

Rethinking public policy in agriculture

Lessons from distant and recent history



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FOREWORD

Many of the agricultural development policies and institutional frameworks adopted by developing countries during most of the last 20 years followed the so-called “Washington Consensus”, referred to in this report as the new conventional wisdom (NCW). This approach emphasized the role of market forces in the economy as the main mechanism for resource allocation and viewed public-sector intervention as having had price-distorting effects that bred inefficiency and stifled growth. The NCW policies, which were mainly prescribed by the World Bank and the International Monetary Fund (IMF), supported stabilization policies and Structural Adjustment Programmes (SAP) and advocated for radical reforms in agriculture that were centred on privatizing production and delivery of services and restricting governments to legislative and regulatory roles and delivering core public-sector goods and services. A key feature of these policies was that they were often prescribed and replicated across the board without due consideration to the realities of individual countries.

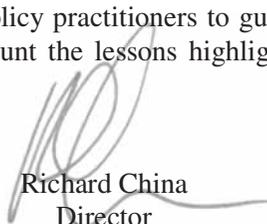
However, compared with the policies of the immediate post-colonial period (roughly from the 1950s through the mid-1970s), the NCW had generally performed poorly, resulting in slowed economic growth, rising inequality and increased poverty. In contrast, some developing countries in Asia and Latin America that followed more calibrated and sequential approaches to economic liberalization have had better results. This has raised questions about the appropriateness of NCW policies and has reignited debate on the relative roles of the public and private sectors, especially in the context of developing countries.

In this report, which is supported by case studies from ten countries, FAO tries to make a case for the complementarity between targeted public-sector interventions and private sector roles. The report provides a wide range of examples of good and bad policy choices and highlights three important lessons. First, in all countries that are now developed, governments played an important role in supporting agriculture at the early stages of economic development by participating in price stabilization and provision of inputs such as seeds and fertilizer. This support was maintained for a long time and it is still maintained in some cases. The same strategy was successfully employed by countries such as Chile and India more recently.

Second, it is evident that a “one-size-fits-all” policy in agriculture often has had disastrous results. The wide array and mix of policy options adopted by countries clearly underlines the importance of taking a pragmatic approach rather than getting locked into pro-state or pro-private-sector ideological viewpoints.

Finally, agriculture thrives best when there is continuity in policy and public-sector support. In the early stages of economic development, state subventions are often justifiable to ensure price stability, food availability and affordability and, ultimately, political stability which are required for long-term investment and development.

FAO hopes that this paper will help policy practitioners to guide the formulation of agricultural development policies, taking into account the lessons highlighted, especially in addressing the needs of the poor.



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Director

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EXECUTIVE SUMMARY

This report on a study by the Food and Agriculture Organization of the United Nations (FAO) on “Applying Historical Precedent to New Conventional Wisdom on Public Sector Roles in Agriculture and Rural Development”, synthesizes the reviews of the history of agricultural policy in ten of today’s developed countries (Canada, Denmark, France, Germany, Japan, Republic of Korea, the Netherlands, Norway, Sweden and the United States of America) and in ten developing and transition economies (Chile, Egypt, Ethiopia, Ghana, Hungary, India, Mexico, Ukraine, Viet Nam and Zambia). It draws lessons for today’s developing and transition countries that go beyond the so-called Washington Consensus, or what is called the new conventional wisdom (NCW) in this report.

The report provides a review of the evolution of agricultural policy in the post-World War II period. In addition to the brief historical review of the rise of neo-liberal economic thinking, the report discusses two key policy proposals behind the neo-liberal view on the role of public policy in agriculture – the elimination of distortions (ostensibly caused by government intervention) and the abandonment of national food security as a policy goal. Concerning the first proposal, the study concludes that certain distortions might be beneficial for various reasons (including the need to create short-term distortions in order to improve long-term productivity and to correct market failures). With regard to the second proposal, it is argued that national food security is a totally defensible economic policy goal when a country is at a low level of economic development (and is therefore exposed to greater risks of long-term food shortages due to low productivity) and/or when their staple foods have limited tradability.

The third section of the report provides justifications for drawing lessons from history by showing how agriculture played very similar roles in the currently rich countries in the late nineteenth and early twentieth centuries. In the late nineteenth century, the conditions for agriculture in the currently rich countries were similar to those found in today’s poorest developing countries. Even after a few decades of (what then was) rapid industrial development, their conditions in the early twentieth century were similar to what we find in some of the poor developing economies today. From the 1930s to the 1950s, the conditions in the then poorer of today’s rich countries, such as Japan and Sweden, were still in the range of Pakistan and Guatemala today. The report argues that the historical comparison is not as misplaced as it might at first seem. This notwithstanding, a discussion of the difficulties involved in drawing lessons from history is also presented.

The main section of the report documents in great detail a large number of agricultural policies that have been used in the past – not just in today’s developing and transition countries in the last 60 years, but also in today’s rich countries in the late nineteenth and early twentieth centuries. The section is divided into two main subsections – inputs policy and outputs policy. In the inputs policy section, the report discusses land policy (land tenure reform and land quality improvement), knowledge policy (research, extension, education and information), credit policy (specialized banks and agricultural credit cooperatives) and physical inputs policy (irrigation, transport, electricity and divisible inputs such as fertilizers, seeds and farm machinery). In the outputs policy section, the report covers the measures intended to increase farm income stability (price stabilization measures, insurance and trade protection) and the measures intended to improve agricultural marketing and processing.

The report concludes with the following lessons:

- In thinking about how to improve agricultural policy in developing and transition economies, there is a lot to be learned from history, especially from the history of the rich countries. There is a surprisingly high degree of similarity in the role that agriculture has played in these countries and therefore in the relevant policies they have used.
- History shows that many successful policy interventions go well beyond (or sometimes even against) the scope recommended by the NCW. Therefore, the contents of the agricultural policy toolbox for today's developing countries will be significantly enriched if history is taken more seriously. History frees our "policy imagination" in the sense that it shows us 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.
- The exact institutional forms that have successfully (or unsuccessfully, for that matter) delivered critical needs of the agricultural sector vary enormously across time and space. There were successes and failures with all forms of delivery in all sorts of countries – public provision, private provision, private delivery subsidized by the state, public-private partnerships, cooperatives, state-cooperative partnerships and so on. All these examples suggest the importance of a pragmatic approach, not 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.
- It is important for countries to actively import and adapt policy and institutional innovations and to create ones of their own. Throughout distant and more recent history, successful countries have learned from others' success stories and have experimented with new policies and institutions – there were international transfers of programmes and approaches in agricultural research, extension services, cooperatives, rural credit and agricultural insurance.

A summarized version of seven of the ten country case studies are included as an annex to highlight the varied typology of agricultural development policies adopted by countries in different stages of economic development. These include a good performer (Chile), two mixed performers (India and Mexico), two suboptimal performers (Ethiopia and Zambia) and two transition economies (Hungary and Ukraine).

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LIST OF ACRONYMS

AES	Agricultural Experiment Station
AgSSIP	Agricultural Services Subsector Investment Programme
ASIP	Agricultural Sector Investment Programme
CAP	Common Agricultural Programme
CIMMYT	International Maize and Wheat Improvement Centre (Centro Internacional de Mejoramiento de Maíz y Trigo)
COPAGRO	Grain Producers Confederation (Confederación de Productores de Granos)
CORA	Corporación de la Reforma Agraria
COTRISA	Comercializadora de Trigo SA
ERP	Economic Reform Programme
FAO	Food and Agriculture Organization of the United Nations
FCIC	Federal Crop Insurance Corporation
GATT	General Agreement on Tariffs and Trade
GDP	Gross domestic product
HEII	Horticulture Exports Industry Initiative
HYV	High-yielding varieties
IMF	International Monetary Fund
INIA	Instituto Nacional de Investigaciones Agropecuarias (National Institute of Agricultural Research).
INDAP	Instituto Nacional de Desarrollo Agropecuario (National Institute of Agricultural Development)
IRRI	International Rice Research Institute
MFI	Microfinance institution
MSP	Minimum support price
NAFTA	North American Free Trade Agreement
NAMB	National Agricultural Marketing Board
NCW	New conventional wisdom
NERP	New Economic Reforms Programme
NGO	Non-governmental organization
OECD	Organisation for Economic Co-operation and Development
PA	Peasant Associations
R&D	Research and development
SAPs	Structural Adjustment Programmes
SLM	Sustainable land management
USDA	United States Department of Agriculture
WDR	World Development Report
WTO	World Trade Organization

1**INTRODUCTION**

It is acknowledged that agricultural development fuels economic growth and is crucial to poverty alleviation and food security. However, in the last 25 years or so, the agricultural sector experienced relatively sluggish development in a number of developing economies. In the mid-2000s, rapidly rising food prices raised concerns about food security for many rural and urban people, particularly in developing countries. Although food prices have generally fallen since mid 2008 because due to the global recession, this experience has revived interest in an issue that many had thought was long dead.

Several factors are associated with agriculture's poor performance observed in the last 25 years: these include structural and technological constraints; an unfavorable external economic environment; war and civil conflicts; vulnerability to natural disasters; and inappropriate policy and institutional frameworks. Among these factors, agricultural policy and institutional frameworks are of particular relevance because they affect agricultural performance most directly and also are controllable to a certain extent by policy-makers.

Many (although definitely not all) of the policy and institutional frameworks adopted by developing countries during the period have followed the so-called "Washington Consensus", which emphasized the role of market forces in the economy as the main mechanism for resource allocation. The prescriptions emanating from these frameworks had emphasized the need to redefine the role of the public sector in promoting and regulating free and competitive markets, rather than in directly providing and subsidizing goods and services needed for agricultural development.

However, for countries in which markets are yet to emerge or are underdeveloped and frequently fail, applying the Washington Consensus policies produced mixed social and economic results. Compared to the policies that were applied during the immediate post-colonial period (roughly from the 1950s through the mid-1970s), the Washington Consensus policies performed poorly and might have resulted in the slowdown of economic growth, rising inequality and persistently pervasive poverty (McKinley, 2004). At the same time, some developing countries in Asia that followed more calibrated and sequential approaches in economic liberalization had much better results.

This has resulted in the emergence of the so-called "post-Washington Consensus", which is less fundamentalist than the Washington Consensus and is more sensitive to the institutional foundations of policy success. However, the post-Washington Consensus, rather than being a genuine shift in thinking, is more of a defensive window dressing by the advocates of the Washington Consensus (Chang & Grabel, 2004-2005). The core policy proposals of the Washington Consensus still remain at the top of the agenda of the post-Washington Consensus (e.g. strict inflation control, trade liberalization, privatization) and the policy practices of the Bretton Woods institutions have changed relatively little.

The failure of the Washington Consensus approach has been particularly severe in the agricultural sector, where many of the world's poor make their living. Food security, poverty reduction and economic growth depend on improvement in rural productive sectors. However, the withdrawal of the state from a developmental role has negatively affected investment in public goods (e.g. agricultural research, education, extension and infrastructure), which has reduced agricultural

productivity. In addition, market-oriented reforms of financial institutions have left agriculture with even less access to credit than before.¹ Trade liberalization has led to increased competition from imports, which has threatened the livelihoods of many farmers. A simultaneous push for agricultural exports in many countries that specialize in the same products often has resulted in falling prices and export earnings.

Fortunately, these problems are now beginning to be recognized by even the traditional advocates of the Washington Consensus (World Bank, 2008), although it remains to be seen whether this will lead to a real shift in policy paradigm. Among the top current priorities of governments in some developing and transition economies is designing and implementing agricultural policies that overcome the limitations of the Washington Consensus approach and address the challenges faced by these countries.

This study hopes to contribute to addressing these concerns by drawing lessons from history. We look at the history of agricultural policy in developing and transition countries over the last several decades and the history of agricultural policy in today's developed countries when they were at similar levels of development as developing countries are today. The project looks at seven developing countries across three continents including a good performer (Chile), two mixed performers (India and Mexico) and four suboptimal performers (Egypt, Ethiopia, Ghana and Zambia). We also look at three transition economies: one is very successful, although it started from a very low level (Viet Nam) and two have mixed results (Hungary and Ukraine). We also examine rich countries, including Canada, Denmark, France, Germany, Japan, Republic of Korea, the Netherlands, Norway, Sweden, and the United States of America. These countries were all successful in developing their agriculture during the late nineteenth and mid-twentieth centuries (the late twentieth century in Japan, and the Republic of Korea), with France being a partial exception (although it started from a high level of agricultural development, its progress during the period in question was not good).

A general observation from the experiences of the above countries is that despite distinctive country-specific issues, the agricultural policy challenges that confront countries at earlier stages of economic development, today and in the past, are remarkably similar. This means that countries can learn from others' historical and contemporary experiences. This report is a contribution to that learning process.

¹ For example, Tanzania has achieved budget savings from eliminating input subsidies and loss-making government commercial activities, but these have not been directed to vital public support for the agricultural sector. The same has happened in several other countries whose economies depend largely on agriculture and thus need sustained growth in this sector to increase its benefits to the wider economy. See FAO (2006).

2

**THE EVOLUTION OF AGRICULTURAL POLICY IN THE
POST-WORLD WAR II PERIOD**

After the 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 became more state-oriented all over the world.

The new world hegemon, the United States, had already overhauled its agricultural policy in that direction in the 1930s in order to deal with the farm crisis that followed the Great Depression. In addition to its already strong government-financed programmes in research, extension and irrigation, it created financial institutions to provide subsidized loans to farmers and introduced government-managed price stabilization schemes. The United States also encouraged land reform in countries under its influence in the belief that it would help fight off (real and imagined) communist threats. It strongly pushed for comprehensive land reform in Japan, and Korea in the late 1940s and early 1950s. It also funded less comprehensive land reform programmes in Latin America through President Kennedy's Alliance for Progress in the 1960s.

The spread of socialism into Eastern Europe and China in the 1940s resulted in widespread agricultural collectivization and the formation of state-controlled cooperatives in many countries. Not all socialist countries completely collectivized their agriculture, however, as the Soviet Union had done since the 1930s. In the 1970s, socialist agriculture was practiced in varying degrees by poor countries like Viet Nam, Egypt and Ethiopia. It goes without saying that the state in these countries directed every aspect of agriculture – product choice, prices, input types, input prices, marketing channels and so on.

The Latin American countries were already independent and started their state-led agricultural development in the 1930s; the best example was Mexican land reform under Cardenas. 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 the market mechanism, if left alone, would not be able to supply socially optimal quantities of basic agricultural inputs (e.g. land, water, transport, seeds, fertilizers, pesticide and animal feeds) nor would it be able to provide the means to attain rural income stability (e.g. credit, insurance, stable prices). It was argued that the state needed to provide these inputs directly or subsidize the private sector in providing them. It was thought that deliberate measures needed to be taken to stabilize rural income.

Many developing countries attempted land reform, although few countries could implement comprehensive and successful land reforms – like those that were carried out in Korea – because of political resistance by the landed class. In most countries, the state invested in rural infrastructure (especially irrigation and roads) and in the improvement of land quality. It also provided research and extension, although in many countries the quality of what was provided was not very high because of financial limitations and a shortage of qualified staff.

In many countries, arrangements were made to provide subsidized loans, particularly to small-scale farmers. State-owned or state-subsidized rural banks were established to expand banking access in rural areas and provide subsidized loans to farmers. Rural credit cooperatives (or co-ops) were encouraged and in some countries (e.g. Japan and Korea) government-controlled

general agricultural co-ops provided credits, subsidized inputs and marketing services to farmers. Modern inputs, especially fertilizers and improved seeds, also were supplied by the state or, when supplied by the private sector, heavily subsidized by the state.

The state also regulated the marketing of key agricultural products through state marketing boards in sub-Saharan Africa and through government-controlled co-ops in countries like Japan, and Korea. The state advanced the processing of agricultural products directly (e.g. through state-run agricultural processing plants as in Ghana) and indirectly (e.g. tariff protection and subsidies for processing industries). This was seen as a way to reduce waste (because fresh products have short shelf lives) and to raise rural income by adding value to agricultural products and creating off-farm employment opportunities.

Many countries tried various means to stabilize rural income. Some maintained minimum prices for important products (especially grains) and managed buffer stocks. Key agricultural products, especially foodgrains, were protected from import competition by tariffs and other trade restrictions. Some countries, notably India, provided crop, livestock and other agricultural insurance to stabilize rural income.

Compared to the policies prescribed by the Washington Consensus, or what we call the new conventional wisdom (NCW) in this report, these policies produced very respectable outcomes, especially when they were combined with Green Revolution technologies: another product of government intervention on an international scale. However, they did have some problems of waste and corruption, and therefore started to come under attack beginning in the 1970s by the believers of what later came to be the NCW.

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

Proponents of the NCW argued that state provision and/or subsidization of inputs (e.g. credit, extension services, irrigation, fertilizers and seeds) was causing inefficiencies and corruption and putting unbearable burdens on state finances. In the context of intense pressure for balancing the budget under the SAPs, it was emphasized that the state could not afford to provide these inputs at subsidized prices. It was advised that the agencies providing these inputs should be privatized and the subsidy elements should be eliminated, or at least radically reduced. State involvement in agricultural marketing (especially attempts to set minimum prices) and processing was to be eliminated, or at least drastically reduced, as it only produced inefficiencies.

The policies recommended under the NCW have produced very poor outcomes in most countries in terms of growth, equality, stability and poverty alleviation. There are good reasons for that which will be discussed later in this report. At this point it is important to highlight the limitations of the very theoretical framework that underlies the recommendations of the NCW in agriculture. Two aspects are particularly important.

2.1 Eliminating “Distortions”

The persistent theme in the NCW was the need to “eliminate distortions”. According to the NCW, state intervention in agriculture (e.g. subsidized fertilizers, artificially cheap credit, tariff protection and state-controlled prices) distorts market signals and therefore channels resources into “wrong” activities. This creates inefficiencies because more outputs could be produced if the resources flowed according to the “right” signals created by the “natural” forces of supply and demand.

