

CSN/14/01

Policy Papers on Countries with Special Needs



The role of agriculture in closing development gaps of LDCs

Clovis Freire

Macroeconomic Policy and Development Division (MPDD)

Economic and Social Commission for Asia and the Pacific
United Nations Building, Rajadamnern Nok Avenue, Bangkok 10200, Thailand;
Email: escap-mpdd@un.org

Series Editor

Dr. Syed A.M. Nuruzzaman,
Chief, Countries with Special Needs Section
Macroeconomic Policy and Development Division

The role of agriculture in closing development gaps of LDCs

Clovis Freire



This page is left blank intentionally.

CSN/14/01

Policy papers on Countries with Special Needs
Macroeconomic Policy and Development Division

The role of agriculture in closing development gaps of LDCs*

by Clovis Freire¹

June 2014

Abstract

The views expressed in this Working Paper are those of the author(s) and should not necessarily be considered as reflecting the views or carrying the endorsement of the United Nations. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate. This publication has been issued without formal editing.

Least developed countries (LDCs) in the Asia-Pacific region face severe structural impediments to growth and sustainable development. Given that the majority of their population makes living from agriculture, the development of that sector is a key priority of action for their inclusive and sustainable development. But agriculture in Asia-Pacific LDCs is characterized by subsistence practices with low levels of value added per worker, inadequate access to both national and global markets and inability to foster increases in labour productivity. This paper proposes a five-step integrated strategy that uses intersectoral linkages and labour movements between agriculture and agro-industries to accelerate progress in closing development gaps in Asia-Pacific LDCs.

JEL Classification Numbers: O13, O14, O18, O25.

Keywords: Agriculture, Industrialization, Diversification, Structural Transformation, Productive Capacities, Economic Development

Authors' E-Mail Address: freire@un.org.

* The author is grateful to Anisuzzaman Chowdhury, Katinka Weinberger, Mia Mikic, Muhammad Malik, Syed A.M. Nuruzzaman, and Upali Wickramasinghe for comments and suggestions for improvement on an earlier version of this paper. The author is also grateful to Gabriela Spaizmann, Eric Roeder for excellent research assistance. All errors are my own. The views expressed herein are those of the author and do not necessarily reflect the views of the United Nations.

1. Clovis Freire, Economic Affairs Officer, Countries with Special Needs Section, Macroeconomic Policy and Development Division, United Nations Economic and Social Commission for Asia and the Pacific, United Nations building, Rajadamnern Nok Avenue, Bangkok 10200, Thailand.

This page is left blank intentionally.

The role of agriculture in closing development gaps of LDCs

Clovis Freire

INTRODUCTION

For a group of 12 least developed countries (LDCs) in the Asia-Pacific region, persistent forms of poverty, serious structural impediments to growth, low levels of human development and high exposure to shocks and disasters pose long term challenges that call for long term development strategies. These countries have a lot to catch up with the levels of development of other countries of the region (box 1). Given that the majority of their population is in rural areas and makes living from agriculture, the development of that sector is a key priority of action for promoting inclusive and sustainable development – a point being emphasized time and again in the Survey.¹

At the outset it is important to emphasize that agriculture in this paper is not only related to staple food crops.² Most LDCs have a sizeable production of meat (cattle, pig, chicken, goat, etc.), vegetables, fruits, and cash crops such as cotton and tobacco. Aquaculture and fisheries as well are part of the production basket not only of Pacific LDCs but also Bangladesh, Cambodia, Myanmar and even of landlocked LDCs such as Lao People's Democratic Republic and Nepal.

A review of the status of the agricultural sector in the LDCs suggests that some of the important differences between these countries and other countries of the region are the large shares of employment in the agricultural sector, dominance of subsistence agriculture and low levels of value added per worker, inadequate access to both national and global markets and inability to foster increases in productivity. Therefore, although agriculture is also a key sector in the majority of the developing countries in the Asia-Pacific region, these specific characteristics of agricultural sector in the LDCs justify a focused analysis on the challenges that these countries face and the opportunities that may present to them.

