

# AGRICULTURAL DEVELOPMENT AND STRUCTURAL CHANGE

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The paper advocates public support for the development of agriculture as a way to facilitate structural change in developing countries. In the first chapter we describe the global transformation in agriculture that has taken place over last few decades. Despite fast population growth, the growth of productivity in agriculture has enabled the development of the industry and service sectors, which in turn have resulted in the reduction of poverty and raising of the standard of living. Structural change has not yet been completed, however, especially in the developing world. In the second chapter we investigate the drivers of and barriers to this process and discuss two policy approaches to facilitate structural change – state-driven industrialisation and support for agriculture development. Following that we outline the policy instruments to overcome the barriers in question. We have focussed on improving the effectiveness of the agriculture market (both for final goods and factors of production) as well as improving the quality of necessary public goods.

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# Introduction

Economic growth is typically accompanied by a diminishing role of agriculture and the increasing importance of the industry and service sectors. For this reason, developing countries try to facilitate structural change by various policy measures. However, this is difficult to achieve, as demonstrated by numerous examples of countries which, despite their best efforts, have failed to modernise their economy. These issues have been the subject of countless research projects and scientific papers. In this policy paper we would like to summarise the findings in order to derive policy recommendations for countries undergoing, or on the eve of, structural change.

According to a popular and intuitive notion, the path to structural change leads through investment in the non-agricultural sectors of the economy. This notion was the motivation for both Latin American import substitution industrialisation and East Asian export-oriented industrialisation. Nevertheless, the main message of this article is that surprisingly good results can be achieved by investing in agriculture. The resulting increase in agricultural productivity helps to generate surplus income in rural areas which in turn facilitates the growth of local demand for non-agricultural products and services. Moreover, the same process leads to the release of labour from agriculture thereby making it available to other sectors.

This article is structured as follows. First, we discuss the growing role of agriculture in the modern world. The conclusion is that the rapid growth of the industry and service sectors in the post-war global economy should not obscure the fact that at the same time there has been unprecedented progress in agricultural productivity. Moreover, in order to satisfy the needs of a growing world population, this progress will have to continue for the foreseeable future. This means that investment in agriculture is necessary, especially in developing countries. In the second section we proceed to discuss the barriers to agricultural development and inter-sectoral migration. In the fourth and final section we proceed to discuss the policy instruments which might help to overcome these barriers and thereby facilitate structural change.

# 1 General overview

According to the UN Food and Agriculture Organization, in the middle of XX century nearly 70% of the world’s population used to work in agriculture. Even in the most developed countries this figure exceeded 35%. Since then, people have started to systematically migrate from agriculture to other sectors of economy. This process was more pronounced in developed countries, where the employment share of agriculture has fallen below 6%. Developing countries have also experienced similar inter-sectoral migration, but are still at the beginning of this path. Even in 2010 nearly half of the world population lived in rural areas and about 30% were working in agriculture. This seems like a high figure. On the other hand, the proportion of the agricultural population in the total population fell by 22 percentage points (to 48%) between 1950 and 2010. Furthermore, the contribution of agriculture to global GDP is falling. In 1970 its share was slightly higher than 10%, whereas in 2012 it was only about 3.1%.

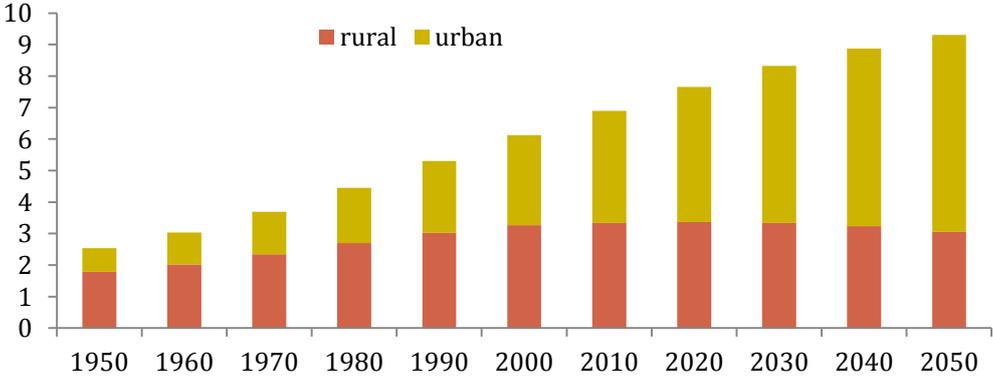
Table 1. Percentage of population working in agriculture, 1950-2010

Year	World	Developed countries	Developing countries
1950	67.1	35.7	81.8
1960	61.3	27.1	76.9
1970	56.1	18.1	72.1
1980	52.1	13.3	66.6
1990	48.9	10.2	61.4
2000	44.8	7.3	55.4
2010	40.8	5.4	49.4

Source: UN FAO (2000).