At one level, it is impossible to disagree with this view. If prices are distorted, then by definition they lead to distorted outcomes, which, by definition, cannot be good. However, 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, distortions may be good or bad, depending on what the market outcomes would have been without them. 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 short-term resource allocation (which is what concerns neoclassical economics, which forms the theoretical basis of the NCW) but that actually may increase long-term productivity. For example, agricultural tariffs can impose short-run efficiency costs, but they may promote agricultural and overall economic growth if the tariff revenues are invested by the government in improving agricultural productivity (e.g. investments in rural infrastructure, research and extension) and/or if the increased agricultural incomes create offsetting extra demand for domestic industries. Agricultural protection had such an effect in Germany in the late nineteenth century and in South Korea in the late twentieth century (Koning, 2007). Therefore, policies that are distortionary in short-term resource allocation actually may help economic growth and poverty alleviation in the long run.

Second, even if we ignore the “dynamic” dimension and focus on short-term allocative efficiency, there are many instances of market failure that justify inducing price distortions in relevant markets. For example, if market signals lead agents to use less than socially optimal amounts of certain inputs, then “distorting” the market signals so that more of those inputs would be used would be socially justified. For example, if the market fails to provide agricultural research (because of the public goods nature of research output and/or the scale economy involved in conducting research), the government may be justified to “distort” the market signals by conducting the research even though it cannot make any profit from it or by providing subsidies to private-sector agents to conduct more research than what market signals would dictate.

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 net, certain “distortionary” policies (such as tariff protection or a price stabilization scheme) may be the only mechanisms that can provide income stability to small-scale farmers. Greater rural income stability 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 poor over time may occasionally fall below the poverty line. This 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 about how often and exactly where markets fail. This 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 do fail and fail more frequently in agriculture.

Moreover, even if we know how much and what to subsidize, there are many ways to do it, and the best way may differ across countries. For example, South Korea produced subsidized 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 village meetings, rather than by government officials) to buy imported fertilizers. Both types of initiatives have produced good results, but they may not work in other contexts, where, for example, state-owned fertilizer companies are inefficient, cooperatives are corrupt or village power structures are such that the strong hog the vouchers. In other words, even if we know the location and the scale of market failures, the design of delivery mechanisms will matter greatly and the discourse advocating elimination of distortions has nothing to say on this issue.

2.2 Abandoning the “Misguided Concern for National Food Self-sufficiency”

Attaining a high degree of national food self-sufficiency was the goal of many developing countries until the 1970s and one which is still pursued by some today. It has been criticized by the NCW as an illusory goal that is based on bad economics and xenophobia. (See FAO, 2003, Chapter 2 for a comprehensive review of the issues involved in the definition and measurement of food security at different levels.)

The supporters of the NCW have argued that greater engagement with international markets through greater specialization will give the national economy (and, by implication, its individual members) more income and therefore a greater ability to secure the necessary amounts of food. By pursuing food self-sufficiency, it was pointed out, nations forgo the lucrative market opportunities in non-food products (especially those that can be exported to higher-income countries where they will command higher prices) and earn less than what they could have, using the same amount of inputs. It is better, it was argued, for nations (and individual farmers) to maximize their incomes by growing cash crops that they can sell in domestic and international markets and to use the increased earnings to buy food in the global market.

This advice, of course, makes sense in certain circumstances. For example, when cheap grains from the New World and Russia flooded into Europe 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. as butter, cheese and bacon). This gave them higher income and thus greater capacity to import everything (including foodgrains), achieving greater national food security.

However, such specialization makes sense in the long run only when countries reach a certain level of economic development.² When countries rise above certain levels of income, even fairly significant declines in their capacity to import food (because of a rise in food prices and/or falls in the prices of their exports) will not reduce food consumption below a certain minimum. In poor countries, however, a fall in food consumption below a minimum level even for a year or two may have serious irreversible negative consequences. There is a hierarchy of human needs in

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

which consumption of food is the most basic. If fluctuating incomes (e.g. because of a fall in the prices of cut flowers that a country exports) or prices (e.g. because of a rise in the prices of food) make it impossible for some people always to consume adequate amounts of food, they are exposed to hunger and malnutrition. This has irreversible negative long-term consequences for people's health and educational achievements and also reduces the productive capabilities of the labour force and the whole economy. Therefore, the issue of national food security needs to be taken very seriously when a country is at a low level of economic development.

Moreover, the argument dismissing national food self-sufficiency concerns is based on the assumption that production portfolios can be easily reshuffled when necessary. In theory, resources can be reallocated into food production if the international prices of food rise sufficiently. However, this adjustment is very slow. Nowhere, outside textbooks of economics, is this adjustment instantaneous, but it is even slower in agriculture because of the time-sensitive nature of agricultural production (i.e. it takes at least one growing season to make the adjustment).

Some staple foods for the African countries – such as cassava, plantains, yams, millet and sorghum in West and Central Africa and white maize in Southern and East Africa (UNCTAD, 1998, p. 141) – are not internationally traded in a significant way outside the region. Transportation costs are also high in many of these countries (UNCTAD, 1998, p. 141). All this means that these countries cannot rely on international trade for their staple foods, as can other countries.

Thus, for countries at low levels of economic development, national food self-sufficiency is not a misguided concern. This is especially true for African countries that have limited trading options for their staple foods and poor transportation infrastructure. When food consumption falls below a certain minimum, the possibility of irreversible damage to a country's productive capabilities, and the obvious human suffering, needs to be taken seriously. The issue of national food-self sufficiency should not be dismissed so easily.

3

LESSONS FROM HISTORY

One unique feature of this report is the examination of the history of agricultural policy in today's rich countries between the late nineteenth and mid-twentieth centuries in an attempt to understand the evolution of agricultural development in the post-World War II period as part of a longer historical phenomenon.

This exercise may seem unjustified. Was not the period in question when today's rich countries were engaged in imperialist projects based on their industrial might, circling the globe, gobbling up weaker countries? Was this not when German companies like I.G. Farben were conquering the chemical world, while the French invented the internal combustion engine and Henry Ford started mass production of automobiles? Was not Japan, the poorest of today's rich countries then, already developed enough to build fighter planes and aircraft carriers by the 1930s? What lessons can we draw from such countries for the Indonesias and Kenyas of today, with nearly half their populations still engaged in agriculture and around 30 percent of their total output originating in the agricultural sector? What about countries like Uganda and Nepal which have 70 percent of their populations in agriculture and 40 percent of their total output coming from the agricultural sector?

However, there are surprising similarities between the rich countries in the late nineteenth and mid-twentieth centuries and today's developing countries in terms of the role that agriculture plays in their economies and the problems they face in 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

Until recently, agriculture was very important in providing employment in many of today's rich countries. 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 after its forced opening in 1853 and the Meiji Restoration in 1866. However, only 15 years before that (1870), the share of agriculture in total employment in Sweden was 72 percent, which is basically the same as some of the poorest developing countries today (e.g. Madagascar is at 78 percent and Uganda is at 69 percent). Today, Sweden and Uganda could be in different universes, but only four generations ago the agrarian conditions in Sweden were not so dissimilar to those that we find in Uganda today. Twenty years later, in 1890, the share of agriculture in total employment in Sweden was still 58 percent, a level that is similar with that of Viet Nam today (60 percent).

In France, the picture was similar. France's per capita income was 21 percent higher than Sweden's until 1875 (although Sweden, as one of the fastest-growing economies at the time, was

³ Of 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 commercialized agriculture in total agricultural output and employment, the share of agriculture in exports, 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 examined. However, such detailed comparisons are beyond the scope of this report because the required information is difficult to acquire, especially for historical cases.

catching up fast).⁴ In 1861, France's share of agriculture in total employment was 53 percent, which is the same as what we find in countries today like Bangladesh (52 percent), Kyrgyz Republic (53 percent) and Georgia (54 percent). This is also similar to the average for 15 European countries (Austria, Belgium, Denmark, France, Germany, Great Britain, Hungary, Italy, Ireland, Norway, the Netherlands, Poland, Russia, Sweden and Switzerland) in 1870, which was 55 percent.

Forty years later in 1910, the average for the above-mentioned 15 European countries fell to 46 percent, which is the level today for Indonesia (45 percent), China (44 percent) and Thailand (44 percent). Even Germany, one of the more developed countries among this group by this time (the fifth richest in the group), was still highly dependent on agriculture even though its chemical and machinery industries were fighting for world supremacy with those of Britain. In 1907, agriculture still accounted for 35 percent of German employment, which is the same level found today in countries like Sri Lanka (35 percent) and Paraguay (32 percent).

Until the mid-twentieth century, the shares of agricultural employment in 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 today in lower-middle income countries like Guatemala (39 percent) and the Philippines (37 percent). As late as 1970, agricultural employment in Japan, at 17 percent, stood at the same level as in Mexico and the Dominican Republic today.

The output data, presented in Table 2, depict a similar picture. In 1870, the share of agriculture in total output was 50 percent in Denmark and 47 percent in Sweden. These figures are found today in countries like Democratic Republic of Congo (48 percent) and Lao People's Democratic Republic (47 percent). In 1885, the share of agriculture in total output in Japan (45 percent) was the same as the levels found today in some of the poorest developing economies, 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, when the country was rapidly emerging as one of the main industrial powers of the world. This is a level similar to what we find today in low-income countries like Rwanda (42 percent), Niger (40 percent), Nepal (39 percent) and Malawi (39 percent).

The share of agriculture in total output stood at approximately 30 percent in Denmark and Japan until around 1920. This figure is comparable to that of Burkina Faso (31 percent), Uzbekistan (31 percent), Madagascar (29 percent) and Kenya (28 percent) today.

The shares of agriculture in output in Norway in 1910 (24 percent), Germany in 1913 (23 percent), Denmark in 1930 (20 percent) and Japan in 1955 (21 percent) were at levels found today in Tajikistan (24 percent), Pakistan (23 percent), Cote d'Ivoire (23 percent), Guatemala (23 percent), Nigeria (22 percent) and Zambia (21 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 today in countries like India (15 percent), China (13 percent), Romania (13 percent) and Dominican Republic (12 percent).

⁴ France's per capita income in 1875 is estimated to have been US\$2 219 in US\$1990 prices. For the same year, Sweden's income is estimated to have been US\$1 835. The numbers are from Maddison (2003) and expressed in purchasing power parity terms in "1990 international Geary–Khamis dollars".

**Table 1: Share of agriculture in total employment*
(in percentages)**

Rich countries in the past	Year	Share	Today's developing countries (2002-2004) and their share
Korea	1960	80	Madagascar (78) <i>Ethiopia (75)</i>
Japan	1885	73	
Sweden	1870	72	Uganda (69)
Japan	1900	68	<i>Viet Nam (60)</i>
Norway	1865	60	
Sweden	1890	58	Georgia (54) Kyrgyz Republic (53) Bangladesh (52) <i>Ghana (51)</i>
Germany	1852	55	
Europe 15 +	1870	55	
Japan	1920	54	
France	1861	53	
Korea	1970	51	
Germany	1880	49	Armenia (46) Indonesia (45) Morocco (45) China (44) Thailand (44)
Norway	1890	49	
Sweden	1910	48	
Denmark	1870	47	
Japan	1935	47	
Europe 15 +	1910	46	
Denmark	1900	40	Guatemala (39) Philippines (37)
Norway	1910	39	
Japan	1955	39	
Sweden	1934	38	
Denmark	1910	36	Romania (35) Sri Lanka (35)
Germany	1907	35	
Korea	1980	34	Paraguay (32) <i>Egypt (29)</i>
Japan	1960	32	
Sweden	1939	30	<i>Ukraine (20)</i> <i>Mexico (17)</i>
Korea	1990	18	
Japan	1970	17	<i>Chile (14)</i> <i>Hungary (6)</i>
Japan	1990	6	

* 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 for this project are shown in italics.

Sources:

Denmark: Henriksen (1992), p. 154, Table 1.1

Germany: Blackbourn (1997), p. 188 and p. 393

Japan: Sugihara (1996), p. 157, Table 7.2

Korea: Francks et al. (1999), p. 37, Table 2.6.

Norway: Hodne (1973), p. 106, Table 8.

Sweden: The data for 1870 and 1934 are from G. Ytterborn (1938), p. 185. Data for other years are from Schön (2006), Table 1. The two data sets are not fully compatible. For one year where there is an overlap, that is, 1870, Ytterborn gives 72 percent but Schön gives 69 percent.

15 countries: Zanden (1991).

Developing countries: World Bank (2008), Table A1, except for Ethiopia and Ghana, which are from our own case studies.

**Table 2: Share of agriculture in total output
(in percentages)**

Rich countries in the past	Year	Share	Today's developing countries (2003-2005) and their share
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	Togo (42)
Japan	1900	39	Niger (40)
Korea	1961	39	Nepal (39)
Denmark	1890	38	Burundi (38)
			Malawi (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	
Sweden	1910	27	Kenya (28)
Korea	1970	27	Chad (26)
Norway	1910	24	Tajikistan (24)
Germany	1913	23	Pakistan (23)
Japan	1955	21	Cote d'Ivoire (23)
			Guatemala (23)
			<i>Viet Nam (22)</i>
			Nigeria (22)
Denmark	1930	20	<i>Zambia (21)</i>
			Paraguay (21)
			Moldova (20)
			<i>India (19)</i>
Sweden	1930	16	<i>Egypt (16)</i>
Korea	1980	15	
Sweden	1939	13	China (13)
Japan	1960	13	<i>Ukraine (12)</i>
			Dominican Republic (12)
			<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 for this project are shown in italics.

Sources:

Denmark: Henriksen (1992), p. 154, Table 1.1 and Henriksen (2006).

Germany: Blackbourn (1997), p. 188 and p. 393.

Japan: Sugihara (1996), p. 157, Table 7.2

Korea: Lee (1999), p. 558, Appendix Table 3.

Norway: Hodne (1973), p. 106, Table 9.

Sweden: The data for 1870 and 1934 are from G. Ytterborn (1938), p. 185. The data for other years are from Schön (2006), Table 1.

Developing countries: World Bank (2008), Table A1.

Therefore, it is not as fanciful as it may sound at first to compare the agricultural conditions and policy responses in today's rich countries between the late nineteenth and mid-twentieth centuries with those that prevail in today's developing countries, including the poorest and most agrarian ones. 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 today's poorest developing countries (e.g. from Madagascar to Bangladesh).

Even after a few decades of what then was rapid industrial development, the conditions in the agriculture of today's rich countries in the early twentieth century were similar to what we find today in the poorer (though not the poorest) developing economies, from Rwanda and Malawi at the bottom to Pakistan and Guatemala at the top. From the 1930s to the 1950s, the conditions in the then poorer of today's rich countries, such as Japan and Sweden, were still in the range of Pakistan and Guatemala today.

Given these structural similarities, it is not surprising that today's rich countries all grappled with issues very similar to those with which today's developing countries are struggling – landlessness, fragmentation of holdings, lack of irrigation and other rural infrastructure, backward technologies, limited availability of credit to small-scale farmers, excessive price fluctuations, limited availability and poor quality of farm inputs (especially fertilizers), poor warehousing and marketing facilities (which often force farmers to sell at the wrong time and wrong prices), food insecurity and trade shocks (which in this period were mainly caused by the inflow of New World wheat and meat enabled since the 1870s by the spread of steamships and refrigeration). Given the similarities of the problems, it is also not surprising that the policy and institutional solutions devised by the farmers and governments of those countries were very similar to what today's developing countries may contemplate (although not necessarily be able to implement for reasons that we will discuss later, including the influence of the NCW).

There are obvious limitations to drawing lessons from the 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 are much more diverse than the rich countries). Indeed, it would be a mistake to suggest that policies that worked in Sweden in the late nineteenth century would work in today's Viet Nam because in both of them agriculture accounts for 60 percent of employment or that policies that worked in 1950s Japan would work in today's Zambia because in both of them agriculture accounts for 21 percent of gross domestic product (GDP). This would be the same mistake as that made by the proponents of the NCW, who have been accused of issuing “one-size-fits-all” policy recommendations.

However, there are some policies and institutions that can be applied fairly universally regardless of time and space, such as land quality improvement initiatives, rural credit schemes, public or subsidized warehousing and price stabilization programmes. There are others that may be applied with relatively minor modifications – 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.

4

POLICY LESSONS FROM DISTANT AND RECENT HISTORY

This section discusses the range of agricultural policies that have been pursued in the past in today's rich countries and over the last 60 years in today's developing and transition countries. It draws lessons from these experiences for contemporary developing countries. The section is divided into two main subsections – inputs policy and outputs policy.

4.1 Inputs Policy**4.1.1 Land policy: land tenure reform and land quality improvement**

Although there are agricultural activities that use a minimal amount of land (such as highly advanced hydroponic agriculture in the Netherlands today), it is difficult to think of agriculture without land. It is thus not surprising that the “land question” has been central in agricultural sector development of most countries throughout history. Especially in the early stages of economic development, most countries have problems with landless rural populations. For this reason, land reform – or redistributing land to the landless or to those who own too little land to make a decent living from it – has been at the centre of debate regarding agriculture in all countries to one degree or another.

We can (and should) debate whether land reform that creates many small holdings is the best way to proceed in all circumstances. There may be contexts in which large-scale agriculture may be more efficient. Many of the former socialist countries certainly thought so, although their experiences (with Hungary being partially the exception) do not inspire great confidence in the solution of collectivization. In other contexts, the labour-land ratio is so high that the holdings created through egalitarian land reform may not be viable in the long run. However, in many countries, egalitarian (i.e. redistributive) land reform seems to have worked quite well when combined with complementary measures to increase agricultural productivity, stabilize agricultural income and create non-agricultural jobs (i.e. 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 subsidized prices, unused public land to settlers. A classic example is the 1862 Homestead Act of the United States, which granted 160 acres of public land (mostly taken from the Native Americans) to anyone who would till it for more than five years (Garraty & Carnes, 2000, p. 423) (see Box 1). In the mid-nineteenth century, Swedish Crown lands were granted to settlers in the sparsely-settled north (Freund, 1946, p. 125).

