the agricultural sector, although the results have not been uniformly bad. The withdrawal of the state has negatively affected investment in public goods such as agricultural research, education, extension, and infrastructure, thereby reducing agricultural productivity. In addition, market-oriented reforms of financial institutions have left agriculture with even less access to credit than before. Trade liberalisation has led to increased import penetration, which has threatened the livelihoods of many farmers. Simultaneous push for agricultural exports in a large number of countries that specialise in the same products has often resulted in falling prices and even export earnings. Fortunately, these problems are now beginning to be recognised by even the traditional advocates of the Washington Consensus (World Bank 2008), although it is yet to be seen whether this will lead to a real shift in policy.

Given this background, designing and implementing agricultural policies which overcome the limitations of the Washington Consensus approach, and address the challenges faced by developing and some transition economies, is currently among the priorities of governments in these countries. This article hopes to contribute to addressing such concerns by drawing lessons from history, distant and recent. The history we look at is not simply the history of agricultural policy in developing and transition countries themselves over the last several decades, but also the history of such policy in today's developed countries in the past when they were at similar levels of development as those of developing countries today. In the developing country group, we look at seven countries across three continents. They include a star performer (Chile), two mixed performers (India and Mexico), and four sub-optimal performers (Egypt, Ethiopia, Ghana, and Zambia). We also look at three transition economies – one very successful, although starting from a very low level (Vietnam) and two with mixed results (Hungary and Ukraine). In terms of the rich countries, we look at, in alphabetical order, Canada, Denmark, France, Germany, Japan, (South) Korea, the Netherlands, Norway, Sweden, Taiwan, and the USA. These countries were all successful in developing their agriculture and making agriculture contribute to overall growth and poverty reduction during the period we cover, that is, the late nineteenth and the mid-twentieth centuries (late twentieth century in the case of Japan, Korea, and Taiwan), with France as a partial exception (although it

started from a high level of agricultural development, its progress during the period in question was not good).

As will become clearer later, despite distinctive country-specific issues, agricultural policy challenges that confront countries at earlier stages of economic development, today and in the past, are remarkably similar across countries. This means that there is much that countries can learn from others' experiences, both historical and contemporary. This article is a contribution to that learning process.

Historical and theoretical backgrounds

After having experienced a major crisis of free-market capitalism during the Great Depression, there was a general shift towards more state-led models of economic management by the end of World War II. In line with this, agricultural policies also became more state-oriented all over the world.

The new world hegemon, the USA, had itself already overhauled its agricultural policy in that direction in the 1930s in order to deal with the farm crisis that followed the Great Depression (see below). In addition to its already strong government-financed programmes in research, extension, and irrigation, it set up a series of financial institutions providing subsidised loans to farmers and introduced government-managed price stabilisation schemes. The USA also encouraged land reform in countries under its influence in the belief that it helps fight off (real and imagined) communist threats. It strongly pushed for comprehensive land reform in Japan, Korea, and Taiwan in the late 1940s and the early 1950s. It also funded (less comprehensive) land reform programmes in Latin America through President Kennedy's Alliance for Progress in the 1960s.

In the meantime, the spread of socialism into Eastern Europe and China in the 1940s resulted in widespread agricultural collectivisation and in the formation of (state-controlled) cooperatives in many countries, although not all socialist countries completely collectivised their agriculture in the manner that the Soviet Union had done since the 1930s. Subsequently, socialist agriculture was practiced, to one degree or another, by poor countries like Vietnam, Egypt, and Ethiopia in the 1970s.

Having earned their independence in the earlier part of the nineteenth century, the Latin American countries started their state-led agricultural development in the 1930s, the Mexican land reform under Cardenas being the best example. Most of the developing countries in Asia and Africa that became independent in the two decades following World War II also adopted state-led models of agricultural development.

It was believed that, if left alone, the market mechanism would not be able to supply socially optimal quantities of many necessary agricultural inputs – land, water, transport, seeds, fertilizers, pesticide, animal feeds, and so on – nor would it be able to provide the means to attain stability in rural income – credit, insurance, stable prices, and so on. It was argued that the state needed to provide these inputs directly or, should the private sector provide them, subsidise them. It was thought that deliberate measures need to be taken to stabilise rural income through measures like buffer stocks, trade protection, insurance, and support for processing and marketing.

Compared to the policies prescribed by the Washington Consensus, or what we call the New Conventional Wisdom (henceforth NCW) in this article, these policies

produced very respectable outcomes in many developing countries, especially when they were combined with Green Revolution technologies (another product of government intervention, albeit on an international scale – see section below on research). However, they did have some problems – wastes and corruption – and thereby started to come under attack from the 1970s by the believers of what later came to be the NCW.

In the 1980s came the turning point for agricultural policy in most developing countries – the obvious exception was Chile, which had embarked upon the neo-liberal path before anyone did, following the military coup of General Pinochet in 1973. The traditional state-led agricultural policies experienced serious reversals, with the launch of the Structural Adjustment Programs (SAPs) implemented by the IMF (International Monetary Fund) and the World Bank (Kay 2006).

It was argued that state provision and/or subsidisation of inputs – credits, extension services, irrigation, fertilizers, seeds, and so on – was causing inefficiencies and corruption, while putting unbearable burdens on state finances. It was advised that the agencies providing these inputs should be privatised and the subsidy elements eliminated, or at least radically reduced. State involvements in agricultural marketing (especially attempts to set minimum prices) and processing were to be eliminated, or at least drastically reduced, as they only produce inefficiencies (Bates 1981; for a critique, see Sandbrook 1985).

The results have been very disappointing. There are good reasons why that has been the case in each policy area, and we will discuss them in greater detail later in the article. However, before we do that, it is important at this point to highlight the limitations of the very *theoretical* framework that underlies the recommendations of the NCW in agriculture. Two points are particularly important.

Eliminating ‘distortions’

The persistent theme in the NCW is the need to ‘eliminate distortions’. According to the NCW, state intervention in agriculture – subsidised fertilizers, artificially cheap credits, tariff protection, state-controlled prices, and so on – ‘distorts’ the market signals and thereby channels resources into ‘wrong’ activities, creating inefficiencies – in the sense that more outputs could be produced if the resources flowed according to the ‘right’ signals created by the ‘natural’ forces of supply and demand (World Bank 1983, is a classic statement of this position).

At one level, it is impossible to disagree with this view. If prices are ‘distorted’, by definition they lead to ‘distorted’ outcomes, which, by definition, cannot be good. But we reach this conclusion only because the whole discourse is set up this way. Underlying this argument is the assumption that ‘distortions’ are bad because markets would have worked well without them. However, if markets are not working well, distorting the prices that prevail may be a good thing, if that is done for the right purpose.

First, certain government actions may create distortions that create inefficiencies in terms of short-term resource allocation (which is what concerns neoclassical economics, which forms the theoretical basis of the NCW) but may actually increase long-term productivity. For example, agricultural tariffs certainly can impose short-run efficiency costs, but they may promote agricultural growth and overall economic growth in the long run, if the tariff revenues are invested by the government in

improving agricultural productivity (for example, investments in rural infrastructure, research, and extension) and/or if the increased agricultural incomes create offsetting extra demand for domestic industries. Germany in the late nineteenth century and South Korea and Taiwan in the late twentieth century are examples (Koning 2007).

Secondly, even if we focus on short-term allocative efficiency, there are many instances of market failure that justify government ‘distortion’ of the prices. For example, if market signals lead agents to use certain inputs at less than socially optimal amounts, actually ‘distorting’ the market signals so that more of those inputs would be used will be socially better. For another example, if there is market failure in the provision of agricultural research (due to the public goods nature of research output and/or the scale economy involved in the conduct of research), the government may be justified to ‘distort’ the market signals by conducting such research itself or by providing subsidies to private sector agents.

Moreover, in some instances, it may be better to create ‘distortions’ even when there is no market failure in the standard sense. For example, in countries where there is no citizenship-based welfare state or well-designed safety nets, certain ‘distortionary’ policies (such as tariff protection or a price stabilisation scheme) may be the only mechanisms that can provide income stability to small farmers. Greater income stability in the rural area may bring greater political stability, which is good in itself and also may contribute to growth by encouraging long-term investments. Moreover, income instability means that many people who are not *over time* poor may occasionally fall below the poverty line, which leads to episodes of malnutrition and interrupted education, which have irreversible negative impacts on people’s productivities in the long run. In this case, agricultural protection may be a good thing, even if there is no ‘market failure’ in the standard sense.

Of course, in practice, it is difficult to agree on how much and exactly where markets fail, which is one of the main reasons why there is so much disagreement on concrete policy, even when most (if not all) people agree that markets fail and that they fail even more frequently in agriculture. Moreover, even if we know how much to subsidise what, there are many ways to do it and the best way to do it may differ across countries. For example, South Korea and Taiwan produced subsidised fertilizers in state-owned enterprises and sold them to farmers through state-controlled agricultural cooperatives, while Malawi distributed vouchers to poor farmers (the exact distribution of which was decided by the village meetings, rather than by government officials) to buy imported fertilizers.

Abandoning the ‘misguided concern for national food security’

Another persistent theme in the discourse of the NCW has been the criticism of the goal of attaining a high degree of ‘national food security’ that had been pursued by many developing countries until the 1970s and is still pursued by some today.¹ The supporters of the NCW have denounced national food security as a misguided goal on the grounds that a greater engagement with international markets through greater specialisation will give the national economy (and, by implication, its individual members) greater income and therefore a greater ability to secure the necessary amounts of food through international trade.

¹See FAO 2003, ch. 2, for further discussion of food security at different levels.

This advice, of course, makes sense in certain circumstances. For example, when cheap grains from the New World and Russia flooded in during the late nineteenth century, most European countries protected their grain producers. However, as we shall discuss later, the Netherlands and Denmark reduced crop production and used the cheap imported grains to feed livestock, which were then processed and exported (e.g., butter, cheese, bacon), giving them higher income and thus bigger capacities to import everything, including food grains, thereby achieving greater national food security.

However, such specialisation makes sense in the long run only when countries reach a certain level of economic development, above which even fairly significant falls in their food import capacities (due to the rise in food prices and/or the fall in the prices of their exports) would *not* reduce food consumption below the critical minimum.² For countries that have not reached this level, a fall in food import capacity even for a year or two may have serious irreversible negative consequences for long-term productivity of many people due to irreversible falls in the provision of nutrition and, for children, education.

The point is that there is a hierarchy of human needs, where food is the most basic consumption good. If fluctuating incomes (e.g., a fall in the prices of cut flowers that a country exports) or prices (e.g., a rise in the prices of food) make it impossible for some people always to consume adequate amounts of food, it exposes them to the danger of hunger and malnutrition, which has irreversible negative long-term consequences for their health and educational achievements. This not only incurs human costs but also reduces productive capabilities of the labour force and thus the whole economy. Therefore, the issue of national food security needs to be taken very seriously when the country is at low levels of economic development, when such eventuality is more likely.

Moreover, the argument dismissing national food security concerns is also based on the assumption that production portfolios can be easily re-shuffled when necessary into food production. However, given the time-bound nature of agricultural production (it will take at least one growing season to make the adjustment), this assumption is particularly unwarranted in agriculture.

It should also be added that some staple foods for the African countries – such as cassava, plantain, yams, millet, and sorghum in west and central Africa, and white maize in southern and east Africa (UNCTAD 1998, 141) – are not internationally traded very much outside the region. Transportation costs are also high in many of these countries (UNCTAD 1998, 141). All this means that these countries cannot rely on international trade for their staple foods, as much as it is possible for other countries.

Thus, for countries at low levels of economic development, especially those in Africa, whose staple foods have limited tradability and which have poor transportation infrastructure, national food security is *not* a misguided concern. The possibility of irreversible damage to a country's productive capabilities, as well as the obvious human suffering, following the fall of food consumption below a certain minimum needs to be taken seriously.