This remarkable structural change should not obscure the fact that the sheer size of the worldwide rural population has been continuously growing due to the high fertility rate. Only after 2020 is the rural population projected to start diminish globally, as illustrated in the figure below.

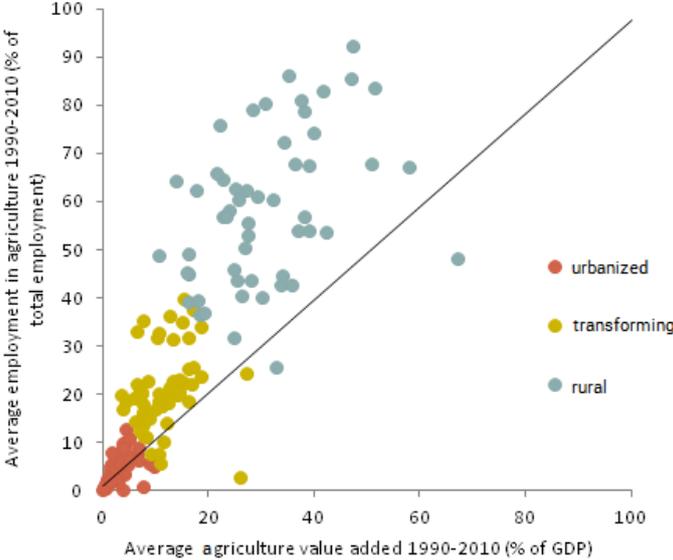
Figure 1. Rural and urban population worldwide 1950-2010 and forecast up to 2050 (billions of people)



Source: Own elaboration based on UN Population Division.

The contradiction between the developed and developing worlds does not fully capture the diversity of agricultural productivity patterns. There are countries where agriculture, usually in a form of subsistence farming, constitutes a cornerstone of the economy, both in terms of jobs creation and GDP share. There are countries in the middle (we've called them "transforming" countries), where agriculture is still important but other sectors of economy are quickly growing in importance. Finally, there are urbanised nations where farming has a miniscule share of employment and the added value. The boundaries between these three worlds are, by necessity, arbitrary, so we have plotted all the countries (for which data was available) in one chart with respect to their average employment share and the value added contribution of agriculture, and then divided them into three equally-sized groups.<sup>1</sup> The results are shown in figure 2.

Figure 2. The contribution of agriculture to GDP and employment in the world (by countries)