In countries where there is significant population pressure and land ownership is concentrated, there is a natural demand for redistributive land reform (i.e. “land to the tiller”). In the former socialist economies, land reform resulted in significant, although by no means uniform, degrees of collectivization either in state farms or state-dominated cooperatives. Poland and the southern part of Viet Nam, for example, had low degrees of collectivization. After the fall of socialism, these countries did “reverse” land reform and broke up large collective farms and cooperatives.

The NCW has a rather contradictory attitude on the land issue. On the one hand, because it believes in the incentive effect of land ownership by individual cultivators, it supports the break-up of underutilized 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.

Box 1: Distribution of public land in the United States

Lack of finance was a problem in the United States, which had a long history of selling public land at subsidized rates (Ingersent & Rayner, 1999, pp. 57-8). This practice started when the country became independent, when confiscated British Crown and aristocratic lands were auctioned at below-market prices. However, these lands were beyond the reach of small-scale farmers – despite the availability of subsidized public credit – because they were sold only in big parcels. Although the land parcel size in public auctions was gradually reduced, subsidized public credit was also abolished and therefore the land was still beyond the reach of small-scale farmers. As a result, there were many landless peasants who illegally occupied public land, despite the country’s plentiful supply of land.

This led to pressure to retrospectively recognize squatter rights. However, the growing agitation among landless peasants for free redistribution of public land (much of it forcefully taken from Native Americans) was resisted by southern landlords, who occupied a powerful position in national politics at the time. The drive for free redistribution of public land was not successful until the outbreak of the Civil War in 1860 and the subsequent passing of the Homestead Act in 1862. The Homestead Act, however, was not as successful as its promoters had hoped because it gave away land without providing financial support to poor, prospective homesteaders to secure farm equipment and draught animals (Garraty & Carnes, 2000, pp. 486-7).

However, the NCW does not fully recognize the potential contradiction between these two positions. Deregulated land markets almost always lead to reconcentration of land ownership, nullifying the result of land reform. 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 Box 2). Below a certain level, a holding becomes too small for farmers to survive the negative shocks that are frequent in agriculture.⁵ Sooner or later, such holdings will be hit by a shock and the owners will have to sell out to survive. Large-scale farmers (be they commercial farms or traditional landlords) who can more easily survive those shocks can buy these fragmented farms and expand. In countries without strong primogeniture, holdings will be fragmented after a generation or two, making eventual reconcentration more likely.

Despite this, the supporters of the NCW insist that there is “little justification for policy measures to restrict land sales” (WDR, 2008, p. 142). However, without such restrictions, land ownership is likely to be concentrated again in the hands of few. Indeed, the very success of land reform in Japan and Korea, which the World Bank praises, was possible partly because of the strict imposition of a land ownership ceiling in the early days of land reform (see Box 3).⁶ Even in India, where land reform has produced mixed results, a land ownership ceiling is considered to have been important in reducing inequality in land holdings (India case study).

⁵ Obviously, the minimum threshold varies widely depending upon the crop, land quality, technologies used and many other factors.

⁶ It is true that the absence of land markets, or the presence of excessively regulated ones, can retard agricultural development. The absence of a land rental market in post-socialist Hungary has led to the abandonment of cultivation on lands owned by elderly people or people who had been “returned” their private land after the fall of socialism but who had already moved to the city (Hungary case study). Inability to sell, rent, or use as collateral the communal land created by land reform (*ejido*) has restricted the ability of Mexican agriculture to attract investment (Mexico case study). At the same time, some restrictions on the land market need to be in place if land reform is to be sustainable.

Box 2: Chilean land reform

In 1962, a land reform law (law number 15 020) was approved allowing the expropriation for private farms with a long-term payment for the land. In order to administer this process, a land reform agency *Corporacion de Reforma Agraria* (CORA) was created. In 1965, the land reform process gained momentum when new legislation (law number 16 640) was approved that gave CORA greater freedom and expediency for expropriating large productive and unproductive estates. Also, another significant law was passed allowing the unionization of farm workers (law number 16 625).

During the Frei government (1964–1970), 3.6 million hectares, (12 percent of the country's agricultural land) were expropriated, benefiting 30 000 families. The expropriated farms were organized into a form of cooperative production unit, where the associates were the workers living on the estate. CORA appointed an administrator for the first three years, after which the administrator was elected by the farmers if they wished to continue as a unit. Alternatively they could choose to divide the land into family lots. During this period, approximately 50 percent of the farm labour force was organized into farm unions.

Land reform was supplemented by policies to enhance productivity. During this period, Chile identified its main agricultural products with potential – temperate fruits, wine, forestry, livestock and dairy in the south – and implemented policies to realize their potential. The policies were aimed at raising agricultural productivity and included providing long-term credit (at positive real interest rates but with grace periods), technical assistance, public investment in basic processing infrastructure (e.g. packing, freezing plants for fruits, wine production and milk processing and cellulose plants) and special incentives to organize cooperatives in these products. Thanks to these programmes, Chile's agricultural growth rate jumped from the sluggish rate of 1.8–2.0 percent per year to a sizeable 5 percent per year, despite the disruption from the land reform process.

Land reform efforts were intensified under the left-wing government of Salvador Allende. However, as land seizures became widespread, the confidence of the remaining large-scale and medium-scale farmers was severely affected. In addition, the incentives in the reformed units were grossly distorted because beneficiaries received an income irrespective of the work conducted. Hence, most of their time was dedicated to the small plots surrounding their houses, which had existed since the *latifundia* times. Moreover, during this period the reformed farms were left with little technical assistance and credit supply, resulting in a drop in agricultural output of 4.8 percent per year between 1970 and 1973.

After the military coup by General Pinochet in 1973, lands that had been reformed were distributed as private plots (to the former farm workers of the expropriated farms), returned to their previous owners or auctioned off to private investors. This process was completed around 1979. As a result, about 30 percent of the land that had been seized towards the end of the Allende period was returned to its previous owners. Furthermore, another third of difficult-to-divide lands was auctioned to the highest bidder. The rest was split into private plots for the former estate farm workers.

However, the reduction in public support and the high interest rates (which reached up to 60 percent in real terms in some years) meant that the new owners could not farm their land properly and were forced to sell out at very low prices. By the mid 1980s, it was estimated that close to 50 percent of land reform beneficiaries had sold their properties, despite the efforts made by the growing non-governmental organization (NGO) movement led by the Catholic Church and other religious denominations to replace the dwindling state support.

Source: Chile country case study.

Of course, a land ownership ceiling is not enough to sustain land reform. If it is to succeed, land reform requires many measures to raise the agricultural productivity of the newly-created small-scale farms. Once again, the position of the NCW in this regard is highly contradictory. The

NCW does recognize that redistributive land reform is likely to fail unless accompanied by “improvements in access to managerial skills, technology, credit and markets” (WDR, 2008, p. 42). However, it believes that such improvements can come mainly through greater freedom for market forces. It fails to recognize that greater liberalization of markets, which it seeks, is likely to reduce the availability to owner-cultivators of those very services that improve “access to managerial skills, technology, credit and markets”.

Distant and recent history show 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 redistributed 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 & Rayner, 1996, p. 28 and Tracy, 1989, p. 61). However, much of the land was sold to large-scale farmers, because the small-scale tenants had no financial means to buy the land. The same problem was observed in Germany after the 1848 revolution, when peasants acquired the right to buy the land they farmed (although in this case, some limited financing was provided by the state land bank) (Tracy, 1989, p. 85). The same problem dogged the United States, even after the 1862 Homestead Act (see Box 1). In contrast, countries that succeeded in creating viable small holdings provided subsidized credit to small-scale farmers. Danish land reform, which started slowly in the seventeenth century, became established only when the government provided subsidized public loans in 1899 to tenants to buy land to form small holdings (Kristensen, 1930, p. 232). Under this new regime, “small farmers [could] borrow at low interest nine-tenths of the value of the [newly-acquired] farm” (Warming, 1923, p. 508). The success of land reform in East Asia was also based on a similar scheme of subsidized financing (see Box 3).

Once small holdings are created, measures may be needed to prevent the reconcentration of land ownership. As mentioned earlier, land reform results were sustained in East Asia only because a land ownership ceiling was strictly applied (see Box 3). Another less direct and less effective measure to prevent land ownership reconcentration is to legally prevent subdivision of small farms below a certain size so that not too many farms become too small to be viable and therefore vulnerable to shocks. Following its policy at the turn of the twentieth century to encourage the creation of small holdings, the Danish Government introduced a law in 1925 banning the subdivision of small farms (Kristensen, 1930, p. 231). Germany also used similar methods in the early twentieth century.

Even with ownership ceilings, most holdings will be fragmented within a generation or two. Therefore, land reform best achieves the aim of creating viable small holdings when it is complemented by measures to absorb the additional labour that results from population growth. This can be accomplished by creating non-farm rural and non-rural jobs. The East Asian land reform was particularly successful because the rapid creation of urban jobs (and rural non-farm jobs in Japan but not in Korea) meant that holdings did not have to be subdivided to the point of threatening their viability (FAO, 1966, for Japan and Francks *et al.*, 1999, for Korea).

Measures are needed to stabilize farm income to prevent marginal farmers from experiencing large negative income shocks and having to sell their lands out of desperation. Price stabilization policy is an obvious measure that has been used successfully in countries like Japan and Chile, less successfully in countries like India and very poorly in countries like Zambia. Encouraging, or even requiring, state-subsidized crop or livestock insurance is another possible solution which has been successfully used in Germany, Japan and the United States and, increasingly, in India.

Box 3: East Asian land reform

Japan

The Japanese experience with the land issue, culminating in land reform after World War II, shows that appropriate land policy differs based on technology and social structures. From 1872–1908, land redistribution was not an urgent issue in Japan because many Japanese landlords were tillers themselves and showed keen interest in increasing land productivity (FAO, 1966, p. 17). However, land tenure became a major issue in Japan during the interwar period because of the rise of absentee landlordism and the resultant relative stagnation of agriculture.

During this period, the Japanese government tried to obviate the need for land reform by providing subsidies for purchases of land by tenants and also by strengthening tenant rights. In 1937, it launched a scheme where agricultural associations advanced loans to tenants to buy excess land from their landlords and interest payments on these loans were subsidized by the government. In 1938, the Farmland Adjustment Bill was introduced to legally recognize a tenancy agreement even if it was not formally registered; this prevented landlords from refusing to renew a tenancy except in cases in which the tenant had committed wrongful conduct (FAO, 1966, p. 18).

After the end of World War II, the Japanese government, under pressure from the United States, finally acknowledged that comprehensive land reform was needed. In 1946, the Special Law on Creation of Owner-farmers was introduced. Under this law, all farmland owned by absentee landlords and all farmland leased by resident landlords in excess of 1 hectare (4 hectares in Hokkaido, where land is less fertile) was bought by the government at below-market prices (Putzel, 1992, p. 73). Naturally, the landlords resisted the law by filing lawsuits regarding its constitutional validity, arbitrarily evicting tenants, conducting illegal sales, falsely insisting that they were the actual tillers of the soil and virtually maintaining possession of large farmlands through nominal subdivision. However, despite their resistance, nearly 80 percent of the tenant-cultivated land was ultimately transferred to the tenants (FAO, 1966, p. 19).

In 1952, the Japanese Government introduced the Farmland Law that “consolidated land reform by restrictions on the transfer of farmland, restrictions on the possession of tenanted land, control of farmland rents and the protection of the rights of tenants” (FAO, 1966, p. 19). It prohibited the acquisition of farmland by small-scale owners and large-scale farmers, leasing of farmland acquired through the reform, subleasing by tenants, possession of farmland by absentee owners (and more than 1 hectare of leased land by resident owners) and the cancellation of farmland lease contracts. It also fixed farmland rents. These measures, when combined with other measures that increased farm productivity and created non-farm jobs in rural and urban areas, prevented reconcentration of land and made the land reform effective.

Republic of Korea

As in Japan, land reform in Korea distributed land to the tillers and encouraged former property owners to invest their compensation in industry. Programmes for investment in agriculture and lending schemes for rural areas were established. In the course of the reform, 65 percent of the agricultural land was redistributed. A ceiling on all individual holdings was set at 3 ha of good cropland. Land in excess of this ceiling was distributed in units of 1 ha to former tenants. This low ceiling enabled nearly 76 percent of all agricultural households to own land for the first time. Under the impact of the reform, agriculture achieved an annual growth rate of almost 4 percent.

Sources: FAO 1996 and Cox *et al.*, 2003, Annex 1.

Also, there should be efforts to raise land productivity so that smaller holdings, which inevitably will emerge through the inheritance process (unless there is a very strong system of primogeniture or legal ban on subdivision as in the examples cited above in Germany and Denmark), can sustain more people. This requires the supply of subsidized modern inputs (e.g. irrigation, fertilizers) and the credit that may be needed to purchase such inputs. The failure to supply inputs severely restricted the viability of the redistributed holdings and the effectiveness of various land reforms, such as the Mexican land reform after 1958 (Mexico case study), the Chilean land reform under the Allende government (see Box 2) and the Indian land reform after independence in 1947 (India case study).

Another way to sustain the viability of small holdings is to encourage investment in land quality improvement. Land degradation is a serious problem in many poor developing countries, such as Ethiopia (see Box 4). Measures to prevent land degradation (e.g. prevention of top soil erosion through appropriate management of water and forestry) and programmes to enrich depleted land (e.g. replenishment of soil nutrients) would be important. In Germany, the state-supported Hypotheken Banks provided loans for land quality improvement. In Japan after World War II, Japan Hypothec Bank, established in 1897 on the German model, and regional agricultural and industrial banks provided loans to encourage land improvement (Sugihara, 1996, p. 156).

The second democratic government of Chile (1994–2000) implemented the Recuperation of Degraded Soils Programme (PRSD), which provided subsidies to activities aimed at recovering the levels of phosphorus and vegetative cover and reducing the levels of acidity, erosion or other chemical or physical soil deterioration (Chile case study).⁷ Ghana tried a similar scheme but had relatively little success, unlike the success it had in the area of rural credit. In Ukraine, the neglect of land quality maintenance during the transition period resulted in a serious decline in land productivity that especially threatened the viability of small farms (Ukraine case study).

Box 4: Land degradation in Ethiopia

Although Ethiopia is said to be endowed with enormous biophysical potential, it is one of the countries most affected by land degradation. Expansion of crop land into forest and marginal lands, and overgrazing are the most important degrading factors, which in turn are caused by an increased population pressure and lack of technological progress.

For instance, the average gross soil loss in the country is currently estimated to be 1 493 million tonnes per year; fifty percent of the soil loss was from cropland and 20 percent was from grazing areas. This has led to an even greater horizontal expansion of cropland and hence worsening land degradation. A study published in 2005 estimated the cost of on-site soil loss to be between 2 and 6.75 percent of agricultural GDP per year. A 1997 estimate by the Environmental Protection Authority estimated that the loss could be as high as 17 percent of the potential agricultural GDP.

Public policies to prevent land degradation have been woefully inadequate. The government of the imperial regime totally overlooked the need for sustainable land management (SLM). SLM practices in Ethiopia started during the socialist regime, in 1973/74. However, they were based on a top-down approach and thus poorly implemented. After market liberalization, the Ethiopian government ignored land management and concentrated on increasing the volume of production. For instance, it has encouraged the expansion of commercial farms and resettlement of drought victims and landless youth in the forest areas, which has resulted in fast depletion of the forest.

Local and international NGOs have tried to fill the gap by implementing environmental rehabilitation and soil conservation programmes. While these programmes have been largely successful, they have been concentrated in the most degraded parts of the country and therefore have remained small in scale. Moreover, these projects lacked continuity because of lack of funding (given the capital-intensive nature of the projects), lack of adequate knowledge and poor commitment of the local government and the community stakeholders.

Source: Ethiopia case study.

⁷ One of the components of this programme was oriented to small-scale farmers and administered by the National Institute of Agricultural Development (INDAP). It subsidized between 50 percent and 80 percent of the cost of the measures and fertilizers needed to overcome soil conservation and rehabilitation problems. Another component of the programme focused on the rest of farmers. It was administered by the Agricultural and Livestock Service (Servicio Agrícola y Ganadero or SAG) and subsidized between 50 percent and 80 percent of the costs for the reduction of soil acidity and the recovery of pasture and phosphorus levels in the soil. The subsidies in this case were allocated through competitive biddings.

Policies can be implemented to consolidate dispersed plots that constrain productivity by preventing mechanization and wasting the farmers' time in moving from one plot to another. Sweden in the early to mid-nineteenth century (Freund, 1946, pp. 124-5; Tuma, 1971, p. 240), Japan in the early twentieth century (FAO, 1966, p. 13), and the Netherlands in the 1920s (Ingersent & Rayner, 1999, p. 30) all implemented policies to encourage consolidation of plots. More recently, certain Indian states – notably Maharashtra, Punjab and Uttar Pradesh – “took the programme of consolidation of fragmented holdings quite seriously” (India case study). In contrast, Hungary's failure to pay attention to this issue in the process of post-socialist land reform has resulted in an average property of about 3 hectares consisting of five to six allotments in different locations. This fragmentation is deemed to be “one of the largest obstacles to rational land use in Hungary” (Hungary case study).

4.1.2 Knowledge: research, extension, education and information

Like all other economic sectors, agriculture requires better technologies to increase productivity. Of course, farmers have always innovated technologically, including through selective breeding and making improvements in agricultural implements. However, from the nineteenth century, technological improvements in agriculture have become more systematic and scientifically-based, making it very difficult, if not totally impossible, for individual farmers to conduct them on their own. Deliberate and organized research is needed now to produce better technologies in agriculture.

Once research produces new technologies, they need to be passed on to farmers. This process requires many institutions and organizations to demonstrate the value of the new technologies and teach the farmers how to use them; these are collectively called “extension services”. The farmers need to be educated so they can better apply the technologies and also engage in incremental innovations. In the process, farmers need to be exposed to information that will raise their awareness about new technological opportunities and shifting demand patterns. Therefore, a whole set of institutions and organizations have come to be needed for technological improvements in agriculture.