²It should also be added that the Dutch and the Danish strategies worked only because there were strong public interventions to promote agricultural productivity, as we shall discuss in detail below.

Lessons from history?

One unique feature of this article is the attempt to understand the evolution of agricultural development in the post-World War II period as a part of a longer historical phenomenon, by examining the history of agricultural policy in today's rich countries between the late nineteenth century and the mid-twentieth century. The exercise may seem unjustified at first sight. However, a more detailed look reveals that there are surprising degrees of similarity between the rich countries during that period and today's developing countries in terms of the role that agriculture plays in their economies and the problems that countries are facing in relation to the agricultural sector. Let us look at the two simplest but most important indicators of the role that agriculture plays in the national economy – the share of agriculture in total employment and the share of agriculture in total output.³

Agriculture was very important in terms of providing employment until surprisingly recently in many of today's rich countries (see Table 1). It is perhaps not totally surprising that 73 percent of Japan's employment in 1885 was in agriculture, given that the country was still struggling to emerge out of feudalism. However, only 15 years before that (1870), the share of agriculture in total employment in Sweden was 72 percent, which is basically at the same level as some of the poorest developing countries today (Madagascar 78 percent, Ethiopia 75 percent, and Uganda 69 percent). Twenty years later, in 1890, the share of agriculture in total employment in Sweden was still 58 percent, a level that is similar to that of Vietnam today (60 percent).

In 1870, the average share of agriculture for 15 European countries (Austria, Belgium, Denmark, France, Germany, Great Britain, Hungary, Italy, Ireland, Norway, the Netherlands, Poland, Russia, Sweden, and Switzerland) was 55 percent. This is similar to what we find in countries like Georgia (54 percent), Bangladesh (52 percent), and Ghana (51 percent) today.

Forty years later in 1910, the average for the above-mentioned 15 European countries fell to 46 percent, but that is still the same level as that of Indonesia (45 percent), China (44 percent), and Thailand (44 percent) today. Even Germany, one of the more developed among this group by this time (fifth richest in the group), was still providing 35 percent of its employment through agriculture in 1907, which is the same level as that found in countries like Sri Lanka (35 percent) and Paraguay (32 percent) today.

Until the mid-twentieth century, the shares of agricultural employment in still-catching-up countries like Sweden (38 percent in 1934) and Japan (39 percent in 1955) were even higher than the German level in the early twentieth century. These are the levels found in lower-middle-income countries like Guatemala (39 percent) and the Philippines (37 percent) today. As late as 1970, agricultural employment in Japan, at 17 percent, stood at the same level as that of Mexico and the Dominican Republic today.

³Of course, these are only the broadest indicators of the role of agriculture in an economy. For proper comparisons, many more indicators (e.g., the share of commercialised agriculture in total agricultural output and employment, the share of agriculture in export, the share of high value-added products in total agricultural output, land tenure structure), including some unquantifiable ones (e.g., the dominant relations of production in agriculture), need to be looked at. However, such detailed comparison is beyond the scope of this article, not least because the required information is difficult to acquire, especially for historical cases.

Table 1. Share of agriculture in total employment.*

Rich countries in the past	Year	Share	Today's developing countries (2002–2004)
Japan	1885	73%	Madagascar (78%)
Sweden	1870	72%	<i>Ethiopia (75%)</i>
Japan	1900	68%	Uganda (69%)
Sweden	1890	58%	<i>Vietnam (60%)</i>
Europe 15 [†]	1870	55%	Georgia (54%)
Japan	1920	54%	Kyrgyz (53%)
France	1861	53%	Bangladesh (52%)
Korea	1970	51%	<i>Ghana (51%)</i>
Norway	1890	49%	Indonesia (45%)
Sweden	1910	48%	Morocco (45%)
Japan	1935	47%	China (44%)
Europe 15 [†]	1910	46%	Thailand (44%)
Japan	1955	39%	Guatemala (39%)
Sweden	1934	38%	Philippines (37%)
Denmark	1910	36%	Romania (35%)
Germany	1907	35%	Sri Lanka (35%)
Korea	1980	34%	
Japan	1960	32%	Paraguay (32%)
Sweden	1939	30%	<i>Egypt (29%)</i>
Taiwan	1980	20%	<i>Ukraine (20%)</i>
Japan	1970	17%	<i>Mexico (17%)</i>
Taiwan	1990	13%	<i>Chile (14%)</i>
Japan	1990	6%	<i>Hungary (6%)</i>

*Agriculture includes forestry and fishing.

[†]Europe 15 is the average for 15 European countries, which are Austria, Belgium, Denmark, France, Germany, Great Britain, Hungary, Italy, Ireland, Norway, the Netherlands, Poland, Russia, Sweden, and Switzerland.

Note: The names of the developing and transition countries that were studied as a part of the background project are in italics.

Sources: Denmark: Henriksen (1992, 154, Table 1.1). Germany: Blackburn (1997, 188, 393). Japan: Sugihara (1996, 157, Table 7.2). Korea and Taiwan: Francks *et al.* (1999, 37, Table 2.6). Norway: Hodne (1973, 106, Table 8). Sweden: the data for 1870 and 1934 are from Ytterborn (1938, 185); data for other years are from Schön (2006, Table 1). The two data sets are not fully compatible; see footnote 4. 15 countries: van Zanden (1991). Developing countries: World Bank (2008, Table A1), except for Ethiopia, Ghana, India, and Zambia, which are from the country case studies for the project.

The output data depict a similar picture (see Table 2). In 1870, the share of agriculture in total output was 50 percent in Denmark and 47 percent in Sweden. These are figures that we find in countries like Democratic Republic of Congo (48 percent) and Lao People's Democratic Republic (47 percent) today. In 1885, the share of agriculture in total output in Japan, at 45 percent, stood at the same level as that we find in some of the poorest developing economies today, such as Ethiopia (44 percent) or Sierra Leone (46 percent).

Even in Germany, the share of agriculture in total output was as high as 41 percent until 1870. This is a level similar to what we find in low-income countries like Rwanda (42 percent), Nepal (39 percent), Malawi (39 percent), and Ghana (37 percent).

The share of agriculture in total output stood at around 30 percent in Denmark and Japan until around 1920. This figure is comparable to that of Burkina Faso (31

Table 2. Share of agriculture in total output.

Rich countries in the past	Year	Share	Today's developing countries (2003–2005)
Denmark	1870	50%	Congo, DR (48%)
Sweden	1870	47%	Lao DPR (47%)
Korea	1953	47%	Sierra Leone (46%)
Japan	1885	45%	<i>Ethiopia (44%)</i>
Germany	1870	41%	Rwanda (42%)
Denmark	1885	40%	Nepal (39%)
Japan	1900	39%	Burundi (38%)
Korea	1961	39%	Malawi (38%)
Denmark	1890	38%	<i>Ghana (37%)</i>
Norway	1865	34%	Uganda (32%)
Sweden	1890	33%	Burkina Faso (31%)
Denmark	1895–1920	30–32%	Uzbekistan (31%)
Japan	1920	30%	Madagascar (29%)
Norway	1890	27%	Kenya (28%)
Taiwan	1961	27%	Chad (26%)
Norway	1910	24%	Pakistan (23%)
Germany	1913	23%	Cote d'Ivoire (23%)
Japan	1955	21%	Guatemala (23%)
Denmark	1930	20%	<i>Vietnam (22%)</i> <i>Zambia (21%)</i> <i>India (19%)</i>
Sweden	1930	16%	<i>Egypt (16%)</i>
Sweden	1939	13%	China (13%)
Japan	1960	13%	<i>Ukraine (12%)</i> Dominican R. (12%)
Taiwan	1980	8%	<i>Chile (6%)</i>
Japan	1970	7%	<i>Hungary (5%)</i> <i>Mexico (4%)</i>

Note: The names of the developing and transition countries that were studied as a part of the background project are in italics.

Sources: Denmark: Henriksen (1992, 154, Table 1.1). Germany: Blackburn (1997, 188, 393). Japan: Sugihara (1996, 157, Table 7.2). Korea: Lee (1999, 558, Appendix Table 3). Norway: Hodne (1973, 106, Table 9). Sweden: the data for 1870 and 1934 are from Ytterborn (1938, 185); data for other years are from Schön (2006, Table 1). Taiwan: Francks *et al.* (1999, 37, Table 2.6). The two data sets are not fully compatible; see footnote 4. 15 countries: van Zanden (1991). Developing countries: World Bank (2008, Table A1).

percent), Uzbekistan (31 percent), Madagascar (29 percent), and Kenya (28 percent) today.

Until as late as 1910, 1913, 1930, and 1955 respectively, the shares of agriculture in output in Norway (24 percent), Germany (23 percent), Denmark (20 percent), and Japan (21 percent) were at levels found today in Pakistan (23 percent), Cote d'Ivoire (23 percent), Guatemala (23 percent), Vietnam (22 percent), Zambia (21 percent), and India (19 percent).

Until as late as 1939 in Sweden and 1960 in Japan, the share of agriculture in total output was 13 percent – a level that is found in countries like China (13 percent), Ukraine (13 percent), and Dominican Republic (12 percent) today.

Thus, in the late nineteenth century the conditions for agriculture in today's rich countries were similar, at least in terms of the broadest indicators of employment

and output shares, to those found in the poorest developing countries today, ranging between today's Madagascar and Bangladesh, so to speak. Even after a few decades of (what then was) rapid industrial development, the conditions in their agriculture in the early twentieth century were similar to what we find in the poorer (though not poorest) developing economies today, ranging from Rwanda and Malawi at the bottom end to Pakistan and Guatemala at the top end. Even in the mid-twentieth century (1930s to 1950s), the conditions in the then poorer of today's rich countries, such as Japan and Sweden, were still in today's Pakistan–Guatemala range.

Given these structural similarities, it is not surprising that during the period in question, today's rich countries all grappled with issues very similar to what many of today's developing countries are struggling with, as we shall see below. And given the similarities of the problems, it is not surprising that the policy and institutional solutions that were devised by the farmers and the governments of those countries were very similar to what today's developing countries may contemplate (although not necessarily be able to implement).

Needless to say, there are obvious limitations to drawing lessons from historical experiences of countries that operated under different geographical, climatic, technological, demographic, economic, political, and international conditions than those we find in today's developing countries (which themselves are very diverse – much more diverse than the rich countries are amongst themselves).

However, there are some policies and institutions that can potentially be applied fairly universally regardless of the time and the space – such as land quality improvement initiatives, rural credit schemes, public or subsidised warehousing, and price stabilisation programmes. There are some others that may be applied with relatively minor modification – such as infrastructural development, extension services, and consolidation of fragmented holdings. There are still others whose applicability may be limited due to domestic capabilities (e.g., agricultural research), domestic political conditions (e.g., land reform), or international politics (e.g., agricultural protection), but even in these areas there are useful lessons that can be derived from the history of today's rich countries, as we shall see later.

Policy lessons from history, distant and recent

In this section, we discuss in detail the range of agricultural policies that were used in today's rich countries in the past, as well as in today's developing and transition countries in the last 60 years, and draw lessons from them for contemporary developing countries. The section is divided in two main sub-sections – inputs policy and outputs policy. In the inputs policy section, we discuss land policy, knowledge policy, credit policy, and physical inputs policy. In the outputs policy section, we discuss the measures intended to increase farm income stability and the measures intended to improve agricultural marketing and processing.

Inputs policy

Land policy: land (tenure) reform and land quality improvement

Especially in the early stages of economic development, most (although not all) countries have problems with landless rural populations. For this reason, land

reform has been at the centre of the debate regarding agriculture in most countries to one degree or another (see Griffin *et al.* 2002, Byres 2004).