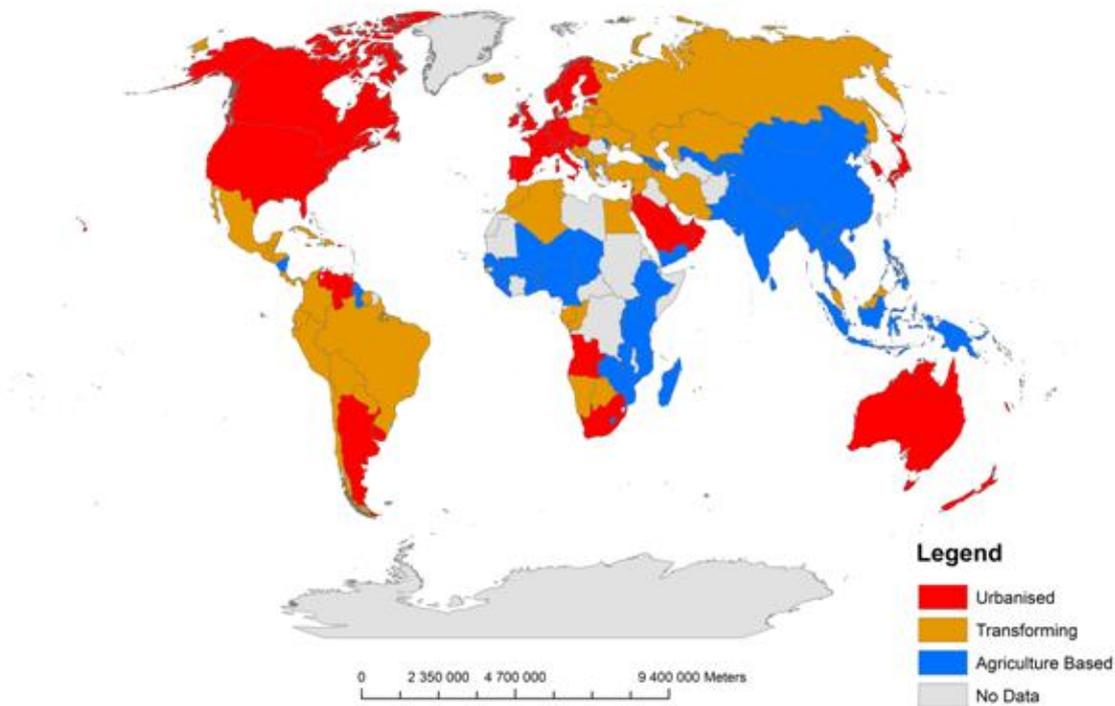


Source: Own elaboration based on the World Bank.

The figure above gives two main messages. Firstly, countries are very diverse in their dependence on agriculture. Secondly, most countries are placed to the left of the 45° line, which means that agriculture productivity is lower than average, as its share of GDP is typically much lower than its share in employment. The geographical distribution of the rural, transforming and urbanised countries is shown on the map below.

<sup>1</sup> This approach is inspired by the World Bank (2008) report on agriculture and poverty.

Figure 3. The geographical distribution of agriculture based, transforming, urbanised countries



Source: Own elaboration based on World Bank.

As we can see the global North is urbanised. Eastern European countries – e.g. Poland, Ukraine and the Baltic states - are transforming. Most of the former Soviet republics are also at the same level of development. Most East Asian countries are still agriculture-based, although they are trying to change their development trajectory as we will see in the next chapters. Africa, for which little data is available, is still an agricultural continent with the exception of South Africa and Angola – the latter being a resource-rich country. Although South America is still improving the productivity of its agricultural sector, it is not an agriculture-based continent. The question we want to answer in this paper is how to make more of the spots on the map red.

**WEALTH AND AGRICULTURE**

It is common knowledge that the wealth of a country is in inverse proportion to its dependence on agriculture, and that economic growth depends on structural change (the decline of the importance of agriculture and the rise of the industry and service sectors). Both statements are so compelling that they are rarely confronted with data. Yet it is worth doing so. As shown in the figures below, wealth is indeed correlated to a lower share of agriculture and the relationship is strong both with respect to GDP and the broader Human Development Index.

Figure 4. Agriculture Index and Human Development Index (countries)

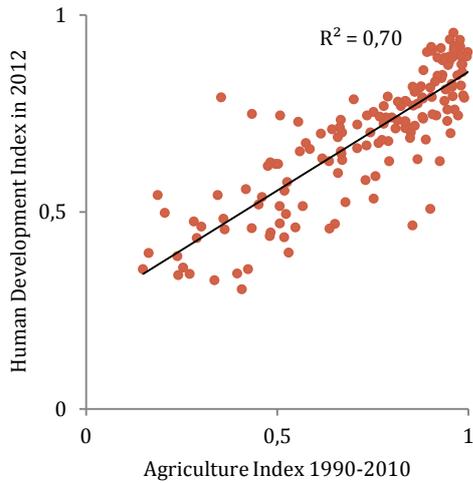
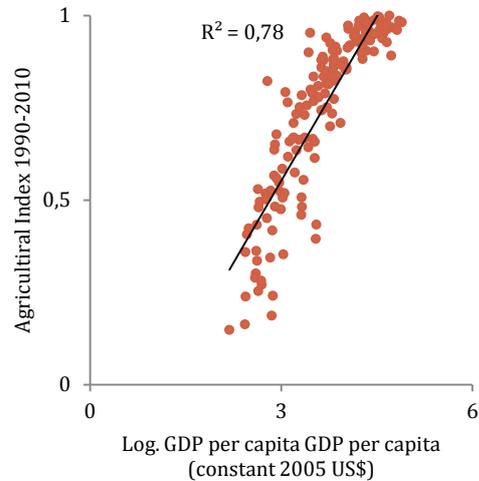