This paper argues that, given their particular situation, LDCs in Asia-Pacific should consider an integrated strategy that uses intersectoral linkages and labour movements between agriculture and agro-industries to promote agricultural and rural development. The implementation of that strategy has great potential to reduce development gaps of these countries by increasing per capita incomes, reducing their economic vulnerability through diversifying their production base and exports, and increase human assets by reducing rural-urban disparities.

Box 1. The least developed countries: what and who are they?

The LDCs comprise developing countries that face severe structural impediments to growth and sustainable development. The category was created by the United Nations through its resolution 2768 (XXVI) of 18 November 1971. Although refined over the years to take into account new insights from research on economic development, updated information on structural impediments to development and improvements in the availability of internationally comparable data, the principle underlying the criteria for identifying LDC has essentially remained the same.

Currently there are 48 countries in the world designated as LDCs, and 12 of them are in the Asia-Pacific region: Afghanistan, Bangladesh, Bhutan, Cambodia, Kiribati, Lao People's Democratic Republic, Myanmar, Nepal, Solomon Islands, Timor-Leste, Tuvalu and Vanuatu. These countries are substantially diverse in size and geography, with population sizes ranging from 150 million in Bangladesh to only 11 thousand in Tuvalu. Yet they share similar structural handicaps and impediments to growth. These limitations are manifested in a low level of human resource development and a high level of structural economic vulnerability. Currently, the identification of LDCs and graduation out of LDC status depends on predetermined threshold values of three main criteria that identify the structural handicaps:

(a) A “low-income” criterion, based on a three-year average estimate of the gross national income (GNI) per capita, with a threshold of \$905 for possible cases of addition to the list, and a threshold of \$1,806 for graduation from LDC status.

(b) A “human assets weakness” criterion, involving a composite index - the Human Assets Index (HAI) – based on indicators of (i) nutrition (percentage of the population that is undernourished); (ii) health (child mortality rate); (iii) school enrolment (gross secondary school enrolment rate); and (iv) literacy (adult literacy rate).

(c) An “economic vulnerability” criterion, involving a composite index - the Economic Vulnerability Index (EVI) – based on indicators of (i) natural shocks (index of instability of agriculture production, share of the population made homeless by natural disasters); (ii) trade shocks (an index of instability of exports of goods and services); (iii) exposure to shocks (share of agriculture, forestry and fisheries in GDP; index of merchandise export concentration); (iv) economic smallness (population in logarithm); and (v) economic remoteness (index of remoteness).

LDCs in Asia-Pacific lag behind developing countries in the region on a number of socio-economic indicators (table A). Only 28% of their population lives in cities, in comparison to 42% of ESCAP developing countries. Under-5 mortality rate (59.9) is 40% higher than ESCAP developing nations (42.5), and the share of their population living in poverty (38.8%) is double of their developing counterparts (18.9%). GDP growth in a 20-year period has been similar for least developed and developing countries in the region, but GDP per capita of the former (US\$ 1,157) is nearly a quarter of the latter (US\$ 5,873).

Table A. Socio economic indicators of Asia-Pacific LDCs, 2011

Country/country group	GDP per capita	Population size	Urban population	Under-5 mortality rate	GDP (2005 U\$) growth		Population living in poverty
	Valued at PPP of 2005	Millions	% of total population	Deaths per 1,000 live births	% change per annum 1991-2001	2001-2011	PPP \$1.25 a day % of the pop. (latest)
Afghanistan	1,098	32.4	23	101.1	-4.3	12.8	-
Bangladesh	1,569	150.5	29	46.0	4.9	6.0	43.3 ⁽²⁰¹⁰⁾
Bhutan	5,162	0.7	35	53.7	5.9	8.5	-
Cambodia	2,083	14.3	20	42.5	6.9	7.9	22.8 ⁽²⁰⁰⁸⁾
Kiribati	2,063	0.1	-	47.4	2.7	1.6	-
Lao People's Democratic Republic	2,464	6.3	34	41.9	6.3	7.4	33.9 ⁽²⁰⁰⁸⁾
Myanmar	-	48.3	34	62.4	8.3	11.5	-
Nepal	1,106	30.5	19	48.0	4.9	3.8	24.9 ⁽²⁰¹⁰⁾
Solomon Islands	2,581	0.6	19	21.6	0.8	5.4	-
Timor-Leste	1,420	1.2	29	54.1	2.6	20.8	-
Tuvalu	-	0.01	-	30.5	4.8	0.4	-
Vanuatu	3,930	0.2	26	13.2	2.0	3.6	-
ESCAP LDCs	1,517	285.3	28	59.9	4.6	7.2	38.8⁽²⁰¹⁰⁾
ESCAP developing economies	5,873	4,064.2	42	42.5	4.5	7.3	18.9 ⁽²⁰⁰⁸⁾