Due to the public goods nature of knowledge, the market tends to under-invest in the generation of new knowledge. This justifies public intervention – either direct state provision or subsidization. Increasing costs of producing and disseminating knowledge have made public involvement even more necessary, because many of these activities are moving beyond the reach of individual farmers or even farmer cooperatives. Therefore, public intervention in providing research, extension, education and information has become more important.

The NCW recognizes the problems involved in producing and extending new agricultural technologies through the market mechanism. However, it believes that market failures that justify state intervention in providing knowledge are not very serious and it has therefore strongly promoted involvement of the private sector in providing knowledge.

The result of following the NCW often has been severe cuts in agricultural research and extension budgets, even when it does not actively recommend such action. The NCW has always emphasized budget balancing, which leads to cuts in expenditures. Of course, this applies to every sector, but agriculture has been hit particularly hard by these cuts, because the agricultural ministry is politically weak in most countries (not just in relation to the finance ministry which holds the purse strings, but also in relation to other spending ministries). Also, cuts often were made in agricultural research and extension because these are long-term expenditures and so cuts in these areas might not have many visible short-term consequences. These tendencies were

compounded by the cuts made in the agricultural components of foreign aid that these countries received.

When countries followed the NCW and privatized or liberalized providing knowledge in agriculture, the results have been disappointing, to put it mildly. In many cases, there simply were not enough private firms to fill the gap left by the state's departure in these activities, especially in research and extension. For example, in Mexico, NCW policies have resulted in insufficient provision of agricultural knowledge and other public goods needed in the sector, such as infrastructure and safety standards.

These examples contrast with the fantastic successes that publicly-led (although not entirely publicly-provided) research and extension services have had in countries like the United States and Japan. Even Chile (which initially privatized and significantly liberalized providing knowledge in agriculture following the recommendations of the NCW) has come to recognize the limitations of the market-based approach and over time has increased public financing and provision of knowledge in agriculture. While it is true that before the rise of the NCW, state-provided research and extension services in some developing countries were inefficient, this was usually because of a lack of funding and qualified manpower, rather than the inherent inefficiency of public provision of these services.

Research

Technology in agriculture is a public good. Its use by those who did not pay for it is difficult to prevent (this is known as non-excludability) and therefore it is undersupplied by the market. However, there is an added difficulty in producing agricultural technologies. Production of knowledge, even if the use of the new knowledge by non-payers can be prevented (e.g. through a patent system), often requires substantial investments. Significant investments may not be a problem when the agent is a large industrial firm or a large commercial agricultural producer, but it can be a crucial obstacle to knowledge production in an agricultural sector dominated by small-scale farmers, which we find in most developing countries. As a result, governments throughout history intent on improving agricultural productivity have been involved in conducting or at least subsidizing agricultural research.

Germany established the first endowed public agricultural research institute in the world in Mockem, Saxony in 1852 (Ingersent & Rayner, 1999, p. 43).⁸ Other European countries that have been most successful in agriculture, such as Denmark and the Netherlands, also heavily promoted agricultural research. In Denmark, the Royal Agricultural Society (established in 1769) started from 1857 to organize "laboratory work of interest to farmers" and "played a leading role in persuading the state to establish in 1858 the Royal Veterinary and Agricultural College" (Ingersent & Rayner, 1999, p. 44). In the Netherlands, in addition to the experimental station at the agricultural university in Wageningen, which was first established as an agricultural school in 1876, five additional experimental stations were set up by the end of the nineteenth century (Ingersent & Rayner, 1999, p. 44). In contrast, the lack of effective public research in agriculture partly contributed to the relatively low productivity growth of French agriculture during this period (Ingersent & Rayner, 1999, p. 42).

⁸ "The Saxon farmers drafted a charter for the station, which the Saxon government legalized by statute, and secured an annual appropriation from the government to finance its operation, inspired by the works of J. von Liebig, the German chemist who pioneered the development of artificial fertilizers". (Ingersent & Rayner, 1999, p.43).

At least since the 1860s, the United States 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 establishing land grant colleges in 1862, which were obliged to provide agricultural research) (see Box 5).

Box 5: Agricultural research in North America

The United States has had the most success in agricultural research. The first Agricultural Experiment Station (AES), which provided publicly-funded agricultural research, was set up in Connecticut in 1877. In 1887, Congress passed the Hatch Act to provide federal grants to state governments to create AESs. Since most AESs were attached to land grant colleges, this Act promoted the integration of teaching and research. By 1893, there was at least one station in each state and 56 in all (Gras, 1925, p. 390). In 1925, the Purnell Act provided more financial support for AESs, including for research on “economic and social problems of agriculture”. (USDA website <http://www.ars.usda.gov/is/timeline/1920chron.htm>).

The activities of the AESs were supplemented by the research provided by the Agricultural Service of the United States Department of Agriculture (USDA). The USDA acquired Cabinet status only in 1862, which is surprising given the importance of agriculture in the country at the time (Ingersent & Rayner, 1999, p. 63).⁹ In addition to conducting public research, the USDA also has provided R&D subsidies to the private sector since 1889 (Ingersent & Rayner, 1999, p. 58).

Canada is another country that benefited from public research in agriculture. In 1886, the country started five experimental stations. By 1936, there were 33 experimental stations and farms, 14 substations, 11 branch laboratories and 233 illustration stations. In 1937, the research function was split between the Experimental Farm Service and the Science Service (including botany, plant pathology, etymology, bacteriology and chemistry) (Estey, 1988, p. 53). However, this split created problems because the Experimental Farm Service was considered low-grade, while the Science Service became increasingly detached from the real world. In 1959, the Canadian government, recognizing this problem, merged all research activities into the Research Branch, except for animal diseases (the research on which was done by the Production and Marketing Branch) and agricultural economics (which was dealt with by the Administrative Branch). Federal illustration stations were phased out (Estey, 1988, p. 54).

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

However, lack of resources has severely constrained public support for agricultural research in many developing countries. Even when they have financial resources for agriculture, governments [in poor countries] 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 (Zambia case study).

⁹ Ingersent & Rayner (1999) argue that the research conducted by the USDA, which tended to focus on biochemical research, had little impact because agricultural technological progress in the United States was at the time mainly based on mechanization (p. 73).

Donor financing is an obvious solution to this problem, but this raises questions about programme sustainability. The end of donor funding usually means the end of whatever programme it was supporting. For example, over the last decade or so, Ethiopia has vastly increased expenditure on agricultural research with the help of donor financing. Public expenditure on agricultural research went up from around 0.75 percent of agricultural GDP (or 0.35 percent of GDP) in the late 1990s to 3 percent of agricultural GDP (or 1.3 percent of GDP) by 2002/03. However, donor funding (from the World Bank and the International Fund for Agricultural Development) accounted for 30–66 percent of this between 1998/99 and 2005/06, which raises serious questions about sustainability (Ethiopia case study).

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 (Ethiopia case study). Moreover, research could be poorly organized. For example, in Hungary under socialism, considerable resources were put into agricultural R&D, but the results were less than impressive partly because they were not mainly driven by consumer demands and partly because there was little international cooperation (Hungary case study). Similar problems were observed in Ghana, including the lack of coordination among research projects conducted by universities and other academically-oriented entities, the de-linking of research from the real world and the absence of links with extension services (Ghana case study).

Interestingly, India's experience shows that financial constraints need not totally bind. Despite spending relatively small amounts of resources in agricultural R&D (0.22 percent of agricultural GDP in 1980–1985 and 0.33 percent in 2002, compared with 0.49 percent in China or 1.3 percent in Ethiopia in 2002/03), India has managed one of the most comprehensive and successful publicly-organized agricultural research programmes in the developing world, not least because it deliberately learned from successful historical cases like the United States (see Box 6).

Of course, public research need not all be conducted by national governments. Ghana has 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 (Ghana case study). The research behind the Green Revolution of the 1960s and 1970s was done with international public money for rice by the International Rice Research Institute (IRRI) in the Philippines (jointly founded by the Philippines government and the Ford and Rockefeller Foundations in 1960) and for wheat by the International Maize and Wheat Improvement Centre in Mexico (jointly founded by the Mexican government and the Rockefeller Foundation in 1943).

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 dissemination (e.g. demonstrations, teaching how to use it, troubleshooting). However, technical support is particularly important in agriculture because it is necessary to adapt technology to the variations in climate and soil conditions in different localities. Therefore, agricultural technology transfer requires the presence of agents who understand the technologies and the local conditions; these “extension services” became particularly important in the nineteenth century with the rise of scientific methods in agriculture.

Box 6: Agricultural research in India

India started systematic efforts to develop agricultural technology at the beginning of the twentieth century. However, these efforts were given a fillip after India's independence in 1947.

Three major organizational developments are noteworthy in this regard: the establishment of an apex organization, the Indian Council of Agricultural Research (ICAR), the establishment of state-level agricultural universities patterned after the United States' Land Grant Colleges and the launching of All India Coordinated Research Schemes in commodities and farming systems. These three organizations complemented one another. The ICAR overviewed the research needs of the country and set the national research agenda. The agricultural universities took a more desegregated, regional view and integrated teaching and research to ensure a close liaison between basic scientific research and applied agricultural research. The All India Coordinated Research Schemes for commodities, located in different soil-climatic zones, enabled experiments to be conducted in different environments, providing cross-sectional results to scientists working on different aspects of a commodity.

The Indian Government also gave special attention to improving the working conditions of the agricultural scientists and raising their emoluments. An All-India Service of Agricultural Scientists was created, enabling scientists to reach top positions in the bureaucratic hierarchy, which earlier were the preserve of generalists in the Indian Administrative Service. This arrangement opened new avenues of promotion and accorded prestige and recognition to the agricultural scientists.

By the early 1960s, when high-yielding varieties of wheat and rice were developed in CIMMYT and IRRI, the agricultural research establishment in India was in a position to select, cross and adapt useful varieties. Studies made in the early to mid-1970s indicate that the annual rate of return on the investment in agricultural research was above 60 percent.

However, since the Green Revolution petered out in the 1980s, India's large, well-trained, scientific workforce and its long tradition of systematic research have not been able to raise agricultural productivity to any measurable extent. Moreover, the cuts in the government research and extension budget, following the macroeconomic adjustment in the early 1990s reform, adversely affected agricultural research.

Lack of resources is only one of the problems facing the Indian agricultural research system. The 2006 report by the high-powered National Commission on Farmers presents a long list of problems, including:

- excessive emphasis on developing seeds;
- absence of research on "poor men's crops" (e.g. coarse cereals and pulses) or non-grain sectors (e.g. horticulture, floriculture, sericulture, animal husbandry, forestry and fishery);
- failure to take sustainability seriously;
- lack of attention to economizing the use of costlier and/or scarce factors of production (e.g. fertilizers, irrigation water and farm energy);
- bureaucratic interference in scientific work;
- rigid and hierarchical organization of the scientific establishments;
- lack of coordination among different national and international research organizations;
- lack of coordination between research and extension;
- lack of involvement by the likely beneficiaries of the research.

In recent years, private research, mainly in high-quality seed production, has become important. However, its development also owes a lot to public intervention. The private sector has been given financial incentives (e.g. tax concessions on R&D expenditures and low import duty rates on equipment for R&D) and free access to public research products (e.g. plant varieties).

Source: India case study

The idea of extension services started in the United Kingdom in 1843 (Rothamsted), but Germany was the pioneer in widely implementing the idea. According to van Zanden (1991), “although the first agricultural experimental station had been set up in Rothamsted in 1843, it was the Germans who set the example in the organization of a more or less nationwide system of agricultural research and extension services, largely sponsored by the state” (p. 237). In contrast, Britain and France, despite their relatively advanced bases of manpower, did not really start agricultural extension services until World War I, which is one of the reasons why countries like Germany and Denmark, which provided better extension services, caught up during this period in terms of agricultural productivity.¹⁰

Like Germany, Sweden and Denmark used itinerant instructors to spread better agricultural technologies. In the Netherlands, a state extension service was developed in the late nineteenth century, alongside agricultural education (Ingersent & Rayner, 1999, p. 45). The government of the Netherlands introduced extension services in 1890, first in crops and then in horticulture and dairy production. Even though there were fewer than 40 agricultural consultants for the whole country (32 in 1907 and 36 in 1913), they supervised hundreds of experimental plots – only one in 1890, but rising to 809 in 1905 and 1 020 in 1910 (Knibbe, 1993, pp. 161-162).

The United States also took extension services very seriously. Economically more advanced states, like New York, set up extension services in the form of a farmers’ institute in the late nineteenth century (Colman, 1965, p. 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 demonstrations (p. 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 fewer farming households) (FAO, 1966, p. 28) (Box 7).

Unfortunately, extension services in many developing countries have been of poor quality. In many countries, they have been underfunded and poorly coordinated with agricultural research. During the 1980s and 1990s when the NCW was dominant, the few remaining extension services suffered from severe funding cuts (including cuts in salaries for extension workers, which made many qualified people leave the service) and diminishing affordability for small-scale farmers because the subsidy elements were cut or even totally eliminated.

The experience of Chile, which was a pioneer in implementing NCW policies in many (although not all) aspects of agriculture, clearly shows the limitations of the market-oriented approach to extension services. In 1976, the Chilean government privatized extension services. It provided special credits to former public employees, mainly extension officers, to set up private-sector extension firms. The scheme, which still exists today, provided a government subsidy of 80 percent for small-scale farmers. However, since farmers rarely pay the remaining 20 percent, the service providers tend to receive only the subsidy. The end result has been that the privatized scheme is covering the same number of farmers as before with equally low quality (Chile case study). More recently (around 1983), the limits to privatized extension service were recognized

¹⁰ In 1870, Germany had lower land productivity (i.e. production per hectare, in wheat units) and lower labour productivity (i.e. production per head, in wheat units) than both France and Britain. In 1910, its land productivity was higher than that in both of those countries and its labour productivity was higher than that of France (although not 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.

and a strong state-backed extension programme targeting medium-sized farmers was established, involving the National Agriculture Research Institute (INIA) and the National Institute of Agricultural Development (INDAP) (Chile case study).

Box 7: Agricultural research and extension in Japan

Japan promoted public research in agriculture very early, despite its relatively backward research capabilities. In 1885, the Japanese Government set up the Experimental Farm for Staple Cereals and Vegetables, which, in 1893, was renamed the National Agricultural Experimental Station. In 1899, many prefectural governments (at the time there were 47 of them) set up prefectural experimental stations with the help of subsidies from the central government.

What made Japan's public research in agriculture particularly effective was the strong cooperation between the central and lower-level research stations, which enabled the country to develop technologies better suited to local conditions (FAO, 1966, p. 14). For example, promising varieties of wheat developed by the central experimental station were handed down to four regional stations, which then developed other varieties suited to the regional conditions. The regional stations would send these varieties to prefectural stations, which developed more varieties suitable for the local conditions. These varieties would be handed down to tertiary stations, which would then recruit experienced farmers to try the new varieties. Only when these trials were successful would the new varieties be widely distributed through the agricultural cooperatives. As mentioned in the 1966 report by the Food and Agriculture Organization of the United Nations (FAO), the fact that no single variety accounted for more than 10 percent of wheat output at the time is an illustration of the effectiveness of the system in encouraging local adaptation (p. 14).

Another factor that enhanced the effectiveness of public agricultural research in Japan was the close link between research and extension. In addition to conducting research, Japanese experimental stations also directed the extension activities of the agricultural associations and trained the technicians from the associations (FAO, 1966, pp. 15-16). In this way, farmers had quicker access to state-of-the-art technologies and the researchers got quicker and better feedback.

Extension service *per se* in Japan was established only in 1948, but "extension-type" activities date from the early Meiji period (FAO, 1966, p. 15). In 1880, the Department of Agriculture and Commerce instructed all prefectural governors to promote agricultural improvement societies. In 1881, the department appointed some outstanding farmers as teachers at Komaba Agricultural College (which became the School of Agriculture at Tokyo University). Other outstanding farmers were hired to tour the country to demonstrate improved techniques. In 1885, the "itinerant instructor system" was established nationwide. With the formal establishment of the Extension Service, extension activities got further impetus and by the 1960s, there was one extension worker per village (compared with one per county in the United States) (FAO, 1966, p. 28).

Sources: Sugihara, 1996 and FAO 1966

Ghana's experience shows how privatization of extension services may put extension services beyond the reach of most farmers, not just financially but also geographically. When Ghana privatized veterinary services, all those who offered the services located themselves in urban areas, making it impossible for farmers in remote regions to use the services, even if they could afford them (Ghana case study). However, the case of horticultural extension services in Ghana (see Box 8) shows that even in countries with poor funding and lack of personnel for extension services generally, success in particular sectors is possible if resources are focused and if a programme is well-designed.

Box 8: Extension services for agricultural export sectors in Ghana

Extension services in general have been of rather poor quality in Ghana. They are poorly coordinated with agricultural research and suffered from lack of funding until the 1990s, when the country's agricultural policy was run mostly according to the NCW. Today, there are 2 500 farmers per extension worker (compared with about 100 farmers in Japan in the 1950s and 1960s – see Box 7). The Ministry of Food and Agriculture's desire to reduce this to 800 farmers per extension worker has been thwarted by a lack of budget.

However, Ghana has experienced considerable success with more specialized extension services for export-oriented agricultural sectors, although those experiences still reveal certain limitations of the NCW approach to agricultural extension.

The Ghanaian Government implemented a World Bank-funded Agricultural Services Subsector Investment Programme (AgSSIP) from 2001–2006. Influenced by the World Bank's wish to increase private-sector participation in extension delivery, a tender system was organized and NGOs were selected initially to provide extension to farmers in five districts. However, since the selected NGOs had no permanent extension staff of their own, they poached staff from the Ministry of Food and Agriculture to carry out their mandate. Furthermore, the project collapsed after the end of AgSSIP for lack of funding. In 2004, the Ghanaian Government requested a restructuring of the original AgSSIP programme and added what came to be known as the "new initiatives". These included rehabilitation of irrigation schemes, establishment of mechanization centres, development of fishing landing sites and the horticulture exports industry initiative (HEII).