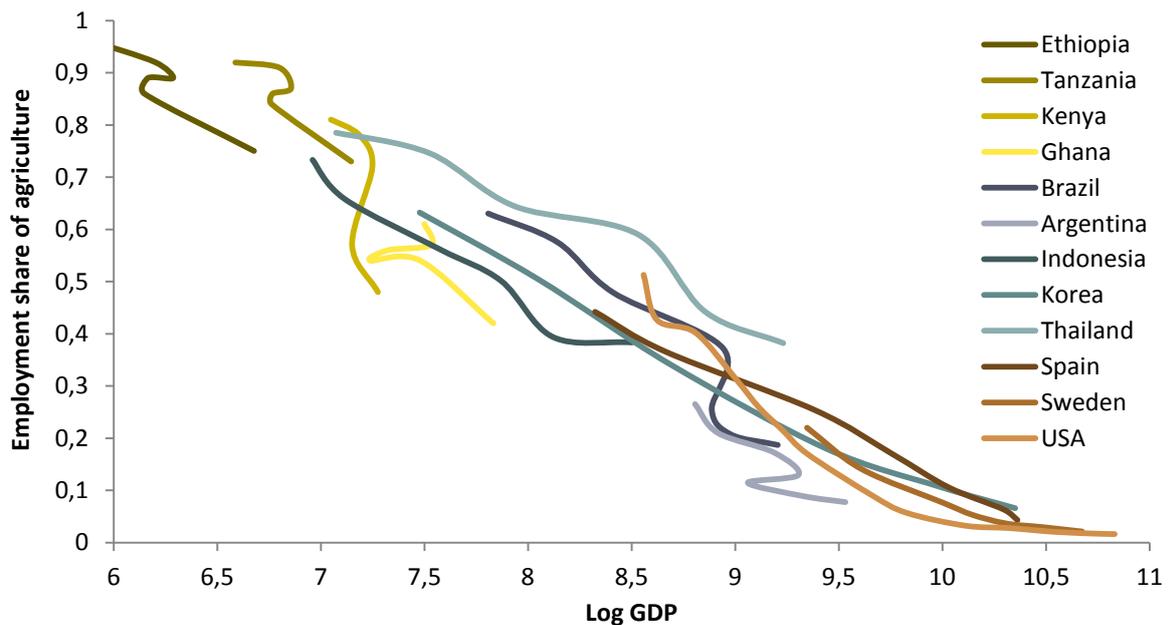
Figure 5. GDP per capita in 2010 (constant 2005 US\$) and Agriculture Index 1990-2010 (countries)



Source: Own elaboration based on the World Bank, UNDP

This relationship between wealth and the employment share of agricultural remains surprisingly strong when one takes into account the dimension of time. The following figure illustrates the growth paths of twelve countries from different parts of the world for as many years as data allows. Two empirical regularities characterise this structural agricultural transformation. Firstly, at low levels of development the share of agriculture in GDP and employment are large (up to 50% and 90%, respectively), but they decline as countries develop. Secondly, there is a large and persistent gap between the share of agriculture in GDP and the share of agriculture in the labour force.

Figure 6. GDP and employment share of agriculture for selected countries for years 1950/60-2010



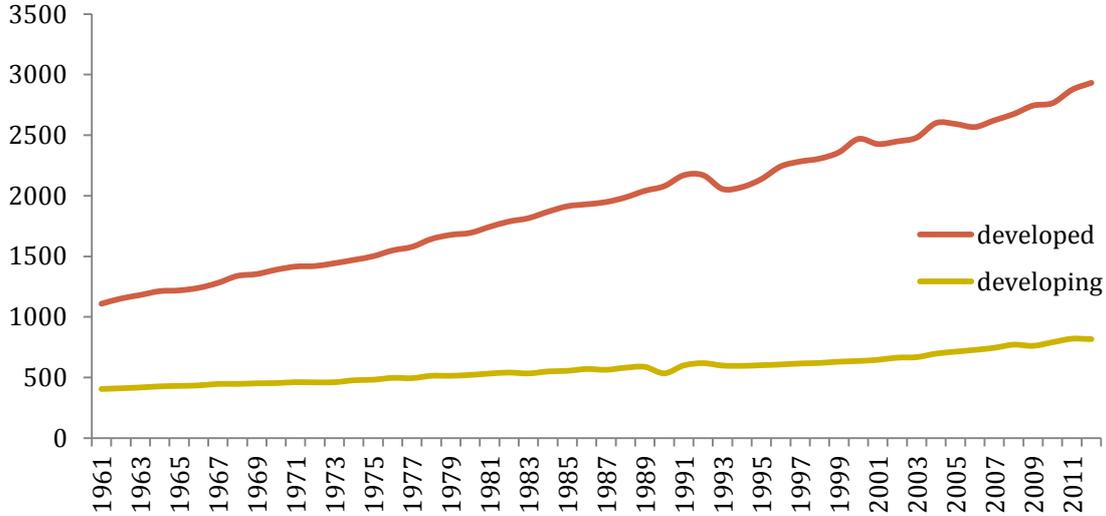
Source: Own elaboration based on GDDG 10-Sector Database