We can (and should) of course debate whether land reform that creates a large number of small holdings is the best way to proceed in all circumstances. There may be contexts in which large-scale agriculture may be more efficient. In other contexts, the labour–land ratio is so high that egalitarian land reform may not create viable holdings. However, in many countries, egalitarian (redistributive) land reform seems to have worked quite well, when combined with complementary measures to increase agricultural productivity, stabilise agricultural income, and create non-agricultural jobs (rural off-farm employment as well as industrial employment).

In countries with an abundant supply of unsettled public land, land reform could take the form of giving away, or selling at subsidised prices, unused public land to settlers. A classic example is the 1862 Homestead Act of the USA (Garraty and Carnes 2000, 423). In the mid-nineteenth century, Swedish Crown lands were granted to settlers in the sparsely-settled North (Freund 1946, 125). However, in countries where there is significant population pressure and land ownership is concentrated, there is a natural demand for redistributive land reform ('land to the tiller').

The NCW has a rather contradictory attitude towards redistributive land reform. On the one hand, it believes in the incentive effect of land ownership by individual cultivators, so it supports the break-up of under-utilised large farms into owner-cultivated small farms. On the other hand, it believes that land markets should be deregulated so that entry into and exit from agriculture becomes easier. However, deregulated land markets almost always lead to re-concentration of land ownership, nullifying the result of the land reform. Sooner or later, such holdings will be hit by a shock and the owners will have to sell out to survive. Large farmers (be they commercial farms or traditional landlords) who can more easily survive those shocks then can buy up these fragmented farms, further expanding. For example, in Chile, close to 50 percent of the beneficiaries of the pre-Pinochet land reform had sold out by the mid-1980s, especially in the face of diminishing state support in credit, extension, and other inputs (see Cox 2008, Bellisario 2006, 2007).

Despite this, the supporters of the NCW insist that there is 'little justification for policy measures to restrict land sales' (World Bank 2008, 142). However, without such restrictions, land ownership is likely to be concentrated again, as we have just seen. Indeed, the very success of land reform in Japan, Korea, and Taiwan, which the World Bank praises in the same page, was possible partly because of the strict imposition of land ownership ceilings in the early days of land reform (see Putzel 1992, Cox *et al.* 2003). Even in the Indian case, where land reform has produced mixed results, a land ownership ceiling is considered to have been important in reducing inequality in land holdings (Vyas 2008).

Of course, a land ownership ceiling is not enough to sustain land reform. If it is to succeed, land reform requires a host of measures to raise agricultural productivity of the newly-created small farms, as we shall soon see. Once again, the position of the NCW in this regard is highly contradictory. The NCW does recognise that redistributive land reform is likely to fail unless accompanied by 'improvements in access to managerial skills, technology, credit, and markets' (World Bank 2008, 142). However, it believes that such improvements can mainly come through greater freedom for market forces (Deininger *et al.* 2003, see Borrás 2003, for a critique). It

fails to recognise that the greater liberalisation of markets that it seeks is likely to reduce the availability to the newly-created owner-cultivators of those very services that improve ‘access to managerial skills, technology, credit and markets’. History, both distant and recent, shows that a broad range of policy measures are required if land reform is to succeed and, more importantly, be sustained.

First, it is *not* enough to give those who lack enough land the right to buy the re-distributed land. They need access to finance. For example, after the Revolution in 1789, France implemented land reform and redistributed the land owned by the nobility and the church (Ingersent and Rayner 1999, 28, Tracy 1989, 61). However, much of the land was sold to large farmers, as the small tenants had no financial means to buy the land. The same problem was observed in Germany after the 1848 Revolution, although in this case, some limited finance was provided by the state land bank (Tracy 1989, 85). In contrast, countries that succeeded in creating viable small holdings provided subsidised credits to small farmers, such as Denmark (Kristensen 1930, Warming 1923) and East Asia (Cox *et al.* 2003).

Secondly, once small holdings are created, measures may be needed to prevent the re-concentration of land ownership, such as a land ownership ceiling (as used in East Asia) or prohibition on the sub-division of small farms below a certain size (as used in Denmark and Germany in the early twentieth century, and discussed in Kristensen 1930).

Thirdly, even with ownership ceilings, most holdings will be fragmented within a generation or two. Therefore, land reform needs to be complemented by measures to absorb additional labour that will emerge due to population growth. This can be through the creation of non-farm rural jobs and/or non-rural jobs, as in the East Asian cases.

Fourthly, measures are needed to stabilise farm income and to prevent marginal farmers from experiencing large negative income shocks and thus having to sell their lands out of desperation. These measures include price stabilisation, used successfully in countries like Japan and Chile, and state-subsidised crop or livestock insurances, successfully used in Germany, Japan, the US, and increasingly India (more on these later).

Fifthly, there should be efforts to raise land productivity so that smaller holdings can sustain more people. This, above all, requires the supply of (subsidised) modern inputs (e.g., irrigation, fertilizers) and the credits that may be needed to purchase such inputs, as seen in the cases of re-distributive land reforms in Mexico (Gomez-Oliver 2008), Chile (Cox 2008), and India (Vyas 2008).

Sixthly, another way to sustain the viability of small holdings is to prevent land degradation (e.g., prevention of top-soil erosion through appropriate management of water and forestry) and to enrich depleted land (e.g., replenishment of soil nutrients). In Germany, the state-supported Hypotheken Banks provided loans for land quality improvement (see below). In Japan after World War II, Japan Hypothec Bank, established in 1897 after the German model, and regional agricultural and industrial banks provided loans to encourage land improvement (Sugihara 1996, 156). The second democratic government of Chile (1994–2000) implemented the Recuperation of Degraded Soils Program (PRSD) (Cox 2008). In the case of Ukraine, the neglect of land quality maintenance during the transition period has resulted in a serious fall in land productivity (Borodina 2008).

Seventhly, policies can be implemented to consolidate dispersed plots, which lower productivity by preventing mechanisation and wasting the farmers’ time in

moving from one plot to another. Sweden in the early to mid-nineteenth century (Freund 1946, 124–5), Japan in the early twentieth century (FAO 1966, 13), and the Netherlands in the 1920s (Ingersent and Rayner 1999, 30) all implemented policies to encourage consolidation of plots. In the more recent period, certain Indian states – notably Punjab, Maharashtra, and Uttar Pradesh – did the same. In contrast, the failure to pay attention to this issue during the post-socialist land reform in Hungary has resulted in the average property of about three hectares consisting of five to six allotments in different locations, seriously hampering productivity improvement (Feher 2008).

Knowledge: research, extension, education, and information

Like all other economic sectors, agriculture requires better technologies if productivity is to be raised. Of course, there has always been technological innovation in agriculture conducted by farmers, including selective breeding and improvements of agricultural implements. However, from the nineteenth century, the process of technological improvements in agriculture has become more systematic and science-based, making it very difficult, if not totally impossible, to be achieved by individual farmers. Now deliberate and organised research is needed in producing better technologies in agriculture.

Once research produces new technologies, these need to be passed on to the farmers. This process requires a whole range of institutions and organisations that will demonstrate the value of the new technologies to the farmers and teach them how to use them, which are collectively called ‘extension services’. And then the farmers themselves need to be educated so that they can apply the technologies better and also become able to engage in incremental innovations themselves. And in the process, the farmers need to be exposed to information that will raise their awareness about new technological opportunities and shifting demand patterns.

Due to the public goods nature of knowledge, there is always a problem of under-investment in the generation of new knowledge through the market mechanism. This justifies public intervention – either direct state provision or subsidisation. Increasing costs of producing and disseminating knowledge have made public involvement even more necessary, as many of these activities are moving beyond the reaches of individual farmers, or even farmer co-operatives.

The NCW does recognise the problems involved in the production and the extension of new technologies in agriculture through the market mechanism. However, it believes that those market failures that justify state intervention in the provision of knowledge are not very serious and has thus strongly promoted the involvement of the private sector and market incentives in the provision of knowledge.

Moreover, the NCW emphasis on budget balancing has often resulted in cuts in knowledge-related expenditures in agriculture. Of course, the NCW does not specifically recommend such cuts, but the political reality is such that, when a government is put under pressure to cut budgets, the cuts usually fall on ‘weak’ ministries, such as agriculture, and on expenditures whose cuts do not immediately show their negative impacts, such agricultural research and extension services. These tendencies were compounded by the cuts made in the agricultural components of foreign aid that these countries receive. When countries followed the NCW and privatised and/or liberalised the provision of knowledge in agriculture, the results

have typically been disappointing, to put it mildly. In many cases, there were simply not enough private firms that came in to fill the gap left by the state's departure in these activities, especially research and extension. However, history shows that knowledge policies have played a key role in agricultural development, ranging from the nineteenth century US, Germany, and the Netherlands, to Chile and India today. We discuss this below.

Research. It is not just in agriculture that technology is a public good, which is under-supplied by the market. However, there is an added difficulty with the production of agricultural technologies. Production of knowledge, even if the use of the new knowledge by non-payers can be prevented (e.g., through the patent system), often requires lumpy investments. Lumpy investments may not be a problem when the agent concerned is a large industrial firm or a large commercial agricultural producer, but it can be a crucial obstacle to knowledge production if an agricultural sector is dominated by small farmers (i.e., what we find in most developing countries).

As a result, throughout history all governments intent on improving agricultural productivity have been involved in conducting or at least subsidising agricultural research. Germany is the country that set up the first endowed public agricultural research institute in the world in Mockem, Saxony, in 1852 (Ingersent and Rayner 1999, 43). Other European countries that have had most successful agriculture, such as Denmark and the Netherlands, also heavily promoted agricultural research. In contrast, the lack of effective public research in agriculture partly contributed to relatively low productivity growth of French agriculture during this period (Ingersent and Rayner 1999, 42). At least since the 1860s, the USA has provided a huge amount of public research and development (R&D) in agriculture, directly (e.g., federal agricultural research labs and experiment stations) and indirectly (e.g., through the establishment of land grant colleges in 1862, which were obliged to provide agricultural research).⁴

In most developing countries of today, there has been a clear recognition of the importance of public intervention in agricultural research. Even Chile, whose agriculture most people think to be a free-market success story, has had a very strong policy towards agricultural research, which has been getting even stronger. For example, in the late 1990s, the Chilean government revitalised the Agricultural Innovation Fund (FIA), created in 1981, and offered subsidies to private sector activities that promote agricultural technologies (e.g., research, learning tours) (Cox 2008).

However, lack of resources has severely constrained public support for agricultural research in many developing countries. Even when they have financial resources for agriculture, poor country governments tend to use them on things that will have more immediate impacts, such as fertilizer subsidies and marketing expenditures. Zambia is a good example of this (Chiwele 2008).

Of course, spending more money on R&D does not necessarily guarantee better results. For one thing, even when the money is ostensibly used for R&D, it is often in practice spent on recurrent expenditures (such as wages and supplies) rather than on genuine investment, as in the case of Ethiopia (Beyene 2008). Moreover, research could be poorly organised, as seen in Ghana – lack of coordination across research

⁴See Gras (1925) and Ingersent and Rayner (1999) for further details.

projects conducted by universities and other academically-oriented entities, de-linking of research from the real world, and the absence of links with extension services (Owusu-Baah 2008).

Interestingly, the experience of India shows that financial constraints need not totally bind. Despite spending relatively small amounts of resources in agricultural R&D,⁵ India has managed one of the most comprehensive and successful publicly-organised agricultural research programmes in the developing world, not least because it deliberately learnt from successful historical cases like the US (Vyas 2008).