The HEII, which promoted horticultural non-traditional crops such as pineapple, mango, papaya, chilli and Asian vegetables, was particularly successful. It provided appropriate seeds and other planting materials (such as MD2 pineapple suckers) and helped farmers source, test, propagate and multiply those materials. It also promoted food safety and quality management by publishing a list of acceptable pesticides for export products.

Following the success of the HEII, the government negotiated with the African Development Bank in May 2006 to design and implement another project, the Export Marketing and Quality Awareness Project (EMQAP), to further improve extension delivery in the horticultural industry. A variety of instruments are being used, including establishing demonstration farms, increasing production of MD2¹¹ pineapple suckers and quality seeds of other horticultural crops, training (e.g. for farm workers, extension personnel, seed inspectors and other private entrepreneurs and exporters' associations), and developing materials to facilitate the training sessions (e.g. handouts, leaflets, CDs and video clips). The EMQAP also offers marketing support, including supplying free cold delivery vans for the pineapple exporters, branding Ghana in the international markets, providing equipment to the Ghana Standards Board to conduct residue analysis, and establishing cold chains in each of the regions covered by the project.

Source: Ghana case study

Education

Extension of new knowledge will be most effective when farmers are able to absorb new knowledge successfully and even make incremental improvements to it. This requires educated farmers (although the success of the Green Revolution in India in the 1960s and the 1970s, when the literacy rate was rather low, cautions us against overemphasizing formal education). Given

¹¹MD2 is a pineapple variety developed by Del Monte.

this, it is not surprising that public intervention in educating farmers (either through direct provision or subsidies) has played a crucial role in all agricultural success stories throughout history.

(a) General education

General rural education is the basis for improving farmers' productive capabilities. Denmark was a pioneer in this regard. It introduced eight-year compulsory schooling countrywide (between the ages of 6 and 14), following the 1814 Elementary Education Act. In 1849, primary education became free for poor children (Henriksen, 1992, p. 162). As a result, by 1870 the majority of the Danish rural population could read (Henriksen, 1992, p. 163). Since the 1840s, the Danish government has spread secondary education in the rural areas by encouraging Folk High Schools¹². In 1868, the state expanded access to secondary education even further by granting scholarships for Folk High Schools to poor students (Tracy, 1989, p. 111). Germany also introduced compulsory basic education in the late nineteenth century (Tracy, 1989, p. 103).

Today most developing countries recognize that education, including in rural areas, is important. For example, Viet Nam's Government has contributed considerably to the country's agricultural development through continued investment in rural education (Viet Nam case study).

(b) Specialist education

General education is not enough for agricultural development. Farmers often need specialized knowledge in agriculture to create a productive agricultural sector. In many of today's rich countries, agriculture was taught in general secondary schools in rural areas (e.g. in New York state in the United States) (Colman, 1965, p. 49). Many of them also established specialized agricultural secondary schools. In the late nineteenth century, Denmark created specialist agricultural schools, which ran for only the five winter months, and by 1914, 1 300 students (or 5 percent of the 20-year-olds) attended them (Henriksen, 1992, p. 163). Specialist agricultural schools were set up also in Japan (FAO, 1966, p. 16), Sweden and the Netherlands (FAO, 1950, p.8).

In many of today's rich countries, governments tried to improve farmers' knowledge even after they left school. In the second half of the nineteenth century in Germany, "considerable development of agricultural education occurred at different levels extending from universities to full-time agricultural schools and part-time 'winter schools'" (Ingersent & Rayner, 1999, p. 43; also see Blackbourn, 1997, p. 315). In the 1890s, the Dutch Government also introduced winter courses, providing 150–225 hours of education over one or two winter seasons; by 1920 these courses covered 5 percent of the farmers in the relevant age group (Knibbe, 1993, p. 163). Sweden also set up schools that educated farmers in the 1860s (Micheletti, 1990, p. 40). In the United States in New York, the state government supported the establishment of a farmers' institute and a winter dairy school (Colman, 1965, p. 43). Even in France, which was a laggard in agricultural research and extension, most *départements* created winter schools in farming techniques by the first decade of the twentieth century, although attendance was limited to a few thousand pupils (Tracy, 1989, p. 78).

In many of these countries, the government went further and promoted agricultural studies in universities. The most striking example in this regard is the United States. After the Morrill Act of

¹² Folk high schools are secondary schools that are not part of the formal school system but are essentially "adult education institution" for those who missed out on secondary education. (As defined by Author).

1862, the United States set up land grant colleges, which were mandated to promote agricultural teaching and research (Lee, 1963; also see Ingersent & Rayner, 1999, p. 43). All land grant colleges were given public land in their states or the rights to public land in other states (if there was insufficient public land in their own states) to finance themselves. In New York, the agricultural college of a private university (Cornell University) was given a land grant and thus effectively “nationalized” (Coleman, 1965, p. 44).

The French Government, under Charles X, set up the Institution Royale Agronomique in 1826. The Danish Government established the Royal Veterinary and Agricultural College in 1858 (Ingersent & Rayner, 1999, p. 44). In the Netherlands, the first state agricultural school was set up in 1876 in Wageningen, expanded in 1906 to cover horticulture and forestry and subsequently granted university status in 1918 (Ingersent & Rayner, 1999, p. 45 and van Zanden, 1994, p. 185). In 1881, the Japanese Government’s Department of Agriculture and Commerce established Komaba Agricultural College, which later became the School of Agriculture at Tokyo University.

Specialist agricultural education does not receive the same kind of emphasis at the secondary and tertiary levels in today’s developing countries, largely because of the excessive emphasis that the NCW has placed on primary education. The experiences of the developing and transition countries studied by our project show how the failure to provide adequate education to farmers at these levels can hold back agriculture.

In Ghana, the austerity measures taken during the Economic Reform Programme (ERP), implemented in 1983, led to the collapse of the farm institutes that were training young farmers and the agricultural colleges that were training extension staff (Ghana case study). In Ukraine, the state’s withdrawal during the transition period led to a collapse in agricultural education and training. In 2000, Ukraine was training only 9.1 percent of tractor operators and 7.7 percent of drivers compared to the number of graduates in 1993 (Ukraine case study). Managers of agricultural enterprises with higher education fell from 90.5 percent in 1995 to 55 percent in 2001–2005. Our Ukraine case study bluntly concludes that “the processes of qualitative renewal of productive human capital almost stopped in agriculture”. This does not bode well for a sector that was just coming out of a major collapse – agricultural output in 1999 was 53 percent of the 1990 level, which, even after a 26 percent increase between 2000 and 2005, means that the 2005 output was only two-thirds of what it had been in 1990.

Information

Educating farmers raises their capabilities to use new knowledge. However, without the availability of good information, heightened intellectual capabilities cannot realize their full potential. Extension services are one means of providing such information, but there is also a need to provide information that is less technical than what one would normally expect from extension services.

In today’s rich countries during the late nineteenth and early twentieth centuries, one common method of providing better information to farmers was organizing agricultural fairs, where prizes were given to those who produced high-quality outputs and exhibitions presented new agricultural implements and inputs. Agricultural fairs in the United States are famous, but other countries (e.g. Japan and the Netherlands) also used them actively (FAO, 1966, p. 16). The Netherlands organized its first international agricultural exhibition in 1884 (Knibbe, 1993, p. 161).

Governments in these countries also provided information on weather, harvests and prices, and conducted censuses that provided detailed information about the state of the agricultural sector

(FAO, 1950, p. 10). In 1900, the Dutch Government set up an “intelligence service” on the harvest and the state of the crops (Knibbe, 1993, p. 164). The collected information was sometimes disseminated in an innovative and user-friendly way. The legendary BBC radio drama, the Archers, was started in 1951 in collaboration with the Ministry of Agriculture as a means to impart relevant agricultural information to farmers.¹³

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 (Zambia case study).

4.1.3 Credit

Due to the seasonal nature of agricultural activities, farmers’ flows of incomes and expenditures are highly variable. For small-scale farmers with little capital, the availability of credit is crucial in being able to smoothly manage the production and consumption processes. If they are to raise productivity, credit is even more necessary to buy more marketed inputs (e.g. fertilizers, machinery) and possibly to invest in infrastructure (e.g. digging wells).

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

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

For these reasons, providing credit to small-scale farmers has been one of the most important challenges facing policy-makers in the early stages of economic development. Various solutions were adopted by different countries, but typically specialized rural banks were established by the state or subsidized by it, rural lending requirements were imposed on public and private banks, and credit coops were promoted.

The NCW believes that, if left to the market, an adequate amount of credit will be provided to almost everyone in most circumstances. At best, it will concede that small-scale farmers may have risks that are too high for the private financial institutions to lend to them. It would argue, however, that the problem can and should be solved by encouraging the group-lending arrangements seen in currently fashionable microcredit schemes, without recourse to government-directed lending (to particular groups, including small-scale farmers) or subsidized interest rates. Consequently, the promoters of the NCW have pushed for the expansion of profit-seeking, private-sector financial institutions and some microfinance.

¹³ I thank Claire Melamed for pointing out this to me.

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

Fortunately, the World Development Report (WDR) 2008 shows that the NCW has significantly changed its position on rural credit. WDR 2008 accepts that when it comes to agricultural financing "[t]he range of alternatives is broad" (p. 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" (p. 145) and talks about the re-emergence of financial cooperatives as "promising institutions in rural finance" (p. 146). Its enthusiasm with microfinance institutions (MFIs) has also been tempered – WDR 2008 explicitly says that "MFIs cannot ... provide the mainstay of rural finance" (p. 145).

It is truly encouraging that the supporters of the NCW are revising their views on rural credit, although it will take some time for what the World Bank says in its intellectual reports to percolate down to field practices. As we shall see below, experiences show that it is crucial for the government to be significantly involved in providing agricultural credit. The simple fact is that without some subsidy elements and/or mandatory lending to small-scale farmers, private-sector financial institutions are not going to extend enough credit to them.

Specialized banks

One common method of providing agricultural credit, which also is often the most effective, is through specialized, 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 1860s), German states (which were not yet unified) supported the establishment of about 30 mortgage banks (*Hypothekenbanken*), especially by granting them limited liability, which was not yet generalized (Friedriksen, 1894, pp. 62-3; Cecil, 1979, p. 12). Although they would lend for urban real estate as well as farming land, they helped farmers borrow in order to acquire land and invest in drainage and livestock (Friedriksen, 1894, p. 75). The Norwegian Government also set up a mortgage bank as early as 1851 (Sejersted, 1992, p. 70) and France (*Crédit Foncier*), Denmark and Sweden adopted the same kind of institution.

However, the ratio of mortgages to the value of property in Germany (approximately 50 percent) was much higher than in other European countries, suggesting that Germany's mortgage banking was more developed than others (Friedriksen, 1894, p. 75). Japan also followed the German model and established the Land Mortgage Bank (or Japan Hypothec Bank) in 1897, especially enabling financing for land improvement projects (Sugihara, 1996, p. 156).

The development of a rural credit system in the United States was slow compared with other countries, but finally 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 Box 9).

Specialized agricultural or rural banks have been much used in developing countries throughout the post-World War II period with mixed results. This has prompted many people, especially the supporters of the NCW, to condemn such banks and, more broadly, the idea of subsidized agricultural credit. However, as the experience of Zambia shows (see Box 10), private-sector financial institutions are not much better at managing rural credit. Moreover, if they are properly supported, specialized agricultural banks can perform well. In 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 themselves). 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 subsidized computer equipment provided by the central bank (Ghana case study).

Box 9: The rural credit system in the United States

Despite rapidly becoming the most economically advanced nation in the world, the United States lacked a good rural credit system until the early twentieth century, causing great difficulties for small-scale farmers and holding back further agricultural progress. In 1908, the Country Life Commission appointed by Theodore Roosevelt talked of “a lack of any adequate system of agricultural credit” (Cochrane, 1979, p. 289). Until 1913, national banks were not allowed to lend money on farm mortgages, so agricultural credit was provided by small state banks at high interest rates.

Finally, in 1913 national banks were allowed to lend money on farm mortgages. In 1916, the Federal Farm Loan Act created 12 Federal Land Banks to make long-term mortgage credit available to farmers on realistic terms. However, these banks did not lend to individuals but only to cooperative borrowing groups. In 1923, the Intermediate Credit Act created 12 Intermediate Credit Banks to make loans to co-ops and farmers’ associations, which were then to make loans to farmers. These banks were slow to take off, but became an important source of operating credit for farmers by the 1930s.

The most comprehensive reform came in 1933, at the height of the Great Depression and the farm crisis through the Farm Credit Act, which still forms the backbone of the United States farm credit system. The system included 12 land banks making mortgage loans, 12 intermediate credit banks making production loans, 13 banks making loans to co-ops and 12 production credit corporations to mediate between farmers and intermediate credit banks. The United States federal government subsidized the system by refinancing farm mortgage institutions other than the Land Banks and also cutting interest rates and extending the due dates for Land Bank loans. In 1935, the federal government introduced the Supervised Loan System for poor farmers, in which loans came with inputs and extension services: this was not very successful partly because the farmers lacked management skills.

In designing the system, the United States learned from missions it sent to Germany and Scandinavia: “Two commissions, one private and one appointed by President Wilson, went to Europe in 1913 to study agricultural credit and cooperation in Northern Europe” (Cochrane, 1979, p. 289).

Source: Cochrane, 1979, pp. 289-91.

India has also made considerable progress in delivering credit to small-scale farmers through a network of nationalized banks (India case study). However, with financial liberalization in the 1990s, the Indian banks started to shun the agricultural sector; the share of small loans in banks’ portfolios declined and the number of rural branches of public and private commercial banks stagnated, although they didn’t decline. As a result, the India case study concludes, “the role of

credit to empower the poor by enabling them to have access to goods and services which was a unique feature of Indian banking was for all practical purposes abandoned”.

Box 10: Zambia’s struggle to develop the rural credit system

Rural finance throughout Zambia’s post-independence history was a huge failure. Part of the problem is that it was linked too much to maize production to the exclusion of other farm and rural enterprises. This means that rural finance was merely a tool for increasing maize production, which was wrongly seen as the only way to attain household food security, at the neglect of other food crops such as cassava, mixed beans, sweet potatoes, sorghum and millet.

By 1994, it became clear that the system had become unviable, with the three lending institutions – Zambia Cooperative Federation Financial Services (ZCF-FS), Credit Union of Savings Associations (CUSA) and Lima Bank – owing the government a total of US\$85.2 million. Their recovery rates of 10 percent, 23 percent and 35 percent in the 1993/94 season gave little hope that these loans could ever be repaid. The government gave up on these institutions and sought to provide credit through private institutions such as SGS Limited and Cavmont Merchant Bank between 1994/95 and 1996/97.

However, the recovery rates by the private-sector banks were equally disappointing, with none of them exceeding 40 percent. Given these disappointing results, the government opted not to be further involved in providing fertilizer credit in the 1997/98 season. In the 1998/99 season, the government delivered fertilizer credit through the Food Reserve Agency (FRA) which subcontracted a private company to distribute it to 150 depots across the country.

The underperformance of rural credit institutions in Zambia led to a decline in the number of smallholder farmers who received credit from 13.2 percent in the 1993/94 season to only 7.5 percent in the 1997/98 season. The emergent commercial farmers were the hardest hit – the proportion of commercial farmers receiving credit declined from 40.7 percent in the 1993/94 season to 22.8 percent in the 1997/98 season. Because much of the credit was linked to farm inputs, particularly maize hybrid seeds and fertilizer, there was a significant drop in the number of farmers accessing these inputs. After 1999, rural credit was playing only an insignificant role in stimulating agricultural production.

The Zambian Government has nevertheless continued to search for a way of revitalizing rural finance. Smallholder Enterprise and Marketing Programme (SHEMP), Zambia Agriculture Technical Advisory Centre (ZATAC) and Cooperative League of the United States (CLUSA) have developed a range of instruments to help small-scale farmers access credit, including the discounting of warehouse receipts, loan guarantees, inventory receivable financing and export-credit financing. More recently, promoting outgrower schemes is seen as a way to help small-scale producers access input advisory services. In 2005, a rural finance programme to be funded by the International Fund for Agricultural Development (IFAD) was designed to run for seven years.

Despite this progress in improving access to short-term working capital, producers still have difficulty accessing long-term financing. The lack of long-term financing is a particularly serious problem for coffee, which takes about four years to mature. There is no long-term financing suitable for coffee growers at the moment.

In response to this problem, the European Investment Bank (EIB) and the International Development Association (IDA) have made available through commercial banks long-term financing whose repayment period could last up to seven years. However, until 2005, both funds were undersubscribed due to the conditions attached to the loans.

Source: Zambia case study

As distant and recent historical examples show, subsidized credit does not guarantee agricultural success; however, agricultural success without it is impossible to achieve. The case of Zambia

(see Box 10) clearly attests to this. Even Chile in the 1980s, when the country was very rigidly following the NCW, provided subsidized credits to small-scale farmers through the National State Bank and INDAP, an agency that was created in the early 1960s to help small-scale farmers (Chile case study). These credits were provided at positive real interest rates, but at reasonable levels (i.e. 7 percent per year), with repayment periods in accordance with the agricultural production cycle.

Support for credit cooperatives

Improving small-scale farmers' access to credit does not have to involve state provision or subsidies. Historical examples, especially in today's rich countries, show that this can be done through cooperatives. Credit cooperatives are not to be confused with microfinance institutions, even though they both involve group responsibility and solidarity. Microfinance institutions, unlike credit cooperatives, are run on profit motives and often charge interest rates – at 70 percent, 90 percent or even higher – that only can be described as usurious.

The agricultural cooperative movement emerged spontaneously in today's rich countries (with the exception of Japan) in the late nineteenth century (see Box 11). There were many different types of co-ops providing activities like joint marketing, joint production, joint input purchase, irrigation and drainage, product quality control, timeshare for machines and credit. Denmark was a pioneer in marketing and production co-ops, while Germany led the way in the development of credit co-ops.

Cooperative banks first emerged in Germany in 1864 in response to the tendency of the *Hypothekenbanken* to lend only to large farms (Tracy, 1989, p. 103; see Box 11 for further details). The idea quickly spread to other countries and their governments started supporting them.