These two facts suggest a key but evolving role for agriculture in fostering growth. These patterns of structural transformation have been observed historically in most developed countries and are currently taking place in developing countries that are experiencing growth. But there are some noteworthy differences. In most Sub-Saharan countries, over the last 50 years the share of labour in agriculture has declined dramatically despite almost no growth in per capita GDP, as illustrated by Kenya and Ghana. The same is true for Latin America since 1980, as illustrated by Brazil and Argentina. By contrast, the reallocation of labour out of agriculture has been very slow in China, partly because of the restrictions on labour mobility, which, given the rapid growth outside of agriculture, is consistent with an increase in the rural-urban divide (Ravallion, Chen, & Sangraula, 2007) .

**AGRICULTURAL PRODUCTIVITY**

The world population has more than doubled since 1950, from approximately 2.5 billion to more than 7 billion today. The demands placed on global agricultural production due to the growth in population and income have almost tripled. Global agriculture has been successful in meeting this increase in demand, as the value of total agricultural output per rural inhabitant has grown on average by 1.9% since 1961. This observation has led Martin & Warr (1990) to the conclusion that agriculture has experienced constant healthy development, even though its pace has been slower than other sectors. On the other hand, the growth of agricultural productivity in developed countries has been faster than in developing countries (2% and 1.4% per year respectively) the productivity gap between these two worlds has widened, as illustrated by figure 7.

Figure 7. World agriculture product per rural inhabitant 1961-2012 (constant 2004-2006 PPP)



Source: Own elaboration based on FAOSTAT.

After half a century the productivity of the developing group of countries is still below the level of the developed ones in 1961. This means that there is high potential for improving agricultural productivity in developing countries. Given the fact that despite diminishing fertility rates, the world population is projected to reach 9.5 billion in 2050, increasing agricultural productivity in developing countries is crucial to ensure the global demand for food is met.

## 2 Drivers and barriers

Facilitating structural change has long been an important goal of various economic policies. The most prevailing and widely used method to achieve that aim has been some kind of state-directed industrialisation (Kohli, 2004). This policy usually takes one of two established forms, either import substitution industrialisation (popular in Latin American countries) or export oriented industrialisation (favoured by East Asian countries). The former aims at substituting imported industrial goods with domestic production, by protecting domestic industries using tariffs, import quotas, subsidised government loans for industry as well as public investment in infrastructure. The second policy is focused on supporting domestic industries producing goods for export. This means opening the market for international trade, encouraging foreign investment (especially with a transfer of technology) and subsidising exports (i.e. devaluing the currency).

Both types of industrialisation have had some success in bringing about structural change (most notably in South Korea, China, Vietnam and to some extent Brazil), but for a number of reasons they did not turn out to be universal remedies. First of all, the global demand for industrial products, although very large, is limited. Developing countries have managed to attract a lot of factories from the developed world, mainly due to the lower labour costs, but this strategy cannot be repeated indefinitely. At some point, developing countries will have to start competing with each other in a vicious cycle which will drive wages down, e.g. through currency wars. Furthermore, it should not be forgotten that not every country has favourable conditions (i.e. access to sea and trade routes) to become a major player in and beneficiary of international trade. On the other hand, attempts to protect domestic industries from foreign competition often fail to foster their development, but rather create moral hazards and political economy dilemmas. In both cases, state-driven industrialisation harms the development of international trade.