Of course, public research need not all be done by national governments. Ghana has itself done little research on rice, but has collaborated with research institutes in neighbouring countries, such as the International Institute for Tropical Agriculture (IITA) in Nigeria and the West Africa Rice Development Association (WARDA), to import improved rice varieties (Owusu-Baah 2008). The research behind the Green Revolution of the 1960s and 1970s was done with international public money in the International Rice Research Institute (IRRI) in the Philippines (jointly founded by the Philippines government and the Ford and the Rockefeller Foundations in 1960) in the case of rice and the International Maize and Wheat Improvement Center (or CIMMYT, from its Spanish name, Centro Internacional de Mejoramiento de Maíz y Trigo) in Mexico (jointly founded by the Mexican government and the Rockefeller Foundation in 1943) in the case of wheat.

Extension services. Because they cannot be easily ‘codified’ and written in instruction manuals, *all* technologies require ‘technical support’ to some degree in their initial phases of diffusion (e.g., demonstration, teaching how to use it, troubleshooting). However, technical support is particularly important in agriculture because of its sensitivity to the variations in climate and soil conditions. Therefore, agricultural technology transfer requires the presence of agents who not only understand the technologies but also the local conditions, providing ‘extension services’.

The idea of extension service started in the UK in 1843 (Rothamsted), but Germany was the pioneer in widely implementing this idea. In contrast, Britain and France, despite their relatively advanced manpower bases, did not really start agricultural extension service until World War I, which is one of the reasons why they were caught up during this period in terms of agricultural productivity by countries like Germany and Denmark, which provided better extension services.⁶

Like Germany, Sweden and Denmark used ‘itinerant instructors’ to spread better agricultural technologies. In the Netherlands a state extension service was developed from the late nineteenth century, alongside agricultural education (Ingersent and

⁵0.22 percent of agricultural GDP in 1980–1985 and 0.33 percent in 2002, in contrast to 0.49 percent for China or 1.3 percent for Ethiopia in 2002–2003, although there is a question mark on the sustainability of the latter case, given its heavy reliance on donor financing.

⁶In 1870, Germany had lower land productivity (production per hectare, in wheat units) and lower labour productivity (production per head, in wheat units) than both France and Britain. In 1910, its land productivity was higher than that in both countries and its labour productivity was higher than that of France (although not that of Britain). In 1870, Denmark had lower land productivity than both France and Britain, while having higher labour productivity than that of both countries (although only marginally higher than that of Britain). In 1910, it had both higher land and labour productivities than France or Britain. See van Zanden (1991) for further information.

Rayner 1999, 45). The US also took extension service very seriously. Economically more advanced states, like New York State, set up extension services in the form of the farmer's institute in the late nineteenth century (Colman 1965, 43). In 1914, under the Smith-Lever Act, county farm bureaus were set up throughout the country to administer extension services, including farmer education and farm demonstration (Coleman 1965, 45). Japan took the idea of agricultural extension even further – it had a much tighter link between research and extension than other countries and had an extension worker for every village (which typically had 100 or less farming households) (FAO 1966, 28; see Sugihara 1996).

Unfortunately, during the phase of state-led agricultural development, extension services in many developing countries have been of poor quality, having been underfunded and also suffering from poor coordination with agricultural research. During the 1980s and the 1990s, when the NCW was dominant, what little extension service there remained suffered from severe funding cuts and diminishing affordability for small farmers (as the subsidy elements were cut or even totally eliminated).

The experience of Ghana shows how privatisation of extension services may put them beyond the reach of most farmers, not just financially but also geographically (Owusu-Baah 2008). Even Chile, which was a pioneer in privatising extension services in the 1970s, has come to recognise the limits to privatised extension service, and has put in a strong state-backed extension programme, targeting medium-sized farmers (Cox 2008).

Education. Extension of new knowledge will be the most effective when the farmers themselves are able to absorb the new knowledge successfully and even make incremental improvements to it. This requires educated farmers, although the relative success of the Green Revolution in India in the 1960s and the 1970s, whose literacy ratio at the time was rather low, cautions us against over-emphasising formal education. Given this, it is not surprising that public intervention (either direct provision or subsidies) in the production of educated farmers has played a crucial role in all agricultural success stories throughout history.

(1) General education

At the basis for the improvement in the farmers' productive capabilities is of course improvement in general rural education. Denmark was a pioneer in this regard. It introduced eight-year compulsory schooling countrywide (between the ages of six and 14) in 1814. From 1849, primary education became free for poor children (Henriksen 1992, 162). As a consequence, by 1870, the majority of the Danish rural population could read (Henriksen 1992, 163). Germany also introduced compulsory basic education in the late nineteenth century (Tracy 1989, 103).

Today, in most developing countries, there is recognition that education, including that in the rural area, is important. For example, the Vietnamese government has contributed considerably to the country's agricultural development through continued investment in rural education (Fforde 2008).

(2) Specialist education

Needless to say, general education is not enough. Specialist knowledge in agriculture on the part of the farmers is often needed for a productive agricultural sector. In many of today's rich countries, agriculture was taught in general secondary schools in rural areas (e.g., New York state in the US; Colman 1965, 49). Many of them set

up specialised agricultural secondary schools – the examples include Denmark (Henriksen 1992, 163), Japan (FAO 1966, 16), as well as Sweden and the Netherlands (FAO 1950, 8).

In many of today's rich countries, governments tried to improve the farmers' knowledge even after they left school through 'winter schools'.⁷ Even in France, which was a laggard in agricultural research and extension, most *départments* created winter schools in farming technique by the first decade of the twentieth century, though attendance was limited to a few thousand pupils (Tracy 1989, 78).

In many of these countries, the government went further and promoted agricultural studies in universities. After the Morrill Act of 1862, the USA set up the so-called land grant colleges, which were mandated to promote agricultural teaching and research (Lee 1963; also see Ingersent and Rayner 1999, 43). All land grant colleges were given public land in their states or the rights to public land in other states (if there was no sufficient public land in their own states) to finance themselves. The French government, under Charles X, set up the Institution Royale Agronomique in 1826. The Danish government set up the Royal Veterinary and Agricultural College in 1858 (Ingersent and Rayner 1999, 44). In the Netherlands, the first state agricultural school was set up in 1876 in Wageningen; it was expanded in 1906 to cover horticulture and forestry and subsequently granted university status in 1918 (Ingersent and Rayner 1999, 45, van Zanden 1994, 185). In 1881, the Japanese government's Department of Agriculture and Commerce set up Komaba Agricultural College, which later became the School of Agriculture, Tokyo University.

The same kind of emphasis is *not* put on specialist agricultural education at the secondary and the tertiary levels in today's developing countries, not least because of the excessive emphasis that the NCW has been putting on primary education. The experiences of developing and transition countries studied show how the failure to provide adequate education to farmers at these levels can hold agriculture back.

In Ghana, the austerity measures taken during the ERP (Economic Reform Program) implemented in 1983 led to the collapse of the 'farm institutes', training young farmers, and of agricultural colleges to train extension staff (Owusu-Baah 2008). In Ukraine, the withdrawal of the state during the transition period led to a collapse in agricultural education and training. In 2000, the country was training only 9.1 percent of tractor operators and 7.7 percent of drivers compared to the numbers in 1993 (Borodina 2008). Those with higher education among managers of agricultural enterprises fell from 90.5 percent in 1995 to 55 percent in 2001–2005.

Information. Education of farmers raises their capabilities to use new knowledge. However, without the provision of good information, the heightened intellectual capabilities cannot realize their full potentials. Extension service is one channel of such information provision, but there is also a need for the provision of information that is less technical than what one would normally expect from extension services.

In today's rich countries during the late nineteenth and the early twentieth centuries, one common method for providing better information to farmers was to organise agricultural fairs, where not only prizes were given to those who produced

⁷See Ingersent and Rayner (1999, 43) for Germany; Micheletti (1990, 40) for Sweden; Knibbe (1993, 163) for the Netherlands; Colman (1965, 43) for New York state in the USA.

high-quality outputs but also exhibitions were organised for new agricultural implements and inputs. Agricultural fairs in the USA are famous, but other countries also used them actively – for example, Japan (FAO 1966, 16) and the Netherlands (Knibbe 1993, 161).

In many of today's rich countries, governments also provided information on weather, harvest, and prices, while conducting censuses that provided detailed information on the state of the agricultural sector (FAO 1950, 10). In 1900, the Dutch government set up an 'intelligence service' on the harvest and the state of the crops (Knibbe 1993, 164).

In many developing countries today, the lack of good information is an obstacle to agricultural development. In Zambia, the lack of adequate price and other market information is considered to be one important reason for the underdevelopment of agricultural markets (Chiwele 2008).

Credit

Due to the seasonal nature of agricultural activities, farmers have highly variable flows of incomes and expenditures. For small farmers with little capital, therefore, the availability of credit is crucial in smoothly managing the production and indeed the consumption processes. If they are to *raise* productivity, credits are even more necessary, as that often requires buying more marketed inputs (e.g., fertilizers, machinery) and possibly investing in infrastructure (e.g., digging wells).

However, especially in the early stages of a country's economic development, small farmers have huge difficulties in getting access to credits. They are exposed to high risks due to things like their dependence on rainfall, exposure to crop and animal diseases (and low availability of preventive measures and cures for them), and poor health (themselves and their family members). Moreover, at these stages of development, it is expensive to provide financial services in the rural areas because of poor transportation and communications. Consequently, the private sector financial institutions (if they are there) often refuse to serve the rural areas.

All this means that local moneylenders are able to exploit their monopolistic positions and charge the small farmers usurious interest rates. Moreover, these moneylenders often have monopoly and monopsony positions in other markets – they are often local landlords, the grain merchants, and oligopolistic suppliers of marketed inputs, all at the same time. This enables them to maximise their profits by manipulating the terms of their transactions with small farmers who transact with them in more than one market.

For these reasons, credit provision to small farmers has been one of the most important challenges that have faced the policy-makers in the early stages of economic development. Exact solutions adopted differed across countries, but typically specialised rural banks were set up by the state or subsidised by it, rural lending requirements were imposed on (public and private) banks, and credit co-ops were promoted.

The NCW believes that, if left to the market, adequate amount of credits will be provided to almost everyone in most circumstances. At best, it will concede that small farmers may have too high risks for the private financial institutions to lend to them, but then it would go on to argue that the problem can be, and should be, solved without recourse to government-directed lending (to particular groups,

including small farmers) or subsidised interest rates, by encouraging group-lending arrangements seen in currently fashionable microcredit schemes (see Bateman and Chang 2008, for a critique of microfinance). Consequently, the promoters of the NCW have pushed for the expansion of profit-seeking private sector financial institutions, with some microfinance institutions (most of which are profit-seeking) thrown in more recently.

However, the result of these policies has been a reduction in small farmers' access to credits, with negative consequences for their productivities. For example, in Ghana, the World Bank's insistence that sectoral allocation of (subsidised) credit to agriculture be abolished has made all the major banks, except the state-owned Agricultural Development Bank, move away from funding agriculture – Barclays Bank, one of the two largest privately-owned banks, closed down all its rural branches and the Standard Bank, the other largest private bank, closed down its agricultural department at its head office (Owusu-Baah 2008). While the private-sector banks in Ghana have more recently moved into microcredit, little of the credit goes into agriculture. Between 1997 and 2006, only 2 percent of commercial bank loans went to agriculture (Owusu-Baah 2008).

Fortunately, World Development Report 2008 (WDR 2008) shows that the NCW is beginning to change its position in relation to rural credits. WDR 2008 accepts that when it comes to agricultural financing '[t]he range of alternatives is broad' (World Bank 2008, 145). It explicitly acknowledges that '[g]overnment-sponsored agricultural lending institutions have been successful in many now-developed economies such as the Republic of Korea and Taiwan' (p. 145) and talks about the re-emergence of financial cooperatives as 'promising institutions in rural finance' (p. 146). Its enthusiasm with micro-finance institutions (MFIs) has also been tempered – WDR 2008 explicitly says that 'MFIs cannot . . . provide the mainstay of rural finance' (p. 145).