Source: ESCAP based on United Nations Statistics Division, National Accounts Main Aggregates Database; United Nations Population Division, *World Population Prospects, the 2010 Revision*; World Health Organization, Global Health Observatory Database, *World Health Statistics*; and United Nations Millennium Development Goals Indicators Database.

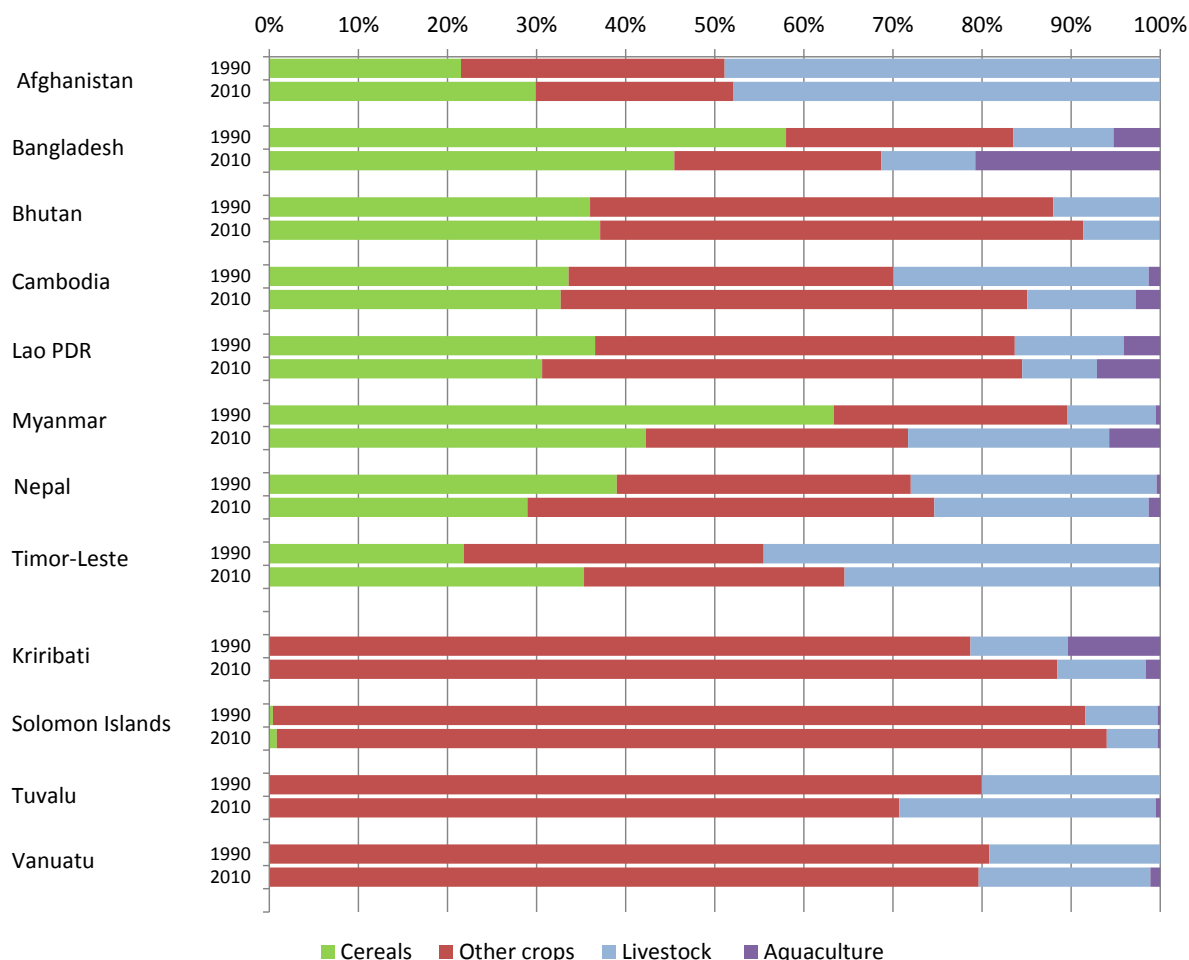
1. AGRICULTURAL SECTOR IN THE ASIA-PACIFIC LDCS