For these reasons we would like to focus on an alternative approach to facilitating structural change. The prevalent industrialisation paradigm may be characterised as a top-down approach, where the state takes the leading role in creating job opportunities (through the proper stimulation of the economy) and expects that agricultural workers will adjust. Another possible approach is more bottom-up. It starts with the observation that rural areas can generate economic demand for non-agricultural products, such as transport,

construction, machine repairs, small trade and personal services. This also means that rural areas have some potential to create non-agricultural jobs which might turn into a self-propelling process (Haggblade, Hazell, & Reardon, 2010). The key to unleashing this potential is improving agricultural productivity. The aim is to promote and modernize income-generating farms which in turn will feed rural demand for non-agricultural goods and services. Increased trade will benefit not only rural areas but also local economic centres and towns (Jatav & Sen, 2013).

The optimistic scenario presented above is far from wishful thinking, as non-farm employment in trade and services is very important in rural areas in all countries, making up over 40% of the total non-farm employment in Sri Lanka, Pakistan, India, the Philippines and Indonesia. The growth rate of non-farm employment ranges from 0.38% in the Philippines to 4% in Indonesia. The effect of non-farm enterprises on all rural household income (both farm and non-farm) was also quite significant and tended to increase over time. For example, in India it increased from 25.5% in 1967 to about 35% in 1981 while in Korea, from 18% to 37% for the same time period; and in Thailand, from 46% in 1971 to 63% in 1995 (Onchan, 2004).

Moreover, non-farm employment and income are important to landless and small farmers and hence to the poor. In India, non-farm employment constituted 46% of the total employment of the landless farmers. Similarly, the poorest groups of farmers in Korea, Taiwan, and Thailand obtained 80%, 67% and 88% of their respective incomes from non-farm sources. Also the story of recent structural change in Poland (described in box 1, next page) seems to support the notion of the vital role played by rural non-farm employment. Most people leaving agriculture started new jobs in local services sectors, such as construction, trade and repairs or transportation.

### Box 1. The patterns of Structural Change in Poland

Poland is one of the European countries that has undergone deagrarianisation and joined the group of developed countries relatively recently. As recently as 1995 the Polish agricultural sector employed 3.3 mil. people (23% of workers) and produced 7.9% of country's GDP.<sup>2</sup> 16 years later, in 2011 the number of agricultural workers has shrunk by 40% (to 2 mil. people) and its contribution to GDP has declined by more than half – to 3.7%. At the same time the labour productivity in agriculture has doubled, although it still lags far behind the levels of richer EU countries (mainly due to the poor quality of soil). Although the structural change in Poland is still in progress, significant progress has already been made.

With the panel data from Labour Force Survey, we can quite accurately describe the patterns of migration from agriculture in Poland during the period 1995-2011. The data is generally consistent with the regularities observed in other EU countries (Tocco, et al., 2013)

- Employment in agriculture is very stable. The risk of unemployment is 3 times lower than in other sectors. This is consistent with the well-known fact that the urban labour market is more competitive and risky than the rural labour market.
- The intensity of migration from agriculture depends on the phase of the business cycle. It slows down or even reverses during recessions and accelerates during booms. Agriculture acts as a buffer sector providing employment during economic downturns in other sectors. The share of unemployed among people flowing into agriculture was more than twice as high as the percentage of people who became unemployed after migrating from agriculture.
- The success of inter-sectoral migration depends highly on the level of education. The probability of finding a new job after leaving agriculture was:
  - 67% for people with tertiary education,
  - ≈50% for people with vocational training (primary or secondary),
  - 32% for people with general secondary education,
  - 14% for people with primary or no education.
- Those who succeeded most often found jobs in the following sectors:
  - 33% in manufacturing,
  - 20% in construction,
  - 19% in trade and repairs,
  - 6% in public administration,
  - 23% in other sectors.

In summary, over the past 20 years significant structural change has taken place in Poland. This process did not happen rapidly, but through the progressive and persistent outflow of agricultural workers to other sectors of economy, mainly manufacturing, construction, trade and repairs. One of the most important factors supporting this transition was good vocational or tertiary education.

*Source: own elaboration based on Kamińska (2013) research based on LFS data for Poland*

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<sup>2</sup> All data in this paragraph comes from the Polish Labour Force Survey.