As we shall see below, experiences show that significant involvement of the government in agricultural credit provision is crucial. The simple fact is that, without some subsidy elements and/or mandatory lending to small farmers, private-sector financial institutions are not going to extend enough credits to small farmers.

Specialised banks. One common and often the most effective way to provide subsidised agricultural credit is through specialised publicly-owned, or at least publicly-supported, banks.

Germany was the pioneer in this regard. Between 1824 and 1870, with a peak in the 1850s and the 1860s, (yet-to-be-unified) German states supported (especially by granting them limited liability, which had not yet been generalised) the establishment of 30 or so mortgage banks (Hypothekenbanken) (Fredriksen 1894, 62–3, Cecil 1979, 12). This helped farmers borrow to acquire land and invest in drainage and livestock (Fredriksen 1894, 75). Norway, France (Crédit Foncier), Denmark, and Sweden adopted the same institution. Japan also followed the German model and established the Land Mortgage Bank (or Japan Hypothec Bank) in 1897, especially enabling the financing of land improvement projects (Sugihara 1996, 156). Compared to that of other countries, the development of rural credit systems in the USA was slow, but when the USA finally did it, it established the most coherent system, not least because it explicitly drew on the experiences of other countries that were more advanced in this regard, such as Germany, Sweden, and Denmark (see Cochrane 1979, 289–91).

Specialised agricultural or rural banks have been much used in developing countries throughout the post-World War II period. However, their records have been mixed. This has prompted many people, especially the supporters of the NCW, to condemn such banks, and more broadly the idea of subsidised agricultural credit. However, as the experience of Zambia shows, private sector financial institutions are not much better at managing rural credits (Chiwele 2008). Moreover, if they are properly supported, specialised agricultural banks can perform well. In the case of Ghana, between 1976 and 1990, 123 rural/community banks were established through partnership between local communities and the central bank (which initially held preferential shares of 50 percent in these banks but over time completely divested itself). These banks have been performing well – as of March, 2007, 103 of these 123 banks (or 84 percent of them) were operating profitably. Their success is greatly owed to the initial capital support, staff training, and subsidised computer equipment provided by the central bank (Owusu-Baah 2008).

Even though subsidised credit does *not* guarantee agricultural success, agricultural success without it is impossible to achieve. Even Chile in the 1980s, when the country was very rigidly following the NCW, provided subsidised credits to small farmers through the National State Bank and INDAP, an agency that was created in the early 1960s to help small farmers (Cox 2008). These credits were provided at positive real interest rates, but at reasonable levels (7 percent per annum), and with repayment periods in accordance with the agriculture production cycle.

Support for credit co-operatives. The improvement in the access to credit by small farmers does not have to involve state provision and/or subsidies. Historical examples, especially in today's rich countries, show that this can be done through co-operatives. Even though they both involve group responsibility and solidarity, credit co-operatives are *not* to be confused with microfinance institutions, as, unlike the former, the latter are run on profit motives and often involve interest rates – at 70 percent, 90 percent, or even higher – that can only be described 'usurious'.

In today's rich countries, with the exception of Japan, the agricultural co-operative movement emerged spontaneously in the late nineteenth century. There were many different types of co-ops, providing activities like joint marketing, joint production, joint input purchase, irrigation/drainage, product quality control, timeshare for machine, and credit. Denmark was a pioneer in marketing and production co-ops, while Germany led the way in the development of credit co-ops.

Co-operative banks first emerged in Germany in 1864 in response to the tendency of the Hypothekenbanken to lend only to large farms (Tracy 1989, 103). The idea quickly spread to other countries, upon which their governments started supporting them.

Credit co-ops spread in Denmark and Norway from the 1880s (Henriksen 1992, 162, on Denmark; Sejersted 1992, 70–1, on Norway). In France, a law was passed in 1894 to support agricultural credit co-ops. In the Netherlands, the first co-operative bank was founded in 1896. By 1920, almost every municipality had a co-operative bank (Knibbe 1993, 150). In Sweden, from 1915, the government started to support the credit co-ops, known as agricultural banks (*jordbrukskassor*), which specialised in providing operating credit (Ytterborn 1938, 196). The US government also started to lend to credit co-ops at a special rate from the early twentieth century. The Japanese and other East Asian cooperatives also played an important role as suppliers of credit to small farmers (Francks *et al.* 1999).

Some developing countries, notably India, have promoted credit co-operatives too, although with less success than in the rich countries that we have mentioned above. For example, the Indian central bank (the Reserve Bank of India) disbursed funds in concessional terms to co-operatives, which produced excellent performances in credit delivery, especially in the Punjab, Bombay, and Madras areas (Vyas 2008). Since the 1990s, the Ethiopian government has supported the formation of co-operative banks (Beyene 2008). Ghana's innovative rural banks, mentioned above, are an interesting hybrid of state-owned banks and credit cooperatives.

Physical inputs

The provision of key physical inputs to agriculture also needs some government involvements. This is for a number of reasons. First of all, some of the inputs, such as canal irrigation and transport infrastructure (roads, railways, and increasingly airports in countries that export horticultural products), have public goods characteristics, so they will be under-provided if entirely left to the private sector. In this case, public provision is the obvious solution, although public-private partnership, pioneered by Sweden in relation to its irrigation development, also should be explored (see below).

Secondly, there are inputs that may not be public goods but whose provisions require lumpy investments and thus are beyond the financial means of most farmers. Deep-well irrigation or agricultural machinery are such examples. To use these inputs, small farmers need state support, such as leasing of state-owned machines and equipment, state-mediated access to credits necessary to purchase such inputs, or subsidies to lower the prices.

Thirdly, even the purchase of divisible inputs that are not subject to problems of public goods or lumpy investments – such as fertilizer (and other agro-chemicals), animal feeds, and seeds – may require government involvement. On the one hand, given the seasonal nature of agricultural production and the lack of private-sector credits, even these inputs may not be affordable to poor farmers. On the other hand, even if the farmers do have the money to buy these inputs, it may be necessary for the government to maintain product quality standards, given the difficulty of the consumers ascertaining the quality of the inputs even after use.

The NCW does not entirely oppose public involvement in the provision of some physical agricultural inputs, especially the ones with public goods characteristics (such as transport infrastructure and large-scale irrigation). However, it is very wary of state involvement in the provision of physical inputs that are private goods (such as fertilizer and seeds).

Whatever the NCW's theoretical position on this issue may be, in practice, the application of the NCW has resulted in severe reduction in physical inputs of all types into agriculture. As mentioned above, NCW policies have led to a fall in government spending on agriculture, especially in long-term investments in transport and infrastructure, the impacts of whose cuts are slow to show (see Vyas 2008, for India, and Owusu-Baah 2008, for Ghana).

Even for physical inputs that are private goods, which the NCW thinks can be better provided by the private sector, the withdrawal of the state has created severe problems in many developing countries. In some cases, the private sector simply did

not show much of the expected supply-side responses. For example, after the liberalisation of the 1980s in Ghana, the expected private suppliers in seed markets simply did not emerge. Even when there were private sector responses, the logic of profit-making has made these services inaccessible to disadvantaged farmers, as we shall see below.

Irrigation and related services. In most countries, irrigation is the most important basis for reliable production in agriculture. Although not all irrigation schemes (e.g., wells) have a public goods nature, many of them do, and this means that government provision and/or subsidisation is necessary. Moreover, in organising large-scale irrigation projects (e.g., canal irrigation), the ability of the government to over-ride individual or sectional interests and/or to re-arrange property rights is particularly important, as otherwise the ‘transaction costs’ of organising such projects may be prohibitive. Given these, it is not surprising that in all agricultural success stories, the government has played a key role in providing irrigation infrastructure, although the exact modes of financing, construction, and management of irrigation projects have differed across countries and times.

In France, the centralisation of power after the Revolution enabled the government to strongly promote the development of irrigation. In addition to sorting out property rights disputes, the French government also provided engineering advice and administrative oversight, although it provided very few subsidies to irrigation (Rosenthal 1990, 632). In Sweden, public-private partnership developed from early on to provide irrigation and drainage – this cooperative relationship later provided a template for the development of other infrastructure, such as railways, telegraph, telephone, and hydroelectric power in the late nineteenth and the early twentieth century (Chang 2002, 40).

In the US, in the mid-nineteenth century, when modern irrigation started, the state governments (especially those in the west, where irrigation is crucial) initially helped the development of irrigation by setting up ‘irrigation districts’ – public or quasi-public corporations that could over-ride individual rights for the sake of irrigation projects (Fuhrman 1949, 965, Teele 1926, 435). Subsequently, the increasing scale of irrigation projects prompted the federal government not only to subsidise irrigation projects but to take them up itself, following the 1902 Reclamation Act (Fuhrman 1949, 966; also see Gras 1925, 392, and Selby 1949, 964). Canada reformed the irrigation system in 1894, consciously imitating the American model (with a bit of Australian elements thrown in), especially the centralisation and the nationalisation of water resources (Lee 1966, 272–3, 279).

The Japanese government invested heavily in irrigation projects. However, their management was often delegated to village associations – a practice that was transferred to Korea and Taiwan through Japanese colonialism in the first part of the twentieth century (Francks *et al.* 1999, 26).

In the developing world, the success of the Mexican land reform under President Cardenas (1934–1940), and the agricultural growth in the subsequent period, owed a lot to public investment in agriculture. Between 1934 and 1950, public investment in agriculture, mainly in big irrigation works, grew at the rate of 17 percent per annum. As a result, value-added rose by 5.8 percent per annum in agriculture as a whole, and at 6.8 percent per annum in the crop sector, between 1940 and 1958, although critics note that the excessive subsidisation of water led to excessive use of water (Gomez-Oliver 2008).

Similarly, between the Independence and the Green Revolution, the Indian state financed, built, and managed all major irrigation projects and the bulk of medium-sized ones. Once water-responsive seeds became available through the Green Revolution, they more than paid themselves off. In contrast, the reduction in government investment in agriculture in the 1990s has resulted in the relative shrinkage of areas covered by surface irrigation and the expansion of groundwater irrigation, which only richer farmers can afford, increasing the inequality of access to water (Vyas 2008).

Chile's recent success in the export of 'Mediterranean' products owes critically to public intervention in irrigation (Cox 2008). Even the free-market Pinochet government provided irrigation subsidies, but the first democratic government of 1990 gave a big push to irrigation through public investment (of large irrigation works, none of which had been built during the Pinochet government) and subsidies for the rehabilitation, expansion, and new construction of smaller irrigation schemes.

In contrast, the declining share of public investment in agriculture going to irrigation (including drainage) in Egypt in the 1980s is considered to have been a major reason behind the falling growth rate of the agricultural sector during the period (Taha and Abdou 2008). What our Ethiopia case study describes as the 'trivial' amount of resources going into irrigation is generally agreed to be a great obstacle to agricultural development in the country (Beyene 2008).

Transport. Rural transports – roads, canals, railways, and increasingly airports – are crucial in incorporating the agricultural sector into the broader economy. For Europe in the nineteenth and the early twentieth centuries, there is even some evidence that the degree of commercialisation (in the determination of which transport plays a crucial role), rather than the use of modern inputs (such as chemical fertilizers), determined international differences in productivity across countries (van Zanden 1991).

Transport infrastructure is an area in which the role of the government is recognised even by many supporters of the NCW. Many transport projects have public goods character, require large investments in their construction, and also need coordination (in their running as well as construction) across projects because of their 'network' nature – characteristics that usually make state provision/subsidisation more efficient.

Even the relatively inactive French state of the late nineteenth and the early twentieth centuries invested in building rural roads and railways (Tracy 1989, 78). The Swedish state, using the public-private partnership developed through the irrigation projects, built the trunk lines and allowed the private sector to build branch lines under government license and (after 1882) price control (Chang 2002, 40). The US government made possible the development of railways in the agricultural west by granting the railway companies free public land (Cochrane 1979, 283).