Credit co-ops spread in Denmark and Norway from the 1880s (Henriksen, 1992, p. 162 on Denmark and Sejersted, 1992, pp. 70-1 on Norway). In Denmark, they provided 46 percent of total mortgage loans by 1901 (Henriksen, 1992, p. 162). In France, a law was passed in 1894 to support agricultural credit co-ops. In the Netherlands, the first cooperative bank was founded in 1896 and by 1910 there were 600 such banks, with 50 000 members. By 1920 membership tripled, with a cooperative bank in almost every municipality (Knibbe, 1993, p. 150). In 1915, the Swedish Government started to support credit co-ops, known as agricultural banks (*jordbrukskassor*), which specialized in providing operating credit (Ytterborn, 1938, p. 196). As discussed earlier (see Box 9), the United States Government also started to lend to credit co-ops at special rates from the early twentieth century. Japanese and other East Asian cooperatives also played an important role in supplying credit to small-scale farmers (Francks et al., 1999).

Some developing countries, notably India, have promoted credit cooperatives, although with less success than the rich countries mentioned above. For example, the Indian central bank (the Reserve Bank of India) disbursed funds in concessionary terms to cooperatives, which delivered credit efficiently, especially in the Punjab, Bombay, and Madras areas (India case study). Since the 1990s, the Ethiopian Government has supported the formation of cooperative banks (Ethiopia case study). Ghana's innovative rural banks, which are owned half by the local community and half by the government, are an interesting hybrid of state-owned banks and credit cooperatives (Ghana case study).

Box 11: A brief history of cooperatives

The first successful co-op was Britain's Rochdale Society of Equitable Pioneers, founded in 1844. A group of 28 weavers and other artisans in Rochdale set up the society to open their own store selling food items they could not otherwise afford. The idea developed into agricultural co-ops in Germany and Denmark.

Germany was a pioneer in credit co-ops. In 1864, Friedrich Wilhelm Raiffeisen set up cooperative banks, which later came to be known as Raiffesisen cooperative banks after the founder's name, in response to the tendency of the state agricultural bank, or the *Hypothekenbanken*, to lend only to large farms.

Denmark was particularly successful with co-ops (Tracy, 1989, pp. 113-4). Credit co-ops emerged in the 1850s and retail co-ops in 1866. Co-op development in agriculture was facilitated by the transition to livestock production, which necessitated arrangements for rapid and efficient processing and marketing that were beyond the means of the individual small producer. Co-op dairies emerged in 1882 and co-op bacon factories in 1887. Egg export co-ops were started in the 1890s (starting date unclear) and, after the Great Depression, the government subsumed export marketing cooperatives and ran state export boards (Murphy, 1957, pp. 367-8). In addition to product co-ops that helped with processing, marketing, input purchase and machine timeshare, there were also co-ops for irrigation and drainage. The idea spread to all other countries, but Japan developed the generalized co-op that served multiple purposes and thereby better coordinated its activities.

Sweden developed its co-ops almost as early as Denmark, but it was less successful (Ytterbon, 1938, pp. 186-7). The first co-ops emerged in the 1880s in the form of creameries, but they took off only in the 1890s. The 1890s also saw the emergence of input-purchasing co-ops, modeled after the German and Danish ones. In 1899, meat packing house associations emerged, modeled after the Danish ones. In 1915, state-supported credit co-ops (*jordbrukskassor*) were founded. However, up to the 1930s, co-ops developed slowly. The success of co-ops in Sweden was limited by: poor research; lack of standard by-laws, standard accounting, a uniform control and audit system; insufficient paid-in capital; lack of managerial competence; lack of a nationwide marketing plan; the near-absence of informational activity and training; and destructive competition among co-ops. In light of this, the General Agricultural Society of Sweden (the association of co-ops) was reorganized in 1929 to promote collaboration for the cooperative movement (pp. 187-8). The Swedish Government provided financial support for this effort (p. 194).

Co-ops were even slower in developing in the United States. The earliest success was the so-called Grange, or the National Order of the Patrons of Husbandry, which was founded in 1867 (Ingersent & Rayner, 1999, p. 59). It played an important role in getting concessions for rail freight rates in some states in the 1860s and 1870s, getting Cabinet status for the USDA in 1889 and establishing the Hatch Act in 1887 which established the state-level agricultural experimental stations. However, governmental legal support for co-ops was rather slow in coming, unlike in other countries. It was only in the early twentieth century that state laws started to support co-ops in the United States (Ingersent & Rayner, 1999, p. 60). The most important federal legal support came through the 1922 Capper-Volstead Cooperative Marketing Act, which exempted co-ops from anti-trust laws and provided co-ops with income tax privileges.

Japan perfected the co-op idea by developing generalized, rather than specialized, co-ops and using them effectively as an arm of the state (FAO, 1966, pp. 22-5). A law in 1900 authorized co-ops for credit, marketing and purchasing. Initially, credit co-ops were not allowed to do other things, but this restriction was removed in 1906. It opened the way for the development of general purpose co-ops, which are more suited to developing countries because, according to FAO (1966), "they are economical of management and permit a large and more economic scale of operations than would be possible with single-purpose co-ops" (p. 23). The Japanese Government backed their development with legal provisions for warehousing services (in 1919), a national purchasing federation (in 1923) and a central bank for co-op associations (in 1923) (p. 23).

The Japanese co-ops were initially more focused on credit, but by 1920 production co-ops were well-established in selling silk cocoons (more than half of national silk cocoon sales), purchasing fertilizer, distributing grain and warehousing. By the 1930s, co-ops were entrenched as credit agencies (following the bankruptcies of local private banks) and they also channeled government subsidies. However, until World War II, co-ops were dominated by landlords and large-scale farmers and permeated by merchants.

Genuine co-ops for small-scale farmers started after 1947, when the official wartime agricultural associations were dissolved and co-ops were re-established. Unlike before the war, only farmers could become members, which eliminated the influence of the merchants. After this, co-ops really took off and by 1957 co-ops covered every village with sub-branches in each hamlet. In 1956, 50 percent of farm credit came from co-ops (compared with 3 percent in 1914), and this represented 70 percent of institutional farm credit, as many credits were individually organized. Interest rates in 70 percent of the cases, however, were higher than bank rates (FAO, 1966, pp. 24-5).

4.1.4 Physical inputs

Government involvement is needed in providing key physical inputs to agriculture for a number of reasons. First, some of the inputs, such as canal irrigation and transport infrastructure (e.g. roads, railways and, increasingly, airports in countries that export horticultural products) have public goods characteristics and they will be underprovided if left entirely to the private sector. In this case, public provision is the obvious solution, although public-private partnerships, pioneered by Sweden for its irrigation development, should also be explored.

Certain inputs, such as deep-well irrigation and agricultural machinery, may not be public goods but providing them requires significant investments that are beyond the financial means of most farmers. If small-scale farmers with little capital are to use these inputs, they would need state support such as the ability to lease state-owned machines and equipment, state-mediated access to credit to purchase the inputs or subsidies to lower the prices.

Even purchasing divisible inputs that are not subject to problems of public goods or heavy investments – such as fertilizer and other agrochemicals, animal feeds and seeds – may require government involvement. The seasonal nature of agricultural production and the lack of private-sector credit may make even these inputs unaffordable for poor farmers. Even if the farmers have the money to buy these inputs, it may be necessary for the government to maintain product quality standards, as consumers have difficulties ascertaining the quality of inputs even after use.

The NCW does not entirely oppose public involvement in providing 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 providing physical inputs such as fertilizer and seeds.

Whatever the NCW's theoretical position on this issue, in practice, adhering to the NCW has resulted in severe reductions in the use of all types of agricultural inputs. The NCW policies led to a drop in government spending in agriculture, especially in long-term investments in transport and infrastructure whose impacts are slow to show. Partly, this was due to macroeconomic policies, such as a requirement for a balanced budget and excessively contractionary macroeconomic policies that reduce output and thus government revenue. It was also partly because of trade liberalization, which had detrimental effects on government revenue, especially in the poorest countries that relied heavily on tariff revenues. Our case studies show that countries like India and Ghana saw declines in infrastructural investment after the adoption of NCW policies.

The withdrawal of the state has created severe problems in many developing countries even for physical inputs that are private goods, which the NCW thinks can be better provided by the private sector. In some cases, the private sector simply did not show much of the expected supply-side responses. For example, after liberalization in the 1980s in Ghana, private suppliers in the seed markets simply did not emerge. Even when there were private-sector responses, profit-making has made these services inaccessible to disadvantaged farmers. For example, in Zambia, liberalization of seed and fertilizer markets has led to the emergence of some private-sector suppliers, but they do not serve remote areas that are not profitable. In Ghana, some private fertilizer suppliers and tractor services have emerged, but their prices are too high for most farmers.

Irrigation and related services

In most countries, irrigation is most important for reliable agricultural production. Although not all irrigation schemes (e.g. wells) are of a public goods nature, many of them are and this means that government provision and/or subsidization is necessary. Moreover, in organizing large-scale irrigation projects (e.g. canal irrigation), the government's ability to override individual or sectional interests and/or to rearrange property rights is particularly important. Otherwise the transaction costs of organizing such projects might be prohibitive. It is therefore not surprising that in all agricultural success stories, the government has played a key role in providing irrigation infrastructure.

The methods of financing, construction and management for irrigation projects have included different combinations from the public sector, private sector and co-ops and have differed across countries and times.

In France, the centralization of power after the revolution enabled the government to strongly promote the development of irrigation. "After the Revolution the central administration not only had the power to provide promoters of irrigation with the property rights they needed, it also had the power to enforce contracts." (Rosenthal, 1990, p. 632). The French Government sorted out property rights disputes that blocked the progress of irrigation projects and provided engineering advice and administrative oversight, although it provided very few subsidies to irrigation (p. 632).

In Sweden, public-private partnerships developed early to provide irrigation and drainage. This cooperative relationship later provided a template for developing other infrastructure, such as railways, telegraph, telephone and hydroelectric power in the late nineteenth and early twentieth centuries (Chang, 2002, p.40).

When modern irrigation started in the United States in the mid-nineteenth century, state governments (especially those in the west, where irrigation was crucial) initially helped develop irrigation by setting up "irrigation districts" – public or quasi-public corporations that could override individual rights for the sake of the irrigation projects (Fuhrman, 1949, p. 965; Teele, 1926, p. 435). Subsequently, the increasing scale of irrigation projects prompted the federal government to subsidize irrigation projects and to take them up itself, following the 1902 Reclamation Act (Fuhrman, 1949, p. 966; also see Gras, 1925, p. 392 and Selby, 1949, p. 964).

In Canada, the government hired American irrigation experts to make the prairie lands of Alberta attractive to settlers because it feared that the United States might try to annex the region (Lee, 1966, p. 272). However, this scheme, built from strategic considerations, was not successful and so the government reformed the system in 1894. It consciously imitated the American model (with some Australian elements), especially the centralization and nationalization of water resources (Lee, 1966, pp. 272-3, p. 279). It is interesting to note the similarity between this and the French experience after the revolution.

The Japanese Government invested heavily in irrigation. However, its management was much more decentralized than in the United States or Canada. The management of irrigation projects was often delegated to village associations – a practice that was transferred to Korea through Japanese colonialism in the first part of the twentieth century (Francks *et al.*, 1999, p. 26).

In the developing world, the success of 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 year.¹⁴ As a result, value added between 1940 and 1958 rose by 5.8 percent per year in agriculture as a whole and by 6.8 percent per year in the crop sector (Mexico case study). However, critics note that the excessive subsidization of water led to its excessive use (p. 11).

Between independence and the Green Revolution, the Indian state financed, built, and managed all major irrigation projects and most medium-sized ones. The productivity of these projects was relatively limited before the Green Revolution due to the absence of water-responsive seeds; however, they enhanced the equality of access to water across regions and classes (India case study). It goes without saying that irrigation investments more than paid for themselves during the Green Revolution with the advent of water-responsive seeds. However, the reduction in government investment in agriculture in the 1990s resulted in the relative shrinkage of areas covered by surface irrigation and the expansion of groundwater irrigation, which only richer farmers can afford. This has resulted in greater inequality in access to water (India case study).

Chile's recent success in exporting "Mediterranean" products was the result of public intervention in irrigation. Even the free-market Pinochet Government provided irrigation subsidies, but the first democratic government of 1990 gave a big push in irrigation. It started constructing large irrigation works (none had been built during the Pinochet Government), assisted private farmers in rehabilitating and expanding existing irrigation schemes and implemented new medium-scale projects. It also gave special impetus to the existing subsidy scheme for small works at the farm level (Chile case study). In addition, it provided special financing to small-scale farmers so that they could commission feasibility studies and execute their irrigation projects (Chile case study).

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 that period (Egypt case study). What our Ethiopia case study describes as the "trivial" amount of resources going into irrigation is generally agreed to have been a great obstacle to agricultural development in the country (Ethiopia case study).

Transport

Rural transport (e.g. roads, canals, railways and, increasingly, airports) is crucial in incorporating the agricultural sector into the broader economy. In Europe in the nineteenth and early twentieth centuries, there is even some evidence that differences among countries in productivity was due to the degree of commercialization (in which transport plays a crucial role), rather than the use of modern inputs (such as chemical fertilizers) (van Zanden, 1991).

Transport infrastructure is an area in which the role of the government is recognized, even by many supporters of the NCW. Many transport projects have a public goods nature, require large investments for their construction and also need coordination (in their operations and construction) across projects because of their "network" nature. These are characteristics that usually make state provision or subsidization more efficient.

Even the relatively inactive French state of the late nineteenth and early twentieth centuries (it was one of the most *laissez-faire* states during this period) invested in building rural roads and railways (Tracy, 1989, p. 78). The Swedish state, using the public-private partnership developed

¹⁴ During this period, public investment as a whole grew at 12.2 percent per year, a huge acceleration compared with the rate of 1.6 percent seen from 1926–1934 (Mexico case study).

through the irrigation projects, built trunk lines and allowed the private sector to build branch lines under government license and (after 1882) price controls (Chang, 2002, p. 40).

The United States Government made possible the development of railways in the agricultural west by granting the railway companies free public land. The Grange (or the National Order of the Patrons of Husbandry), the farmers' union that was founded in 1867 and was influential in the late nineteenth and early twentieth centuries, pressured some state governments into passing legislation to reduce railroad rates. The Grange also played a key role in passing the federal Interstate Commerce Act of 1887, which provided the basis for controlling passenger and freight rates across the nation (Cochrane, 1979, p. 283; on the Grange, see Ingersent & Rayner, 1999, p. 59).

Our case studies reveal that road and railroad links (and increasingly air links in the case of horticultural products) are also critical for agricultural development today. The Ghana case study estimates that “about 70 percent of agricultural marketing costs are directly attributable to the poor state of the feeder road network”. In Zambia, because of the poor state of roads and railways and the country's size and land-locked nature, it is estimated that “transport-related costs constitute 17.1 percent of [the country's] total value of exports” (Zambia case study).

Road building also offers a good vehicle for using 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 programmes (e.g. India).

Electricity

Electricity helps agriculture by providing it with the power source to run small machinery needed for cultivation (such as water pumps). It also promotes the development of rural industries that increase value-added components and create non-farm employment – for example, by helping to develop an agricultural processing industry by providing a power source for machines and refrigeration facilities. However, electrification typically requires large investments and centralized coordination because of the networked nature of the electricity supply. These characteristics 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 that time is summarized in Lenin's famous quote: “Communism is Soviet power plus the electrification of the whole country”.

Of course, this does not mean that development of an electrical supply can be done only by the state. For example, Sweden used the public-private partnership, originally developed through irrigation schemes, to develop hydroelectric power in the late nineteenth century (Chang, 2002, p.40).

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.

Ghana's Government embarked on a Rural Electrification Project in the 1980s to help with rural industrialization and the creation of rural non-farm employment, with less-than-impressive results (Ghana case study). The Mexican Government also invested a lot in rural electrification, but the

fiscal adjustment of the 1980s severely arrested the process (Mexico case study). In contrast, Viet Nam has rather successfully electrified its rural areas through a combination of investments by the state and the relevant local population (Viet Nam case study).

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. For example, the effectiveness of better irrigation and increased fertilizer use was enhanced during the Green Revolution, because the new seeds were highly responsive to water and fertilizer.

Throughout history, public intervention has played a critical role in supplying better seeds. Better seeds have been developed in all of today's rich countries, often through public research. For example, the Japanese Government organized and financed an elaborate multi-layered system of seed development and dissemination, which enabled the country to develop seed varieties that suited different local conditions (see Box 7).

Public interventions in the production and distribution of seeds have been common in today's developing countries. Governments have provided or subsidized research for better seeds. The Philippines Government and the Mexican Government joined forces with international non-profit foundations (i.e. Ford and Rockefeller) to develop high-yielding varieties of rice and wheat. The Egyptian Government has also been deeply involved in the development, multiplication, importation and distribution of seeds (Egypt case study).

Once produced, improved seeds have often been disseminated at 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 privatization and/or liberalization of these services. Unfortunately, this solution has often not worked, especially for financially disadvantaged farmers and/or for those who are in remote areas, because serving them is not profitable.

For example, in Ghana, the inefficient state-owned enterprise, Ghana Seed Company, which had taken over the responsibility from the government of supplying improved seeds at subsidized prices 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 (Ghana case study). Although liberalization of the seed market did improve the seed supply in Zambia and India, small-scale farmers and farmers in remote areas were excluded (Zambia case study and India case study).

Fertilizers

The importance of fertilizer in modern agriculture cannot be overemphasized. However, small-scale farmers, especially in poor countries, use suboptimal amounts of fertilizer for a number of reasons (Ethiopia case study).

First, they are often not fully aware of the importance of fertilizers in increasing output. Second, even if they knew fertilizers were useful, they often do not have access to the credit needed to buy them. Third, small-scale farmers tend to operate on the margins of subsistence, so they are often not willing to take the risk of spending money for fertilizers because 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. Fourth, they often do not take into

account the long-term implications of adequate fertilizer use in maintaining soil fertility. Moreover, even when they know the importance of maintaining soil fertility through regular replenishment of soil nutrients, they are often too poor to care about the long-term consequences of their actions.