In theory, increasing agricultural productivity is easy and involves farm enlargement and specialisation, complemented by the utilisation of better crops, machines and fertilizers. However, in developing countries there are numerous barriers which limit the availability of such improvements. These barriers can be summarised in the following points:

- **Lack of political support for the development of agriculture.** The successful modernisation of agriculture requires the active involvement of the state in the provision of some public goods: infrastructure, education and support for R&D in agriculture. However, the governments of developing countries often have a so-called urban bias (Lipton, 1977; Bezemer & Headley 2008) – favouring urban areas in development policies (especially in case of industrialisation) at the expense of rural areas. This frequently manifests itself in the excessive taxation of agricultural products and factors of production.
- **Malfunction of markets for agricultural factors of production.** Most of these factors (e.g. land, crops, and fertilizers) can and should be supplied through regular markets. But their operation is frequently hampered by unnecessary government intervention, such as the subsidisation and rationing of fertilizers and agricultural machinery, restrictions on purchasing land or the lack of a proper legal environment of the markets (enforcement rules, well-defined property rights, etc. – see Brooks 2010).
- **Limited access to credit and insurance.** The enlargement and modernisation of farms is often associated with substantial costs (Cadot, et al., 2006) and risk. On the other hand, poor farmers do not have access to the credit and insurance market due to a lack of sufficient collateral. Moreover, agricultural risks (e.g. adverse weather events) require tailor-made insurance products, which are simply not available in developing countries (Dercon, 2002). Farmers respond to this by investing less in agriculture, diversifying agricultural production and growing crops that are less prone to adverse weather conditions, but are also less profitable (Dercon & Christiaensen, 2011). Consequently, the limited access to credit and insurance is one of the main barriers to agricultural development.

One should not forget that even in the absence of these barriers, the economy might not experience structural change. There are numerous other factors that petrify the *status quo*. Most of them simply prevent labour from flowing between rural and urban areas or different sectors of economy, such as:

- **Explicit legal restrictions about changing the place of residence.** The classic example is the *hukou* – a household register system in China that limits migration and regulates the eligibility for state-provided healthcare, education and housing (Chan & Zhang, 1999).

- **Labour market rigidity, such as the minimum wage (if too high), employment protection legislation or working time regulations.** They increase labour costs, hinder the creation of jobs (by lowering the relative price of capital) and stimulate the growth of the shadow economy.
- **Cultural norms that discourage mobility.** One such norm is reluctance towards individual entrepreneurship and profit-seeking behaviour. The other important barrier is the discrimination of women and the restriction on their mobility and engagement in paid work outside agriculture (in its most radical form – *Purdah* this practice prevails in Pakistan and Afghanistan). It has an enormous impact on inter-sectoral migration because according to ILO data, women dominate in agricultural employment in developing countries.

In summary, successful state-driven industrialisation is not the only way, nor a universal way, of achieving structural change. The policy is to raise the productivity of agriculture and bolster rural demand for non-agricultural products, which in turn should create new employment opportunities for agricultural workers and encourage migration. However, this process is hampered in developing countries by numerous barriers. In the next chapter we will summarise the main instruments to overcome these barriers.

### 3 Policy implications

Development and structural change are complex issues for which no easy policy recommendations can be made. The successful transformation of the economy is usually a result of numerous interrelated factors, such as the rule of law, a stable macroeconomic environment, access to international trade, the availability of human capital and natural resources etc. Moreover, each country has a different agricultural sector and different socio-economic environment, which has an impact on which policies they will need. That being said, the existing research and experience provide some basis for formulating general policy guidelines. We will focus on two different areas of intervention. One is supporting the development of the agricultural sector, which – as was earlier explained – is instrumental for structural change. The other is reducing the barriers of migration between rural and urban areas.

The development research seems to provide two general lessons for policymakers wishing to facilitate agricultural development to foster structural change. Firstly, this process requires the existence of an efficient market for factors of production and agricultural products. This means that policymakers should target market friction resulting from price controls, excessive taxation, restrictions on land accumulation, etc. Secondly, apart from the market, agricultural development also requires certain public goods, such as rural infrastructure (roads, melioration), research and development activities, safety nets, training and education. The last sphere of public engagement in particular is often emphasised as

an important instrument of structural change (e.g. Brooks, 2010; Krueger & Lindahl, 2011). The specific solutions for these barriers are outlined in the following table.