Road, railroad, and air links are also critical for agricultural development in today's developing countries. Owusu-Baah (2008) estimates that about 70 percent of agricultural marketing costs are directly attributable to the poor state of the feeder road network in Ghana. Chiwele (2008) estimates that, due to the poor state of roads and railways as well as the country's size and land-lockedness, transport-related costs constitute 17.1 percent of Zambia's total value of exports. Road building also offers a good vehicle for the use of surplus labour in low seasons (e.g., Korea used this

extensively in the 1970s through its famous Saemaul, or New Village, Movement) or for creating food-for-work programs (e.g., India).

Electricity. Electricity helps agriculture by providing it with the power source to run small machinery needed for cultivation (e.g., water pumps) but also by promoting the development of rural industries (e.g., power source for machines, refrigeration facilities) that increase the value-added components and create rural non-farm employment.

However, electrification typically requires large investments and centralised coordination, given the ‘network’ characteristic of electricity supply. These have made it a natural candidate for state involvement. From the late nineteenth century, electrification of the countryside has been an important project for all governments interested in rural development. The spirit of the time is summarised in Lenin’s famous quote: ‘Communism is Soviet power plus the electrification of the whole country’ (Lenin 1977, 280). Of course, this does not mean that it can only be done, or has been done, by the state. For example, Sweden developed the public-private partnership originally created through irrigation schemes and used it to develop hydroelectric power in the late nineteenth century (see above).

Today, electricity is becoming even more important for agricultural development, especially with the rise of global food (and other agricultural) export chains that require a reliable supply of electricity for refrigeration and freezing. However, different countries have had different degrees of success with rural electrification. In Ghana, the government embarked on a Rural Electrification Project in the 1980s, with the intention to help rural industrialisation and the creation of rural non-farm employment, with less-than-impressive results (Owusu-Baah 2008). In contrast, Vietnam has achieved a rather successful electrification of the rural areas through a combination of investments both by the state and the relevant local population (Fforde 2008).

Divisible inputs: fertilizers, seeds, and farm machinery

(1) Seeds

It goes without saying that better seeds are critical in raising agricultural productivity. The effectiveness of some other modern inputs also critically depends on the nature of seeds concerned. For example, the effectiveness of better irrigation and greater fertilizer use was enhanced during the Green Revolution, as the new seeds were highly responsive to water and fertilizer. As shown throughout history, public intervention has played a critical role in the supply of better seeds. To repeat the point made above (see section 2.1), better seeds have often been developed in all of today’s rich countries through public research.

Public interventions in the production and the distribution of seeds have been common in today’s developing countries. Governments have provided or subsidised research for better seeds. The Philippines government and the Mexican government joined forces with international non-profit foundations (Ford and Rockefeller) to develop high-yielding varieties of rice and wheat (see above).

Once produced, improved seeds have often been disseminated at relatively affordable prices through government-run extension services or government-supported cooperatives. Distribution of seeds through state agencies, however, has not always been successful, so the NCW has argued for privatisation and/or

liberalisation of these services. Unfortunately, this solution has often not worked, especially for financially and/or locationally disadvantaged farmers, serving who is not profitable. For example, in Ghana, the inefficient state-owned enterprise, Ghana Seed Company, which had taken over the responsibility of supplying improved seeds at subsidised prices from the government in the mid-1970s, was abolished in the 1990s. However, this has not led to the expected emergence of private seed producers, despite the supply of 'breeder seeds' from the government (Owusu-Baah 2008). Although liberalisation of the seed market *did* improve seed supply in Zambia and India, small farmers and farmers in remote areas were excluded (Chiwele 2008, on Zambia; Vyas 2008, on India).

(2) Fertilizers

The importance of fertilizer in modern agriculture cannot be over-emphasised. However, small farmers, especially in poor countries, use sub-optimal amounts of fertilizers for a number of reasons. First, they are often not fully aware of the importance of fertilizers in raising output. Secondly, even if they are, they often do not have access to the necessary credits to buy them. Thirdly, they tend to operate on the margins of subsistence, so they are often not willing to take the risk of spending money for fertilizers – they are not sure that they will eventually earn enough money to recoup the costs, especially when the lack of irrigation makes output dependent on the vagaries of the weather. Fourthly, they often do not take into account the long-term implications of adequate fertilizer use in maintaining soil fertility, at least partly out of the short time horizon that poverty brings.

In many of today's rich countries in the past, governments subsidised fertilizers and/or promoted their uses through extension services. In the long run, fertilizers are likely to be even more successful if they are combined with the supply of fertilizer-responsive crop varieties, as seen in the cases of Japan, Korea, and India (Sugihara 1996, 156, on Japan; Francks *et al.* 1999, 138, on Korea; Vyas 2008, on India).

Another fertilizer policy that is *not* widely discussed despite its potential importance is public regulation of fertilizer quality. Because fertilizer quality cannot be easily ascertained even after the use (there being too many intervening variables), there is a great scope for fraud in the fertilizer market, especially when the producers do not have recognisable brand names. Given this, some governments tried to impose quality standards or even supply fertilizers themselves, in an attempt to assure quality. For example, the New York state government imposed quality standards on fertilizers in the late nineteenth century (Colman 1965, 42), while the Korean and the Taiwanese governments produced fertilizers in state-owned companies.

The NCW has taken the opposite approach to the one taken by today's rich countries in the past in relation to fertilizers. For example, the Ghanaian government was forced by the World Bank and the IMF through the ERP conditionalities to abolish fertilizer (and other agricultural input) subsidies and to privatise its importation and marketing. The result was rising prices, which put fertilizers beyond the reach of most farmers, and falling imports (as the private sector was not interested in unprofitable ventures) (Owusu-Baah 2008). In Hungary, cuts in fertilizer subsidies during the transition period have resulted in average fertilizer consumption falling from 200–220kg per acre to 50 kg in 2001. When combined with a drastic drop in the use of irrigation (by 50 percent), crop yields ended up falling back to the level of the 1970s (Feher 2008).

In contrast, the supply of subsidised fertilizers (as well as irrigation and machinery) by the government in Vietnam has enormously contributed to the development of the productive capabilities of agriculture in poorer regions (Fforde 2008). The Vietnamese case is also interesting in that Vietnam managed to improve the efficiency of fertilizer distribution in the 1980s through increased competition among state-owned enterprises (SOEs), rather than through privatisation and liberalisation, as the NCW recommends (Fforde 2008). The recent experiences of Malawi and Tanzania also highlight the importance of increased fertilizer use in many developing countries.

(3) Machinery

In the case of farm machinery, quality control is less of a problem than fertilizers, as it is relatively easy to see the quality of the product soon after the purchase and as it tends to be produced by large firms with recognisable brand names. Rather, the problem is that its purchase is often way beyond the means of individual small farmers.

As a result, co-ops have been used to jointly purchase farm machinery and rent it out to individual farmers in countries like Germany, Denmark, Sweden, and the Netherlands. As far as these governments gave financial help to these co-ops, which they did, it can be said that such practice was encouraged through public policy, at least implicitly.

In Ghana, the government used to provide subsidised (by 50 percent or more) tractor services in the 1970s, but this collapsed during the economic crisis in the early 1980s, as foreign exchange shortages restricted the country's ability to import necessary spare parts. The private sector failed to fill the vacuum left behind, as there were few firms offering the service and, where available, the rates were prohibitive (Owusu-Baah 2008). Recognising the problem, as of 2008, the government is in the process of again establishing mechanisation centres, in partnership with private sector firms, with a view to pull out after three years.

In contrast, in Egypt, at least since the 1980s, the private sector has played an active role in providing hire services for farm machinery. However, the public sector has still played an important role in the spread of farm machinery by providing relevant research and extension service through the Agricultural Engineering Research Institute (Taha and Abdou 2008).

Outputs policy

Measures to increase farm income stability

In the earlier stages of development, farm incomes tend to fluctuate more violently than at later stages. At such stages, the lack of irrigation means that the exposure to the vagaries of weather is higher. The lack of chemicals to control crop diseases (e.g. pesticide, fungicide) and animal diseases (e.g., vaccines, antibiotics) means that there are greater risks of output failure. Price fluctuation is magnified because farmers are less capable of diversification (on account of the deficiencies in education, extension service, and market information). In these stages of development, price fluctuation is often exacerbated by the lack of even relatively 'simple' things like warehousing facilities, which force the farmers to sell soon after harvest time, creating an unnecessary glut in the market.

If farm incomes fluctuate more in the earlier stages of development, their consequences are greater too. At those stages, a significant number of farmers are sufficiently close to the subsistence level that any significant fluctuation in their incomes can push them into serious poverty. And this has long-term consequences for productivity, through its effect on nutrition and education, as it has been repeatedly pointed out throughout this article.

Moreover, farmers often need to know in advance their future income with some reliability if they are to invest in expensive modern marketed inputs, so high fluctuation in incomes tend to discourage productivity-enhancing investments, as seen in the case of Ethiopia (documented in Beyene 2008).

For these reasons, especially (but not exclusively) in the earlier stages of development, most governments have adopted policies that are meant to reduce the fluctuations in farm income, such as price stabilisation schemes (through price controls, buffer stock management, and warehousing facilities), provision and/or subsidisation of agricultural insurances, trade protection, and direct income supports.

The NCW recognises that farm income stability is important. However, it believes that liberalisation is usually the best way to achieve it. The proponents of the NCW point out that development of microfinance markets can help small farmers smooth their consumption, thus enabling them to avoid falling below the critical income threshold. They also argue that income fluctuations can be smoothed out by liberalising markets for crop and livestock insurances. Greater liberalisation of output markets, especially trade liberalisation, they contend, will create 'thicker' markets with more buyers and sellers, where individual actions have smaller effects and thus prices fluctuate less. The international rice market is frequently cited as a case where more countries liberalising their trade will result in greater volumes being traded and thus fewer and less dramatic price fluctuations. These market-based measures to increase income stability can work in theory, but the practice has often been different.

Consumption smoothing through credits comes at a high cost, even if they are not by the moneylenders but by microcredit schemes, as their interest rates are very high. Moreover, these days even the proponents of the NCW acknowledge that microfinance is unlikely to be the mainstay of rural finance (see above).

Insurances are better than consumption-smoothing credits, but they are unlikely to work without some government help. There is the problem of adverse selection, where high-risk customers have a greater incentive to take out an insurance policy. And given the high risk that poor farmers face in developing countries, private sector insurance companies are unlikely to enter the market. This is why the governments of countries like Japan and Germany had to subsidise agricultural insurances in the late nineteenth and the early twentieth centuries.

While concerted trade liberalisation across countries may reduce price fluctuations, greater liberalisation also comes at a cost. When trade shocks are large, liberalised trade may expose poor countries to unacceptable levels of risk, as the recent food price hikes have shown. It is for this reason that many European countries re-introduced agricultural tariffs and quotas in the late nineteenth century, when New World (and to a lesser extent Russian and Ukrainian) imports dramatically increased thanks to the development of steamships, refrigeration, and railways.

Price stabilization

(1) Price measures

The most frequently adopted measure to stabilise farm income is a price stabilisation scheme through government price-setting and stockpile management. Governments have provided price floors by guaranteeing to purchase (unlimited quantities of) certain agricultural products at pre-announced prices. Such a programme was used not just in countries like Japan, where the government heavily intervened in the agricultural sector (and the rest of the economy), but also in countries like Chile, where government intervention in the agricultural sector was more circumscribed.

In many countries, price floors were combined with price ceilings, which were meant to protect vulnerable consumers, including many small farmers who are net buyers of food. Chile operated a price band system, where if the import price is below the 'floor' price, a variable levy is imposed on imports, while if it is above the 'ceiling' price, existing tariffs are reduced, to reduce the impact on the consumers.