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

Another fertilizer policy that is not widely discussed despite its potential importance is public regulation of fertilizer quality. Because farmers cannot know the quality of fertilizer before its use and because its quality cannot be easily ascertained even after its use (because there are too many intervening variables), there is great opportunity for fraud in the fertilizer market, especially when the producers do not have recognizable brand names. Given this, some governments tried to impose quality standards or even supply fertilizer 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, p. 42), while Korea produced fertilizer in state-owned companies.¹⁵

The NCW has taken the opposite approach in fertilizers to the one taken by today's rich countries. For example, the Ghanaian Government was forced by the World Bank and the IMF through the ERP conditions to abolish subsidies for fertilizer and other agricultural inputs and privatize its importation and marketing. The result was rising prices, which put fertilizers beyond the reach of most farmers, and falling imports (because the private sector was not interested in unprofitable ventures) (Ghana case study). In Hungary, cuts in fertilizer subsidies during the transition period resulted in average fertilizer consumption falling from 200–220 kg per acre in the 1980s to 50 kg per acre in 2001. When combined with a drastic decline in the use of irrigation (by 50 percent), crop yields fell to the level of the 1970s (Hungary case study).

In contrast, the Viet Nam Government's supply of subsidized fertilizers (as well as irrigation and machinery) is thought to have enormously contributed to the development of agricultural productive capabilities in poorer regions (Viet Nam case study). Viet Nam is also interesting in that it managed to improve the efficiency of fertilizer distribution in the 1980s through increased competition among SOEs, rather than through privatization and liberalization, as the NCW recommends (Viet Nam case study). The recent experiences of Malawi and Tanzania also highlight the importance of increased fertilizer use in many developing countries (see the discussion in the Ethiopia case study).

Machinery

Quality control is less of a problem with farm machinery than with fertilizers, because it is relatively easy to see the quality of the product soon after the purchase and machinery tends to be manufactured by large firms with recognizable brand names. The problem with machinery is that its purchase is often way beyond the means of individual small-scale farmers. As a result, co-ops have been used to jointly purchase farm machinery and rent it out to individual farmers in

¹⁵ Animal feeds have the same quality control problem and could benefit from similar government regulation. The New York State Government imposed quality control for animal feed in the late nineteenth century (Colman, 1965, p. 47).

countries like Germany, Denmark, Sweden and the Netherlands. To the extent that these governments gave financial help to the co-ops, they at least implicitly encouraged the practice through public policy.

In the 1970s, Ghana's Government subsidized tractor services by 50 percent or more, but this collapsed during the economic crisis in the early 1980s because a shortage of foreign exchange restricted the country's ability to import necessary spare parts. The private sector failed to fill the vacuum because there were few firms offering the service and, where available, the rates were prohibitive (Ghana case study). Recognizing the problem, the government began in 2008 to re-establish mechanization centres in partnership with private firms, with a view to pulling out after three years.

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

4.2 Outputs Policy

4.2.1 Measures to increase farm income stability

In the earlier stages of development, farm incomes tend to fluctuate more violently than at later stages. At earlier stages, a lack of irrigation increases the exposure to the vagaries of weather. The lack of chemicals to control crop diseases (e.g. pesticides, fungicides) and animal diseases (e.g. vaccines, antibiotics) means that there are greater risks of output failure. Price fluctuation is magnified at the earlier stages of development because farmers are less capable of diversifying (because of deficiencies in education, extension services and market information). In the earlier stages of development, price fluctuation is often exacerbated by the lack of even relatively "simple" things like warehousing facilities, which force 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, the consequences are greater too. At those stages, many farmers earn incomes that are sufficiently close to the subsistence level that any significant fluctuation in their incomes can push them into serious poverty. This has long-term consequences for poverty and productivity, as has been repeatedly pointed out throughout this report. Irreversible negative consequences for long-term productivity growth – for individual farms and for the agricultural sector as a whole – include the loss of assets through "distress sales" and hunger and malnutrition (especially because many small-scale farmers are net buyers of food) that harm family members' (especially children's) long-term productivity and interrupt children's education.

Moreover, farmers often need to have reliable future income if they are to invest in expensive, modern inputs; therefore, high fluctuation in incomes tends to discourage productivity-enhancing investments. Our Ethiopia case study points out that price fluctuation (especially price collapses in good years) have been one of the main obstacles to adopting improved technologies in the country.

For these reasons, most governments have adopted policies especially (but not exclusively) in the earlier stages of development that are meant to reduce the fluctuations in farm income. Examples

include price stabilization schemes (through price controls, buffer stock management and warehousing facilities), providing and/or subsidizing agricultural insurance, trade protection and direct income support.

The NCW recognizes that farm income stability is important. However, it believes that liberalization is usually the best solution to achieve this. They point out that developing microfinance markets can help small-scale 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 liberalizing markets for crop and livestock insurance. Greater liberalization of output markets, especially trade liberalization, they contend, will create “thicker” markets with more buyers and sellers, where individual actions will have smaller effects and prices will fluctuate less. The international rice market is frequently cited as a case where more countries liberalizing 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. Smoothing consumption through credit comes at a high cost, even if the credit is offered not by moneylenders but by microcredit schemes, because their interest rates are very high. Moreover, even the proponents of the NCW acknowledge today that microfinance is unlikely to be the mainstay of rural finance.

Insurance is better than consumption-smoothing credit, but it is 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 insurance. 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 government in countries like Japan and Germany had to subsidize agricultural insurance in the late nineteenth and early twentieth centuries.

While concerted trade liberalization across countries may reduce price fluctuations, greater liberalization also comes at a cost. When trade shocks are large, liberalized 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 reintroduced agricultural tariffs and quotas in the late nineteenth century, when New World and, to a lesser extent, Russian and Ukrainian imports dramatically increased because of the development of steamships, refrigeration and railways.

Price measures

The most frequently adopted measure to stabilize farm income is price stabilization through government price-setting and stockpile management. Governments provide price floors by guaranteeing to purchase unlimited quantities of certain agricultural products (such as key foodgrains, but also other things like oilseeds, as in Chile) at pre-announced prices. Such programmes were used in countries like Japan, where the government heavily intervened in the agricultural sector and the rest of the economy, and 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-scale farmers who are net buyers of food. Chile operated a price band system, where if an 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 consumers.¹⁶

A classic 1966 report on Japanese agriculture by 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 stabilize the price of rice (p. 21). Through the Rice Law of 1921, the Japanese Government was “empowered to buy rice when prices were low (within a financial ceiling on purchases) and to sell when prices were high” (p. 21). However, in the face of fast-growing imports from its colonies such as Korea, government purchase proved inadequate, so the Rice Control Law of 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” (p. 21). FAO assesses that the attempt to maintain prices in a period of surplus, primarily because of the growth of imports, “was not wholly successful, though it probably slowed down the fall in prices” (p. 21).

However, FAO points out that once the Japanese Government started to tightly control the quantity of imports from about 1940, the measures became more successful (p. 21). However, the success depended on the nature of the product involved. FAO (1966) evaluates that “[f]or rice, the price stabilization scheme appears to have worked satisfactorily and to have stimulated output”, although “for wheat which enjoys no particular consumer preference over the imported product to offset the higher domestic price, and for barley for which the demand is falling, the government has incurred substantial losses since 1956” (p. 22).

In 1930, the Dutch Government introduced a law that came into effect in July 1931, which guaranteed minimum prices for wheat at about twice the world-market level (Knibbe, 1993, p. 197). Canada also introduced a price stabilization scheme in 1944 through the Agricultural Prices Support Act, which was succeeded in 1958 by the Agricultural Stabilization Act (Turner, 1959).

The United States’ Agricultural Adjustment Act of 1933 attempted to stabilize the prices of main crops through subsidized destruction of produce and price supports. However, in the 1930s it was successful only for cotton and tobacco (Cochrane, 1979, pp. 287). Between World War II and 1952, this Act was dormant because of soaring agricultural prices. However, when farm prices fell again in 1952, the Act kicked in again and supply control programmes were brought back for wheat, corn and cotton (pp. 287-8). From 1955–1965, “there was a continuous struggle between those who advocated holding farm prices above their equilibrium levels through the employment of production controls and supply management and those who wanted to eliminate [them] and let farm prices fall to their market clearing levels” (p. 288). In 1965, through the Food and Agriculture Act, a compromise was reached which involved voluntary acreage control (where farmers were paid not to produce), price support for farmers participating in the programmes, income payments to them at or near world market levels as a means to protect farm income and foreign and domestic disposal of surplus agricultural products (p. 288). The programme is said to have worked fairly well until 1972, when farm prices started rising again (p. 288).

¹⁶ However, when the price shocks are too large, even price bands may not be enough. For example, in response to the recent dramatic rise in food prices because of rising demand from China and other fast-growing countries and because of dramatic increases in the demand for biofuel, countries like Viet Nam, a major rice exporter, imposed an export ban because it was worried about the availability of rice for the poor consumers at home.

Many developing countries have also used pricing policies to stabilize agricultural income. For example, since the 1960s, the Indian Government has announced minimum support prices for important products at the beginning of the sowing season and procurement prices towards the beginning of the harvesting season, at which 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 overproduction of the covered crops. However, this scheme stabilized the returns to the farmers and encouraged the adoption of Green Revolution varieties, eventually vastly enhancing the country's food security (India case study).

Of course, guaranteeing minimum prices can create a large fiscal burden if it is combined with policies for excessively cheap food to consumers. This happened in Zambia with maize in the late 1970s and 1980s (Zambia case study). Initially, this looked affordable when the prices of copper, the country's main export and the main source of government revenue, were high, but it became unsustainable when copper prices fell. Moreover, providing minimum prices for maize created disincentives for agricultural diversification, arresting the country's agricultural and overall development.

Therefore, price stabilization programmes need to be carefully designed so as not to become a fiscal drain and an obstacle to production diversification. However, a well-designed price stabilization programme can bring benefits, as we have seen in Japan and other rich countries in the past. Chile also has had such a programme since the 1980s which initially covered maize, rice, wheat, oilseeds and sugar beets, but today it no longer covers maize and rice (see Box 12).

Box 12: The Chilean price bands system

Chile's system of price bands sets a minimum and a maximum import entry price for a specific product. If the entry price is below the minimum, a variable levy is applied to increase the entry price until it reaches the floor of the band. If the entry price is above the ceiling of the band, then existing tariffs are reduced until the entry price coincides with the ceiling. If this is not enough, then an import subsidy would be applied, although this has never happened in practice. Between these levels, the market operates freely.

The floor and ceiling of the band are calculated by ordering the last 60 monthly international prices of the commodity from the highest to the lowest value. Then the 15 highest prices are eliminated, leaving the 16th price as the ceiling of the band. Likewise, the lowest 15 prices are eliminated and the 45th becomes the floor of the band. Each year, the first year of the series is dropped and the previous year comes into the calculation.

Unlike in other countries that have adopted a similar system, in Chile it remained restricted to only a few critical commodities (i.e. wheat, oilseeds and sugar). In addition, the system for calculating the band is fixed by law, thereby preventing the influence of political pressures in setting the band.

The price band system was established in 1983 and there was no agency to manage it because the existing state marketing agency had been abolished during the privatization drive of the late 1970s. However, it was accepted that a buying agency needed to be established because of the inherent imperfections in the internal cereal markets (i.e. oligopsonistic practices on the part of millers and small local buyers, usually truck drivers).

Because of the mistrust of the military government to perform any direct state action, this function was entrusted to a confederation of cooperatives of commercial grain producers-*Confederación de Productores de Granos* (COPAGRO). This institution operated on the government's account, using state-owned storage facilities (carried over from the old state marketing agency) and an open line of credit from the state bank.

(cont.)

However, after a few seasons, COPAGRO went bankrupt because of the accumulation of wheat stocks which were not sold as a result of bad management. Therefore, the government was forced to establish a state-owned company, *Comercializadora de Trigo SA* (COTRISA), with small private-sector participation and with intent to pull out of it eventually.

However, when the democratic government came to power in 1990, COTRISA's role was enhanced. It was told to buy all the wheat that farmers would be willing to sell to it at the floor price of the band (i.e. the full cost of importing wheat at the floor price), less the storage and financial costs of holding the national harvest until it was fully consumed. The credibility of COTRISA's commitment to buy all the wheat offered was crucial in stabilizing and establishing a competitive buyers' market.

During the democratic period, COTRISA started opening buying outlets, mainly in the more remote areas of the drylands of the Andean and coastal ranges, where most of the small-scale farmers are located and there are fewer buyers. It also shifted from a policy of direct operation of the outlets to contracting them to small farmer cooperatives and NGOs. COTRISA's outlets increased from five (established in 1990 and fully operated by COTRISA) to 27 in 1994/95, of which only seven were directly operated by COTRISA (later this number was reduced to five).

The opening of new outlets in remote areas brought about an immediate increase in the prices paid by the traditional buyers to the level offered by COTRISA. In the first years of operation of the scheme, the prices increased from a low of 2 percent in a fairly connected and competitive locality, to 22 percent in remote, isolated localities. As the credibility of COTRISA grew, the price differentials and its purchases decreased. Its credibility also increased market transparency. Therefore, when the oligopsonistic buyers test COTRISA's ability to handle an unknown market, the market is stabilized after a few weeks of operation and the agency practically stops receiving supplies. COTRISA is still a major player in Chile's wheat market, but it has intervened very little, when measured by actual purchases.

The system is deemed to have worked well by allowing internal prices to lag the trend of international prices and preventing the day-to-day fluctuations of prices that create havoc in internal markets.

Unfortunately, the World Trade Organization (WTO) ruled in 2002 that Chile's price band system was against WTO rules. This forced the Chilean Government to modify the system. Under the new system, the upper and lower levels of the band had to be fixed every month. Therefore, it no longer guaranteed the same price at sowing time as at harvest and therefore could not provide the same degree of stability as the original scheme did. This affected wheat production from 2003-2005, reducing the area under wheat cultivation. However, this situation is currently being reversed due to the rise in international prices for agricultural commodities, including wheat and maize.

Source: Chile case study

Warehousing

Providing warehousing facilities is one tool of price stabilization that has not been receiving the attention it deserves. Most poor farmers need to sell their products soon after the harvest, which floods the market and causes prices to crash. This is largely because the farmers have little financial reserves to allow them to wait until they can get better prices. However, even the farmers who have some financial reserves may have to sell soon after the harvest if they do not have places to store their products. If the farmers can store their products and sell them more gradually, their incomes will be more stable and their average incomes may become higher.

Unfortunately, this is often not possible because storage facilities require large investments that are beyond the means of individual small-scale farmers. Our Ghana case study cites the lack of storage facilities as a key reason for price fluctuations in the country. In Ethiopia too, the absence of proper storage systems is considered to be a major cause of price fluctuations (Ethiopia case study).

Therefore, public intervention in providing warehousing facilities is a relatively simple but very helpful means of stabilizing income in the agricultural sector. Japan is the most successful example of such intervention, where the government made it compulsory since 1919 for the ubiquitous agricultural co-ops to offer warehousing services; this also had the benefit of offering a very stable source of income for the co-ops (FAO, 1966, pp. 20-23).

Insurance

In theory, risks due to agricultural income fluctuation can be covered by adequate insurance for crop or animal yields. Insurance coverage also encourages banks to make loans to farmers because the banks know that the default risk is lower. Therefore, many countries have tried to develop insurance schemes for agriculture. The trouble is that private-sector companies in poor countries do not like to extend insurance to small-scale farmers who are exposed to high risks. Also, farmers who are strapped for cash and who operate with a very short time horizon may not want to take out insurance, 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, p. 12). Interestingly, this development was directly transferred to Japan.

As early as 1888, Paul Mayet, a German consultant to the Japanese government, recommended introducing agricultural insurance (Yamauchi, 1986). However, it was only after the 1920s that Japanese policy-makers became seriously interested in agricultural insurance. In 1929, the Japanese Government introduced the Livestock Insurance Law and promoted livestock insurance by reinsuring the insurance companies (FAO, 1966, p. 25; Yamauchi, 1986, p. 224). In 1938, it enacted the Agricultural Insurance Law and promoted crop insurance by paying 15 percent of the insurance premiums (FAO, 1966, p. 25 and Yamauchi, 1986, p. 223). After the post-World War II land reform, the Japanese Government combined the crop insurance and livestock insurance systems under the Agricultural Loss Compensation Law in 1947. It is believed that this law “helped newly created owner/farmers to withstand yield losses arising from natural calamities and thus to avoid reverting back to tenant status” (Yamauchi, 1986, p. 224).

In the United States, the early failures of crop insurance offered by private companies prompted a Senate hearing in the 1920s and finally culminated in the Federal Crop Insurance Act of 1938, which set up the Federal Crop Insurance Corporation (FCIC), a public agency within the USDA (see Kramer, 1983; also see Gardner & Kramer, 1986). However, federal crop insurance, initially offered only to wheat, performed poorly in the first three years because of poor policy design and data and the FCIC had to be injected with public money three years later (Kramer, 1983, p. 190). The problems continued until the late 1940s, but after that the programme “gradually expanded and operated on a limited but successful basis” (Gardner and Kramer, 1986, p. 222).

The Indian Government administers the National Agricultural Insurance Scheme (NAIS), the world’s largest crop insurance programme (in terms of the number of farmers insured), 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 subsidizes a small

portion of the premium for small-scale farmers. While the programme has proven reasonably successful, the Indian Government is currently improving it, with a view to doubling the crop insurance penetration ratio by 2012 (for details of the proposed improvements, see Rao, 2008, pp. 48-63).

The third democratic government of Chile (2000–2005) established an agricultural insurance system covering mainly annual crops. It is operated by private companies but the government very heavily subsidizes the premium – 50 percent of the premium for commercial farmers (up to a maximum of USD2 000) and up to 85 percent for small-scale farmers. A government commission oversaw the operations of the private companies and also negotiated lower premiums. As a result, the premium fell from 4.9 percent of the insured amount to 2.8 percent (Chile case study).