**Table 2. The barriers of structural change and possible solutions to them**

	Barrier	Possible solutions
<b>Agricultural development</b>		
1.	Lack of political support for agricultural research and development	<ul style="list-style-type: none"> <li>• Including agricultural development into national strategy documents and operational programs as one of the priorities</li> <li>• Funding a research programme and implementation strategy for the development of domestic agriculture</li> <li>• Increasing public investment in rural infrastructure</li> <li>• Encouraging farmers to raise their competitiveness by forming producer groups and cooperatives</li> <li>• Promoting agricultural investment through conditional cash transfers or input subsidies</li> </ul>
2.	Excessive taxation or price control of agricultural products	<ul style="list-style-type: none"> <li>• Price liberalisation of agricultural products and factors of production</li> <li>• Shifting the tax burden from farmers to the whole population</li> </ul>
3.	Restricted access to credit for farmers	<ul style="list-style-type: none"> <li>• Developing incentives for banks to provide financial services to farmers</li> <li>• Support for microcredit schemes targeting rural populations</li> </ul>
4.	Lack of insurance services dedicated to farmers	<ul style="list-style-type: none"> <li>• Providing farmers with a public insurance scheme which supports them in case of adverse events, such as floods, droughts and crop disease.</li> <li>• Encouraging insurance companies to offer farmers dedicated services (in particular weather insurance).</li> </ul>
5.	Lack of an efficient land market	<ul style="list-style-type: none"> <li>• Granting farmers the ownership (instead of lease) of agricultural land.</li> <li>• Allowing free trade of agricultural land</li> </ul>
<b>Rural-urban migration</b>		
6.	Explicit mobility barriers, such as a household register system ( <i>hukou</i> in China)	<ul style="list-style-type: none"> <li>• Liberalisation of internal migration policy</li> <li>• Developing paths for migrants from rural areas to legally relocate and sign employment contracts</li> </ul>
7.	Discrimination of woman, restricting them from working	<ul style="list-style-type: none"> <li>• Identification and revocation of all discriminating laws</li> </ul>

	outside agriculture, such as the <i>pardah</i> system in Central Asia	<ul style="list-style-type: none"> <li>• Anti-discrimination programmes in public institutions</li> <li>• Promotion of the empowerment of women in public education</li> </ul>
8.	Lack of proper education and training of the rural population to work outside of agriculture	<ul style="list-style-type: none"> <li>• Broadening the access of the rural population to secondary education and vocational training in modern education and the skills necessary for construction, manufacturing, transport, trade and personal services</li> </ul>
9.	Labour market rigidities	<ul style="list-style-type: none"> <li>• Reduction of the minimum wage (if too high)</li> <li>• Introduction of more flexible labour market regulations, with regards to</li> <li>• Anti-discrimination programmes in public institutions</li> </ul>
10.	Prevalence of high urban unemployment	<ul style="list-style-type: none"> <li>• Strengthening the safety nets and social security system</li> <li>• Modernising employment services by introducing active labour market policies</li> </ul>

*Source: own elaboration*

## 4 Conclusion

Over the past few decades, the role of agriculture in the global economy has undergone a major change. Its share of employment has significantly diminished and the productivity per worker as well as overall food production has greatly increased. This was caused not only by technical progress in agriculture, but also by the creation of new job opportunities in the manufacturing and service sectors. Despite population growth, the world has become less rural and more urbanized, which is associated with a drop in poverty and general improvements in living standards. This process has occurred on global scale, but was much more pronounced in developed countries than in developing ones. For this reason, the facilitation of structural change is both an opportunity and a major challenge for the developing world.

Historically, the most commonly used policy to facilitate structural change has been state-driven industrialisation, either in the form of import substitution or export oriented industrialisation. However, this does not seem to be a universal way to achieve the desired goal. As a solution, we advocate a different approach in which the productivity growth in agriculture, stimulated by public policy, is the first step in the process of structural change. The idea is to help farmers receive surplus income, increase the rural demand for non-agricultural products and foster the creation of new job opportunities outside agriculture. For that purpose, policymakers need to overcome the main barriers of agricultural development and inter-sectoral migration, namely the malfunctioning of the agricultural market (due to price controls, excessive taxation, trade restrictions and lack of capital) and the low quality of necessary public goods – education and training, agricultural R&D and rural infrastructure.

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