A classic 1966 report on Japanese agriculture by the FAO describes Japan as 'possibly the first country in the world to attempt the systematic price stabilization of staple farm products for domestic consumption' for its 1921 measure to stabilise the prices of rice (FAO 1966, 21). However, in the face of fast-growing imports from its colonies (Korea and Taiwan), government purchase proved inadequate, so the Rice Control Law 1933 provided more comprehensive power by establishing 'minimum and maximum prices for rice (taking into account estimated production costs, general price trends and the cost of basic foods, etc.)' and permitting 'unlimited purchases at the floor price' (FAO 1966, 21). The FAO assesses that the attempt to maintain prices in a period of surplus, due primarily to the growth of imports, 'was not wholly successful, though it probably slowed down the fall in prices' (p. 21). However, the FAO points out that, once the Japanese government started to tightly control the quantity of imports from about 1940, the measures became more successful, at least for rice (p. 21).

In 1930, the Dutch government introduced a law guaranteeing minimum prices for wheat at about twice the world-market level (the law went into effect in July 1931) (Knibbe 1993, 197). Canada also introduced a price stabilisation scheme in 1944 (Turner 1959). The 1933 Agricultural Adjustment Act of the USA attempted to stabilise the price of main crops, through subsidised destruction of produce and price support. However, it is said that in the 1930s it was successful only for cotton and tobacco (Cochrane 1979, 287). Between World War II and 1952, this Act was dormant, because of soaring agricultural prices, although it became effective again in periods of falling farm prices (Cochrane 1979, 287–8).

Many developing countries have also used pricing policies to stabilise agricultural income. For example, since the 1960s, the Indian government announced the minimum support prices for important products at the beginning of the sowing season and announced the procurement prices towards the beginning of the harvesting season, at which time the Food Corporation of India would procure any quantity of the relevant crop. In the early 1970s, the distinction between minimum support prices and procurement prices was abolished, which encouraged over-production of the crops thus covered, but this scheme stabilised the returns to the farmers and thus encouraged the adoption of Green Revolution varieties, eventually vastly enhancing the country's food security (Vyas 2008).

Of course, guaranteeing minimum prices for the farmers can create a large fiscal burden, if it is combined with an excessively cheap food policy. This was the case with maize in Zambia in the late 1970s and the 1980s, which initially looked affordable but turned out to be unsustainable once the prices of copper – the main source of government revenue – fell (Chiwele 2008). Moreover, the provision of a minimum price for maize created disincentives for agricultural diversification, arresting the country's agricultural and overall development.

Therefore, price stabilisation programmes need to be carefully designed so as not to turn into a fiscal drain and an obstacle to production diversification. However, a well-designed price stabilisation programme can bring benefits, as we have seen in the case of Japan and other rich countries in the past and also the case of Chile since the 1980s, whose programme initially covered maize, rice, wheat, oilseeds and sugar-beets but now covers only the last three.⁸

(2) Warehousing

One tool of price stabilisation that has not been receiving the attention it deserves is the provision of warehousing facilities. Most poor farmers need to sell their products soon after the harvest, thus flooding the market and causing the price to crash. This is largely because they have little financial reserves to allow them to wait until they can get better prices. However, even the ones that have some financial reserves may have to sell soon after the harvest, if they do not have places to store their produce.

If the farmers can store their products and sell them more gradually, not only will their incomes be more stable, but their average incomes may become higher. In many developing countries, the lack of storage facilities prevents such action. Owusu-Baah (2008) cites the lack of storage facilities as a key reason for price fluctuation in Ghana. In Ethiopia, too, the absence of a proper storage system is considered to be a major cause of price fluctuation (Beyene 2008).

Therefore, public intervention in the provision of warehousing facilities is a relatively simple but very helpful means of stabilising income in the agricultural sector. The most successful example of such intervention is Japan, where the government from early on (1919) made it compulsory for the (ubiquitous) agricultural co-ops to offer warehousing services, which also had the benefit of offering a very stable source of income for the co-ops (FAO 1966, 20–3).

Insurances. In theory, risks due to agricultural income fluctuation can be covered by adequate insurances for crop or animal yields. Insurance cover also encourages banks to make loans to farmers, as the banks know that the default risk is lower. Therefore, many countries have tried to develop insurance schemes for agriculture. The trouble is that the private sector companies in poor countries do not like to extend insurance to small farmers who are exposed to high risks, while farmers strapped for cash, and operating with a very short time horizon, may not want to take out insurances, even when it is rational to do so.

Germany was a pioneer in the development of agricultural insurance. The German government promoted livestock insurance through legislation in 1880 and 1909 (Cecil 1979, 12). Interestingly, this development was directly transferred to Japan.

⁸See Cox (2008) for the details on the Chilean programme.

As early as in 1888, Paul Mayet, a German consultant to the Japanese government, recommended the introduction of agricultural insurance (Yamauchi 1986). However, only in 1929 did the Japanese government promote livestock insurance by re-insuring the insurance companies (FAO 1966, 25, Yamauchi 1986, 224). In 1938, it promoted crop insurance by paying part (15 percent) of the insurance premiums (FAO 1966, 25, Yamauchi 1986, 223). In 1947, following the land reform, the Japanese government combined the crop insurance and the livestock insurance systems, with the intention of stabilising the income of the newly created owner/farmers (Yamauchi 1986, 224).

In the USA, the early failures of crop insurances offered by private companies prompted a Senate hearing in the 1920s and finally culminated in the establishment of the Federal Crop Insurance Corporation (FCIC) in 1938 (see Kramer 1983; also Gardner and Kramer 1986). After a decade of teething problems, the programme 'gradually expanded and operated on a limited but successful basis' (Gardner and Kramer 1986, 222).

The Indian government administers the world's largest crop insurance programme (in terms of the number of farmers insured) through the National Agricultural Insurance Scheme (NAIS), covering 15 percent of all farmers and 17 percent of all cropped area (Rao 2008). The insurance companies are allowed to charge only a flat premium and the government subsidises a small portion of the premium for small farmers.

The third democratic government of Chile (2000–2005) established an agricultural insurance system, mainly covering annual crops. It is operated by private companies but with the government very heavily subsidising the premium – 50 percent of the premium for commercial farmers (up to a maximum of \$2,000) and up to 85 percent for small farmers. A government commission oversaw the operations of the private companies and also negotiated premiums down. As a result, the premium fell from 4.9 percent of the insured amount to 2.8 percent (Cox 2008).

Trade protection. Trade protection of agriculture is another common method of stabilising farm incomes when there is a rapid inflow of new imports, although there are many other possible motives for providing protection – national food security concern is one obvious other motive, but countries have also used it for the purpose of providing stable markets for domestic manufacturing industries.

All of today's rich countries used agricultural tariffs. In the 1870s, many European countries raised agricultural tariffs in response to the increased agricultural imports. The most famous of these are the German tariffs of the 1870s under the Chancellor Otto von Bismarck, who formed the so-called 'union of iron and rye' by providing heightened agricultural protection to the Junkers and higher tariffs for the iron and steel and other heavy and chemical industries that were emerging then (Chang 2002, 35). Bismarck's protection was tempered by a series of bilateral commercial treaties (or trade agreements) advanced by his successor, Count Caprivi, between 1891 and 1894, but was intensified after 1902, when these treaties expired (Tracy 1989, 89–92). The French tariffs were also raised after the 1890s. It is widely believed that strong protection of French agriculture 'diverted attention away from the need for a constructive long-term policy' (Tracy 1989, 78), while German agricultural protection is believed to have contributed to the country's economic development by providing stable markets for infant industries (Koning 2007, 207).

Even the USA, one of the countries that caused the wave of agricultural protectionism in Europe, introduced high agricultural tariffs in the 1890s, starting with the so-called McKinley Tariff (Blackbourn 1997, 317). Moreover, in the face of the 1920–1921 agricultural crisis, tariffs on wheat, corn, meat, wool, and sugar were raised in 1921 (Ingersent and Rayner 1999, 69–70).

Another wave of increased agricultural protectionism arrived after the Great Depression. Major agricultural tariffs were imposed even in Denmark, a country that had not used agricultural tariffs even in the late nineteenth century (Tracy 1989, 206; Koning 2007, 201), and the Netherlands, a country with the most consistent tradition of free trade since the eighteenth century and very strong agriculture (Knibbe 1993, 196–8). Quantitative restrictions were also used. In 1929, France ‘became the first country to make systematic use of [import quotas] as a means of protection’ (Tracy 1989, 165). In 1930, the Dutch government introduced the requirement that bakers had to maintain 20 percent minimum content of Dutch flour (raised later to 35 percent, as this measure boosted Dutch wheat production) (Knibbe 1993, 197).

Later in the twentieth century, Japan and Korea practically banned rice imports when their rice farmers became internationally uncompetitive, as the natural limits to agricultural production started biting in the midst of rising production costs that had resulted from rapid industrial development.

In the early post-World War II period, most developing countries protected much of their agriculture, especially food grains, mainly in pursuit of national food security but also in an attempt to provide a stable livelihood to farmers. However, the rise of the NCW since the 1980s has forced many of them to reduce their agricultural protection. When combined with the reduction in public intervention in input markets and other areas of agricultural policy, the result of trade liberalisation has been the demise of food production and consequent compromising of national food security (and the food security of many poor people, including many farmers), which we have witnessed in the recent world food crisis. Trade liberalisation has also been negative for the income stability of many farmers. With limited capabilities to diversify, they have either left the countryside or moved back into traditional agriculture, where there is even less government support and thus an even narrower scope for future betterment.

Measures to improve marketing and processing

Producing a greater quantity of raw agricultural products by using better inputs (see above) is one thing, but the farmers’ final incomes critically depend on how the products are processed and how (and where) they are marketed. One important area of public intervention in relation to agricultural marketing is the regulation of oligopsonistic practices in the distribution chain, the weakening of which enables the farmers to get better prices. Another important area of public intervention is the provision and/or subsidisation of ‘public goods’ that are necessary if the products are to be sold in areas with higher incomes – transport infrastructure, market information (e.g., amount demanded, prevailing tastes in the destination markets), and the ‘branding’ of product variety (e.g., Blue Mountain coffee) or even of the whole country (e.g., Colombian coffee). These inputs, of course, can also be provided by producer associations or farmer co-operatives, so government can also

intervene indirectly in their provision through legal and financial help for these organisations.

There are other inputs into marketing that are not ‘public goods’ but may be costly to provide (e.g., warehouses, cold storage, or testing facilities for food sanitation and safety). The government may help small farmers secure such inputs by providing better access to credits or, as it happened in many of today’s rich countries in the past, by promoting agricultural co-ops that will pool resources and collectively purchase these inputs.

In addition to better marketing, better processing of agricultural products is very important for raising rural incomes. Relatively simple processing of agricultural raw materials can add significant value and in the process promote industrialisation and overall economic development. Development of agro-processing industries is also important in creating more lucrative rural non-farm employment, which is particularly helpful for those who have little or no land and therefore rely mostly on employment for their livelihoods. Processing also reduces wastage. For example, in Ghana, it is estimated that 20–40 percent of agricultural products are lost because they are not processed (Owusu-Baah 2008). In India, it is estimated that about 40 percent of fruits and vegetables are lost after the harvest (World Bank 2008, 126). For these reasons, in the early post-World War II years many developing countries tried to intervene in agricultural marketing and promoted agro-processing industries. Some of these interventions did not produce good results – for example, the state-owned agro-processing enterprises in Ghana.

The NCW used to highlight these failures in state marketing and processing and advise countries to abolish state marketing boards and privatise state-owned agro-processing industries. However, trade liberalisation, especially reduction in industrial tariffs, has forced many incipient agro-processing firms in developing countries to close down. At the same time, privatisation and de-regulation did not lead to the emergence of vibrant private sector firms to take over marketing and processing functions from the state, as they too needed public support, ranging from better infrastructure (for marketing firms) to protective tariffs (for agro-processing firms).