Trade protection

Another common method of stabilizing farm incomes when there is a rapid inflow of new imports is trade protection of agriculture. There are also many other possible reasons to provide trade protection, including concerns about national food security and to provide stable markets for domestic manufacturing industries.

All of today's rich countries used agricultural tariffs. Many European countries raised agricultural tariffs, particularly from the 1870s, when grains, meat and dairy started arriving from the New World in large quantities because of the development of steamships and refrigeration technology and grains flowed from Russia and Ukraine via the railways. The most famous of these were the German tariffs during the 1870s under Chancellor Otto von Bismarck. They formed the so-called "union of iron and rye" by providing heightened agricultural protection to the Junkers and higher tariffs for the iron, steel and other heavy and chemical industries that were emerging then (Chang, 2002, p. 35).¹⁷ 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, pp. 89-92).

The French tariffs were also raised after the 1890s – especially under the influence of the famous politician Jules Méline, whose idealized vision of France as being full of artisans and small-scale farmers made agricultural protection an obvious solution to the country's economic problems. It is widely believed that France's strong protection of agriculture "diverted attention away from the need for a constructive long-term policy (Tracy, 1989, p. 78), while Germany's agricultural protection is believed to have contributed to the country's economic development by providing stable markets for infant industries (Koning, 2007, p. 207).

Even the United States (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, p. 317). Moreover, in the face of the agricultural crisis from 1920–1921, tariffs were raised in 1921 on wheat, corn, meat, wool and sugar through an emergency tariff law, which was later ratified as the Fordney-McCumber Tariff in 1922 (Ingersent & Rayner, 1999, pp. 69-70). Needless to say, this did little to help farmers who were producing products for export (Ingersent & Rayner, 1999, p. 70).

¹⁷ German protection was not particularly high by international standards (Blackbourn, 1997, p. 317). It benefited not just the Junkers but also middle and large farmers (p. 316). It was, however, not very crucial in subsequent recovery (p. 317).

Another wave of increased agricultural protectionism arrived after the Great Depression. Major agricultural tariffs were imposed in Denmark, a country that had not used agricultural tariffs even in the late nineteenth century (Tracy, 1989, p. 206; Koning, 2007, p. 201) and the Netherlands, a country with very strong agriculture and the most consistent tradition of free trade since the eighteenth century (Knibbe, 1993, pp. 196-8). Germany imposed quotas on agricultural imports from Denmark and Sweden in 1932 (Murphy, 1957, p. 364). During this period, Germany also abused hygiene regulations to slow livestock imports even further (Blackbourn, 1997, p. 316; Tracy, 1989, pp. 91-2).

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, p. 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, because this measure boosted Dutch wheat production) (Knibbe, 1993, p. 197).

Later in the twentieth century, Japan and Korea practically banned rice imports when their rice farmers became internationally uncompetitive; they were faced with natural limits to agricultural production 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 foodgrains, mainly to pursue national food security and to provide stable livelihoods for farmers. However, the rise of the NCW since the 1980s has forced many of them to reduce their agricultural protection. As mentioned earlier, agricultural protection was seen as preventing countries from maximizing their income (and thus food consumption) by making them overproduce uncompetitive foodgrains and underproduce potentially competitive export items, such as horticultural products. It was rarely mentioned that many of the food items in developing countries were internationally uncompetitive, often because the rich countries heavily subsidized their own farmers who produced and exported such things. Even when the negative shocks from agricultural trade liberalization on small-scale farmers were acknowledged, they were seen as a transitory problem that would be resolved by overall growth in the economy.

The result of trade liberalization, when combined with reduced public intervention in input markets and other areas of agricultural policy, has been the demise of food production. As a consequence, national food security (and the food security of many poor people, including many farmers) has been compromised, as we have witnessed in the recent world food crisis. There has also been a negative impact on income stability for many farmers. Farmers who have limited capabilities to diversify, have either left the countryside or returned to traditional agriculture where there is even less government support and fewer opportunities for betterment.

4.2.2 Measures to improve marketing and processing

Producing greater quantities of raw agricultural products by using better inputs is important, but farmers’ final incomes critically depend on how products are processed and how and where they are marketed.

One important area of public intervention in agricultural marketing is regulating oligopsonistic practices in the distribution chain, which enables farmers to get better prices. Another important area of public intervention is providing and/or subsidizing public goods that are necessary if the products are to be sold in higher income areas. These public goods include transport infrastructure (e.g. roads, ports and, increasingly, airports), market information (e.g. amount

demanded, prevailing tastes in the destination markets) and branding of products by variety (e.g. Blue Mountain coffee) or for export by the whole country (e.g. Colombian coffee). These inputs, of course, can also be provided by producer associations or farmer cooperatives with the government intervening indirectly by providing legal and financial help for those organizations.

There are other inputs into marketing that are not public goods, but which may be costly to provide (e.g. warehouses, cold storage or testing facilities for food sanitation and safety). The government may help small-scale farmers secure such inputs by providing better access to credit or, as happened in the past in many of today's rich countries, by promoting agricultural co-ops to 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 thus promote industrialization and overall economic development. Butter and cheese bring better value for milk producers. Exporting live farm animals is less profitable than exporting raw meat, which in turn is less lucrative than turning it into cured meat like bacon. Processed palm oil commands much higher prices than unprocessed palm oil, and so on.

Processing adds value and also reduces waste. Fruits and vegetables that could not be sold immediately would have to perish and be thrown away without canning, drying or freezing processes. For example, in Ghana, it is estimated that 20-40 percent of agricultural products are lost because they are not processed (Ghana case study). In India, it is estimated that about 40 percent of fruits and vegetables are lost after the harvest (WDR, 2008, p. 126).

Developing agroprocessing 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 mainly on employment for their livelihoods.

For these reasons, in the early post-World War II years many developing countries tried to intervene in agricultural marketing and promote agroprocessing industries. Some of these interventions did not produce good results, such as the state-owned agroprocessing enterprises in Ghana. The NCW used to highlight these failures in state marketing and processing and advised countries to abolish state marketing boards and privatize state-owned agroprocessing industries. However, trade liberalization, especially reductions in industrial tariffs, forced many incipient agroprocessing firms in developing countries to close down. At the same time, privatization and deregulation did not lead to the emergence of vibrant private-sector firms taking over marketing and processing functions from the state, because they too needed public support, ranging from better infrastructure (for marketing firms) to protective tariffs (for agroprocessing firms).

Fortunately, the proponents of the NCW seem to have realized that much more than free play of market forces is necessary if developing country farmers, especially small-scale farmers, are to market their products better and add more value to their products. For example, WDR 2008 (Chapter 5) shows a clear awareness that markets do not spring up naturally once the hand of the state is removed. Further, it suggests a whole range of public interventions and public-private partnerships in marketing, although its support of similar interventions in agroprocessing is more muted, probably because of its unwillingness to endorse protectionist industrial policy.

Modernizing the marketing channels

In most developing countries, agricultural markets are segmented because of poor transportation, which gives local merchants monopsonistic or oligopsonistic powers, enabling them to extract

more from the farmers. In countries with a high incidence of tenancy, the landlords often act as agricultural merchants, maintaining even more bargaining power over the small-scale farmers. One obvious solution to this problem is improving transport infrastructure and integrating national markets so that local buyers lose much of their bargaining power.

However, the process of integrating markets by providing roads and other transport infrastructure is a slow process. Therefore, governments can decide to deliberately bring alternative purchasers into the market and weaken the existing monopsonistic powers. In countries like Denmark, Japan and Korea, cooperatives played this role, although in these countries the state was also deeply involved through schemes like compulsory government procurement of key grains (as in East Asia) or state export marketing boards (as in Denmark) (See Box 11). Surprisingly, even in supposedly free-market Chile, state marketing agencies have protected small-scale wheat farmers against oligopsonistic millers. Large private-sector firms, including foreign companies (like supermarkets) based in rich countries, also can counter traditional high-cost merchants with local monopsonies.

Moreover, if the alternative purchasers are large entities with direct (or at least less mediated) access to consumers, farmers' incomes will increase as a result of reduced transaction costs; the number of transactions will be reduced as will the unit transaction costs (given the need for costly investments in things like storage and transportation facilities).

Of course, the net benefit to small-scale farmers of a "non-traditional" marketing arrangement will depend on the kind of alternative purchaser. If it is an agricultural co-op that does not seek profit, it is likely that small-scale farmers will benefit. State marketing agencies have mixed records in this regard – often, they were used to squeeze surpluses from farmers. If the purchasers that replace the traditional merchants are large private-sector firms, (especially national or even international supermarkets), they may benefit small-scale farmers through their lower unit marketing costs and better quality management techniques. However, exactly how much benefit they will bring also depends on the relative bargaining powers of those involved. On the one hand, these large firms may have even greater market power than the local merchants, potentially making them even more capable of extracting larger shares of surplus from small-scale farmers than traditional merchants. On the other hand, if small-scale farmers are organized into co-ops, they may be able to extract a better deal than when they are dispersed.

Product quality management

Product quality management is an issue even for simple products like wheat; that is why Canada established a wheat marketing board during World War I (Turner, 1949, p. 595). Canada later extended the scheme to all agricultural products through the Agricultural Products Cooperative Marketing Act of 1939 (p. 595).

Processed agricultural products require greater product quality control than unprocessed agricultural commodities, particularly for products for the export markets. Typically, countries that import agricultural products, especially processed agricultural products, are richer countries with higher product quality and hygiene standards. The tests and inspections required to meet these standards are beyond the means of small-scale farmers. However, an inability to meet these standards would mean either that the country could not export or that its exports, exhibiting inconsistent quality, would command lower prices than their average qualities would warrant.

Today's rich countries resolved the problem of agricultural product quality management through agricultural marketing cooperatives or state export marketing boards – or indeed a *de facto*

merger of the two (as was the case in Denmark between the 1930s and 1950s). The Danish Government imposed quality standards on butter, in association with cooperative butter export associations (Murphy, 1957, p. 364). The government used a more indirect means for bacon – it encouraged quality improvement through government-endorsed bacon quality competitions (Murphy, 1957, p. 364). In 1932 and 1933, Denmark set up export marketing boards for cattle, meat, butter, cheese, eggs, poultry, horses, straw and potatoes (Murphy, 1957, pp. 367-8).

Partly in response to Danish competition, the Dutch Government introduced butter quality control in 1889 (Knibbe, 1993, pp. 164-5). Initially, the police were given the authority to take butter samples and check their quality. Laws were subsequently revised (in 1902 and 1908) to introduce penalties for violators and in 1903 a specialized butter research station was set up and professional inspectors were hired. The government also subsidized a scheme run by the Frisian agricultural association to inspect the butter-making process, which covered 90 percent of butter production by 1912. In 1900, the Dutch Government set up the phyto-pathological service, in response to a new United States regulation (Knibbe, 1993, p. 164). In 1902, an export meat quality control service was established (Knibbe, 1993, pp. 165-6).

In Sweden, butter quality for the export markets was primarily maintained by the Swedish National Creamery Association, which had a virtual export monopoly, but the State Agricultural Board closely supervised the Association (Yetterborn, 1938, p. 191). In the United States in New York, the state supervised quality maintenance in the dairy and slaughter industries (Colman, 1935, p. 43, and p. 49).

Box 13: Contract farming in Zambia

After the demise of cooperatives and other state-sponsored marketing institutions in the 1990s, contract farming emerged to fill the gap in Zambia. This was most successful in high-value crops such as paprika, vegetables, cotton, sunflowers and soybeans.

The most common method used was “resource-providing contracts”, whereby a processing or marketing firm provided resources to farmers to be used in the production process. The contracting agency provided inputs to the producer and repayment of the inputs was in kind.

Another type of contract is the “management and income-guaranteeing contract” which involves forward contracting to supply a product at an agreed price and quality. The farmer does not have to look for a market for the product after harvest.

The cotton industry provides a particularly interesting and important example. A company supplied inputs to an entrepreneur, who in turn provided these inputs to selected farmers in his locality who were contracted to produce a specified volume of cotton. The farmers were obliged to supply cotton to the entrepreneur who in turn was contracted to supply to the cotton company. This arrangement worked well and the recovery rates were very high (over 95 percent in some years), until the 2005 season when the Kwacha appreciation forced cotton ginneries to reduce their pre-planting prices, which made farmers rebel.

Source: Zambia case study

Today, underfunded governments in developing countries often struggle to provide adequate services for agricultural product (especially export) quality control, especially for the tests for sanitary and phyto-sanitary requirements. For example, in Zambia, difficulty in meeting the sanitary and phyto-sanitary requirements is a major obstacle to exports, but the Ministry of Agriculture is unable to provide a satisfactory testing service, even in collaboration with the Zambia Export Growers Association (ZEGA). (Zambia case study).

Today, 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 the purchase of certain amounts of product at certain prices, thereby reducing the marketing costs for small-scale farmers and guaranteeing them a minimum income. They also typically provide credit to buy inputs (e.g. seeds and fertilizers). They impose stricter product quality standards while helping farmers improve their product quality, thereby making it easier for them to export to rich country markets that have higher product quality standards and prices. Contract farming is deemed to have been quite a success for crops like cotton and export vegetables in Zambia. (Zambia case study).

Processing

While agroprocessing has the potential to add value and create additional employment, it is often not taken up by small-scale farmers – even when its value is obvious, as in the case of making butter out of milk – because it requires capital investments that are beyond the means of the small-scale farmers. Capital requirements may be even higher for exported products because they typically need to meet the higher quality and hygiene standards of the more industrialized, richer countries.

In the history of today’s rich countries, Denmark may be the most successful example of a country developing an agroprocessing industry. 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 for milk and pork. Co-op dairies emerged in 1882 and co-op bacon factories began in 1887.

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

Since the democratic transition in Chile in 1990, the small-scale farmer agency INDAP has provided special assistance, including investment funds, for group processing and marketing of produce through cooperatives or other group marketing schemes. An interesting programme involved linking agro-industrial plants with small-scale farmers using a contract farming scheme. Under this arrangement, INDAP channeled technical assistance and credit through cooperating agro-industries, which provided secure contracts at sowing time, a fair pre-established price and technical assistance (Chile case study).

5

CONCLUSIONS

There is a lot to learn from history about improving agricultural policy in today's developing and transition economies. This does not mean simply examining the history of those countries to discover what went right or wrong. In fact, there is much to learn from the history of agricultural policy in today's rich countries because in their earlier stages of development, they had to grapple with the very problems that dog the agricultural sector in 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 stabilities, trade shocks, agroprocessing and marketing were all present. In this report, we have shown a range of policies that today's rich countries used in the past and have tried to draw lessons from them for today's developing and transition economies.

The report shows that many successful policy interventions go well beyond (or even against) the recommendations of the NCW, which has ruled agricultural and other policies in the last quarter of a century:

- Land reform today is supported only in very muted and market-based forms (e.g. no ownership ceilings, liberalized land markets), but Japan and other East Asian countries had very successful comprehensive land reform that included strict land ownership ceilings.
- State-backed, specialized 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. Ghana's rural banks, owned equally by the government and the local community, are an innovative variation on the theme.
- While marketing boards are routinely denounced by the orthodoxy, especially in sub-Saharan Africa, Denmark and some other European countries have benefited 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 agroprocessing and marketing in Denmark, Germany, Sweden and Japan are not sufficiently emphasized by them.
- Price stabilization 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 United States and Japan. More recently, Chile has used a very effective price stabilization scheme.
- Things like state-subsidized agricultural insurance, public provision or subsidization 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-subsidized insurance). Today's orthodoxy does not actively object to them, but they don't give them sufficient attention.

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.

There has been enormous variety in the institutional forms that have successfully delivered critical needs of the agricultural sector. There were successes with all forms of delivery in all sorts of countries – public provision (e.g. agricultural research in the United States, extension in the Netherlands, irrigation in Viet Nam, seeds in Mexico, rural credit in Germany), private

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

Our study also reveals cases of failure with many of these delivery modes. Public provision failed miserably in agroprocessing 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 were deeper than ownership form – rural credit in Zambia and seed supply in Ghana are such examples. Cooperatives in many developing countries were not very successful, which gave cooperatives a bad image.

All of these examples suggest the importance of a pragmatic approach, not bound by pro-state or pro-private-sector ideologies. Indeed, one important common characteristic of the success stories is their willingness to pick solutions that do not fit neatly into ideological boxes. A particularly interesting example is Chile. Right after General Pinochet's coup, Chile implemented extreme versions of most NCW policies, but over time it has come to recognize their limitations and slowly strengthened public intervention in almost all key areas, including extension services, subsidized credit, price stabilization, irrigation, agricultural insurance and marketing. This started during the military government but has been strengthened by the democratic governments.

Our report also shows that it is important for countries to actively import and adapt policy and institutional innovations from abroad and to develop their own innovations:

- The idea of cooperatives was first implemented in the United Kingdom in the form of a consumer co-op in 1844, but the Germans and the Danes developed the idea for production. Sweden explicitly modeled its co-ops after the German and the Danish ones. This idea was perfected by the Japanese, who invented the generalized co-op, rather than a single-product (e.g. egg) co-op or a single-input (e.g. credit or irrigation) co-op. The generalized co-op better coordinated different activities and raised the efficiency of co-ops.
- Agricultural research was first started in Germany in 1852, but the United States and Japan honed it to a fine art. Extension services were first started in the United Kingdom in 1834, but they were further developed by Germany and, later, the United States and Japan. In developing its agricultural research system, India imported many ideas from the United States.
- The United States imported its farm credit system from Germany and Scandinavia, after sending delegations to those countries on a fact-finding mission: "Two commissions, one private and one appointed by President Wilson, went to Europe in 1913 to study agricultural credit and cooperation in Northern Europe" (Cochrane, 1979, p. 289). Japan copied Germany's hypothec bank.
- Canada consciously imitated the United States irrigation law and hired American irrigation experts. Agricultural insurance was first put on Japan's policy agenda at the recommendation of a German consultant.

Our report shows how much we can learn from history – not only from developing and transition countries but also from today's rich countries when they were at levels of development similar to those found in the majority of developing countries today. History frees our "policy imagination"

in the sense that it shows us 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 and improve upon other countries' successes 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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