Fortunately, the proponents of the NCW seem to have come to realise that much more than free play of market forces is necessary if developing country farmers, especially small farmers, are to market their products better and add more value to their products. For example, WDR 2008 (chapter 5) suggests a whole range of public intervention and public-private partnership in the area of marketing, although its support of similar interventions in agro-processing is more muted, probably because of its unwillingness to endorse protectionist industrial policy.

Marketing

(1) ‘Modernising’ the marketing channels

In most developing countries, agricultural markets are segmented due to poor transport, which gives local merchants (who are often landlords as well) monopsonistic or oligopsonistic powers, enabling them to extract more surplus from the farmers. Improving transport infrastructure and thus integrating national markets, where the local buyers lose much of their bargaining power, is one obvious solution to this problem. However, the process of market integration through the

provision of transport infrastructure is a slow one. Therefore, governments can make decisions to deliberately bring alternative purchasers into the market and weaken the existing monopsonistic powers.

In countries like Denmark, Japan, Korea, and Taiwan, co-operatives played this role, although in all these countries the state was also deeply involved in the process through schemes like compulsory government procurement of key grains (East Asia) or a state export marketing board (Denmark) (see FAO 1966 on Japan, and Murphy 1957 on Denmark). Surprisingly, even in supposedly free-market Chile, state marketing agencies have played the role of protecting small wheat farmers against oligopsonistic millers. Large private sector firms, including foreign companies like supermarkets based in rich countries, can also become counters to traditional high-cost merchants with local monopsonies.

Moreover, if the alternative purchasers are large entities with direct (or at least less mediated) access to the consumers, it can increase the farmers' incomes by reducing transaction costs, first by reducing the number of transactions and also by reducing the unit transaction costs (given the need for lumpy investments in things like storage and transportation facilities).

Of course, the net benefit to small farmers of a 'non-traditional' marketing arrangement will depend on who the alternative purchaser is. If it is an agricultural co-op that does not seek profit, it is likely that small farmers benefit. The state marketing agencies have mixed records in this regard – often, they were used as the means to squeeze surplus out of the farmers. If the purchasers that replace the traditional merchants are large private sector firms, especially (national or even international) supermarkets, they may benefit small farmers through their lower unit marketing costs and better quality management techniques. However, these large firms may even have bigger market power than the local merchants, potentially making them even more capable of extracting larger shares of surplus from small farmers than traditional merchants.

(2) Product quality management

Product quality management is an issue even for simple products like wheat, for which grading and quality control can be important – which is why Canada established a wheat marketing board during World War I (Turner 1949, 595). Canada later extended the scheme to all agricultural products through the Agricultural Products Co-operative Marketing Act of 1939 (Turner 1949, 595).

However, processed agricultural products require greater product quality control than do unprocessed agricultural 'commodities'. The efforts need to be particularly great when it comes to export markets. Typically, countries that import agricultural products, especially processed agricultural products, are richer countries with higher standards in product quality, including hygiene standards. The tests and inspections required for the maintenance of these standards are beyond the means of small farmers.

Today's rich countries resolved the problem of agricultural product quality management through agricultural marketing co-operatives or state export marketing boards – or indeed a *de facto* merger of the two (as was the case in Denmark between the 1930s and the 1950s). The Danish government imposed quality standards on butter, in association with cooperative butter export associations (Murphy 1957, 364). In relation to bacon, it used a more indirect means – it encouraged quality improvement and its maintenance through government-endorsed bacon quality

competition (Murphy 1957, 364). In 1932 and 1933, it set up state export marketing boards for cattle, meat, butter, cheese, eggs, poultry, horses, straw, and potatoes (Murphy 1957, 367–8).

Partly as a response to Danish competition, the Dutch government introduced butter quality control from 1889 (Knibbe 1993, 164–5). In 1902, export meat quality control service was established (Knibbe 1993, 165–6). In Sweden, butter quality for the export markets was primarily maintained by the Swedish National Creamery Association, which had virtual export monopoly, but the State Agricultural Board closely supervised the association (Ytterborn 1938, 191). In New York State in the USA, quality in the dairy and slaughter industries was maintained through state supervision (Colman 1965, 43, 49).

Today, under-funded governments in developing countries often struggle to provide adequate services for agricultural products' (especially export) quality control, especially the tests for sanitary and phyto-sanitary requirements. For example, in Zambia, the difficulty in meeting the sanitary and phyto-sanitary requirements is a major obstacle to exports (Chiwele 2008).

Recently, another channel for export quality control has opened up with the emergence of so-called 'contract farming' or 'outgrower schemes'. Large private sector companies, often multinational companies, guarantee purchase of a certain amount of products at certain prices, thereby reducing the marketing costs for small farmers and guaranteeing them some minimum income. They typically provide credits to buy inputs (e.g., seeds, fertilizers) as well. They also impose stricter product quality standards while helping farmers improve their product quality, thereby making it easier for them to export to rich country markets, where prices are higher but so are product quality standards. Contract farming is deemed to have been quite a success in crops like cotton and export vegetables in Zambia (Chiwele 2008).

Processing. While its potential to add value and create additional employment is clear, agro-processing is often not taken up by small farmers, even when it is 'obvious' (as in the case of making butter out of milk) because it requires capital investment that is beyond their means. The capital requirements may be even higher in the case of exported products, as (because they are usually being exported to more industrialised, richer countries) they typically need to meet higher quality standards, including hygienic standards.

In the history of today's rich countries, the most successful case of the development of an agro-processing industry may be Denmark. In the late nineteenth century, Denmark developed very successful export-oriented butter and bacon industries by setting up co-ops that collectively established processing facilities. Co-op dairies emerged from 1882 and co-op bacon factories from 1887.

In Sweden, meat packing house associations emerged from 1899, modelled on the Danish ones. Around the turn of the twentieth century, the Dutch co-operatives successfully developed industries processing milk, potato starch, and sugar (Knibbe 1993, 150). Japan was also successful in promoting rural industries processing agricultural products, such as silk, through co-ops from the 1920s.

In Chile, since the democratic transition in 1990, the small-farmer agency INDAP provided special assistance, including investment funds for group processing and marketing of their produce through co-operative or other group marketing

schemes. An interesting programme in this respect was the linking up of agro-industrial plants with small farmers. Under this arrangement, INDAP channelled technical assistance and credits through co-operating agro-industries, which provided secure contracts at sowing time, a fair pre-established price, and technical assistance (Cox 2008).

Conclusions

The first point that emerges from our study is that there is a lot that developing and transition economies can learn from the history of agricultural policy in today's rich countries. In the earlier stages of development, the latter countries too had to grapple with those very problems that dog the agricultural sectors of today's developing countries – problems related to land tenure, land degradation, fragmentation of holdings, agricultural research, extension services, rural credit, irrigation, transport, fertilizers, seeds, price and income stability, trade shocks, agro-processing, marketing, and so on.

Secondly, our study shows that many successful policy interventions go well beyond (or even against) the scope recommended by the New Conventional Wisdom (NCW), which has ruled agricultural (as well as other) policies in the last quarter of a century. Land reform is supported by the NCW only in very muted and market-based forms (e.g., no ownership ceilings, liberalised land markets), but Japan and other East Asian countries had a very successful comprehensive land reform that included strict land ownership ceilings. State-backed specialised rural banks and credit subsidies are only reluctantly accepted by the NCW, but virtually all of today's rich countries used these devices. In the current orthodoxy, profit-driven microfinance is favoured over credit co-ops, but many of today's rich countries used the latter successfully. While marketing boards are routinely denounced by the orthodoxy, especially in Sub-Saharan Africa, Denmark and some other European countries benefitted from effective export marketing boards.

Co-ops are not exactly discouraged by the proponents of the NCW, but the central role that they played in the development of agro-processing and marketing in Denmark, Germany, Sweden, and Japan is not sufficiently emphasised by them. Price stabilisation measures are frowned upon by the NCW, but many of today's rich countries used them and some had great success with them, such as the USA and Japan. More recently, Chile has used a very effective price stabilisation scheme. Things like state-subsidised agricultural insurances, public provision or subsidisation of warehousing facilities, and input (e.g., fertilizer) quality control were very useful policies used by today's rich countries (and some of today's developing countries, like Chile in the case of state-subsidised insurances). However, they are not given sufficient attention by the NCW, although they are not actively objected to by it. All these suggest that the contents of the agricultural policy tool box for today's developing countries will be significantly enriched if history is taken more seriously.

Thirdly, our study reveals that the exact institutional forms of successfully delivering critical needs of the agricultural sector have varied enormously across time and space. There were successes with all forms of delivery in all sorts of countries – public provision (e.g., agricultural research in the USA, extension in the Netherlands, irrigation in Vietnam, seeds in Mexico, rural credit in Germany), private

provision (e.g., marketing service through contract farming in Zambia, machinery services in Egypt), private delivery subsidised by the state (e.g., agricultural insurances in Chile, certain types of research in the Netherlands), public-private partnership (e.g., irrigation in Sweden), co-operatives (e.g., butter and bacon processing and marketing in Denmark, credit co-ops in Germany), state-co-operative partnership (e.g., rural banks in Ghana, export marketing in Denmark, fertilizer supply in Korea) – that suggest that the standard dichotomy between the public sector and the private sector is crippling our policy imagination.

Likewise, our study reveals cases of failures with many of these delivery modes. Public provision failed miserably in agro-processing in Ghana before the 1980s. Private provision failed spectacularly in fertilizer supply in post-socialist Hungary, in agricultural education in post-socialist Ukraine, and in extension and fertilizer supply in post-reform Ghana. Sometimes both the public sector and the private sector failed *in the same area*, suggesting that the causes of the problem lie deeper than ownership form – rural credit in Zambia and seed supply in Ghana are such examples. Co-operatives in many developing countries were not very successful, giving co-operatives bad names. All these examples suggest the importance of a pragmatic approach, not hide-bound by pro-state or pro-private-sector ideologies. Indeed, one important common characteristic of success stories is their willingness to pick solutions that do not neatly fit into ideological boxes.

Fourthly, our study shows the importance of active importation and adaptation of policy/institutional innovations from abroad as well as of policy/institutional innovations of one's own. The idea of co-operatives was first implemented in the UK in the form of consumer co-op (1844), but the Germans and the Danes developed the idea in the area of production. Sweden explicitly modelled its co-ops after the German and Danish ones. This idea was perfected by the Japanese, who invented the generalised co-op, as opposed to single-product (e.g., egg co-op) or single-input co-op (e.g., credit co-op, irrigation co-op), thereby better coordinating different activities and thus raising the efficiency of co-op activities.

Agricultural research was first started in Germany (1852), but it was the US and Japan that honed it to a fine art. Extension service was also first started in the UK (1834), but was further developed by Germany and the Netherlands, and later, the USA and Japan. In developing its agricultural research system, India has imported many ideas from the USA.

The USA imported the farm credit system from Germany and Scandinavia, to which it sent delegations on a fact-finding mission (Cochrane 1979, 289). Japan copied Germany's hypothec bank. Canada consciously imitated the US irrigation law and hired American irrigation experts. Agricultural insurance was first put on Japan's policy agenda at the recommendation of a German consultant.

To sum up, our study shows how much we can learn from history. History frees our 'policy imagination' by showing that the range of policies and institutions that have produced positive outcomes for agricultural development has been much wider than any particular ideological position – be it the pre-1980s statist one or the pro-market NCW – would admit. History also shows that the willingness to experiment with new policies and institutions, and the willingness to learn from other countries' successes and improve upon their solutions, were important in all agricultural success stories, ranging from Germany in the nineteenth century to Chile in the last few decades.

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