As emphasized in the previous section, agriculture is not just staple food crops. In Asian LDCs, agriculture is characterized by different activities. On average, as shares of production value, agriculture is comprised of 35% cereal crops, 39% other crops (fruits, vegetables, roots and tubers, seeds, spices, etc.), 21% livestock and 5% aquaculture (figure 1). Cereal crops comprise a larger share in Bangladesh (45%) and Myanmar (42%), and a lower share in Afghanistan (30%) and Nepal (29%). Other crops account for around half of the production in value in Bhutan (54%), Cambodia (52%), Lao People's Democratic Republic (54%) and Nepal (46%). Livestock is more important in Afghanistan (48%), Nepal (24%) and Timor-Leste (35%) than in the other Asian LDCs, while aquaculture accounts for a very low share in most of these LDCs except in Bangladesh, where it represents 21% of total production value. In Pacific LDCs, other crops dominate, particularly coconuts and roots and tubers, accounting for over 80% of the total production in value, while livestock production represents 16% on average. Aquaculture, which is the farming of fish, crustaceans and other aquatic organisms, is not as common as fishing and represents less than 2% of the value of agricultural production in Pacific LDCs.³ There is no internationally comparable data on the contribution of fishing but that activity accounts for a large share of exports of Solomon Islands and Vanuatu, although it is not as important in Kiribati and Tuvalu, where fishing rights are granted to other countries to explore their resources.

The structure of agriculture has changed in Asian LDCs over the past two decades. In most of these countries, other crops have expanded as shares in total agricultural production value. Notable changes by country are the sharp increase of aquaculture in Bangladesh, from 5% in 1990 to 21% in 2010, and the diversification in Myanmar's production with an increase

in livestock and aquaculture and reduction of the dominance of cereal crops. In the Pacific LDCs, the structure of agriculture has not changed much and non-cereal food crops continue to dominate.

Figure 1. Structure of Agriculture, selected LDCs (percentage share in total production value)



Source: Author based on FAO Statistics 2013, Value of Agricultural Production dataset, available from <http://faostat3.fao.org/faostat-gateway/go/to/home/E> (accessed 24 February 2014), and FAO Fishery and Aquaculture Global Statistics.

Notes: Data of gross production value in constant 2004-2006 million US\$. Values corresponded to three year averages.

Given the importance of agricultural activities for LDCs in Asia-Pacific, it would be expected that a large share of land was dedicated to agricultural production. However, somewhat surprisingly, Asian LDCs have a lower share of their land dedicated to crops and pasture than the world's average (37.6%) and the average for lower (38.6%) and middle income countries (44.3%) (table 1). The exceptions are Afghanistan and Bangladesh with 58.1% and 70.1% of their land dedicated to agriculture respectively. On the other hand, share of land dedicated to food crops is in general higher in Asian LDCs.

Investment in agricultural inputs (irrigation, machinery and fertilizers) is in general very low in these countries. Relative to global averages, Bangladesh makes more use of

fertilizers with 184.4 kg per hectare of arable land, and Nepal makes more use of machinery (23.8 tractors per 100 sq. km of arable land) when compared with other low income countries. However, cereal yield for these countries is about the same as for the other Asian LDCs, which is in average 3,000 kg per hectare. That is almost 50% higher than the average yield of low income countries (1,982 kg per hectare) but still lower than the global average (3,622 kg per hectare). Agricultural indicators for Pacific LDCs are also shown in table 3.1 but they should be interpreted taking into consideration the smallness of their land area. For example, the number of tractors per 100 sq. km of arable land is 88.9 in Kiribati but that corresponds to only 18 tractors in 2003, given the small area of the country (810 sq. km).

Table 1. Agricultural indicators, Asia-Pacific LDCs, 2011

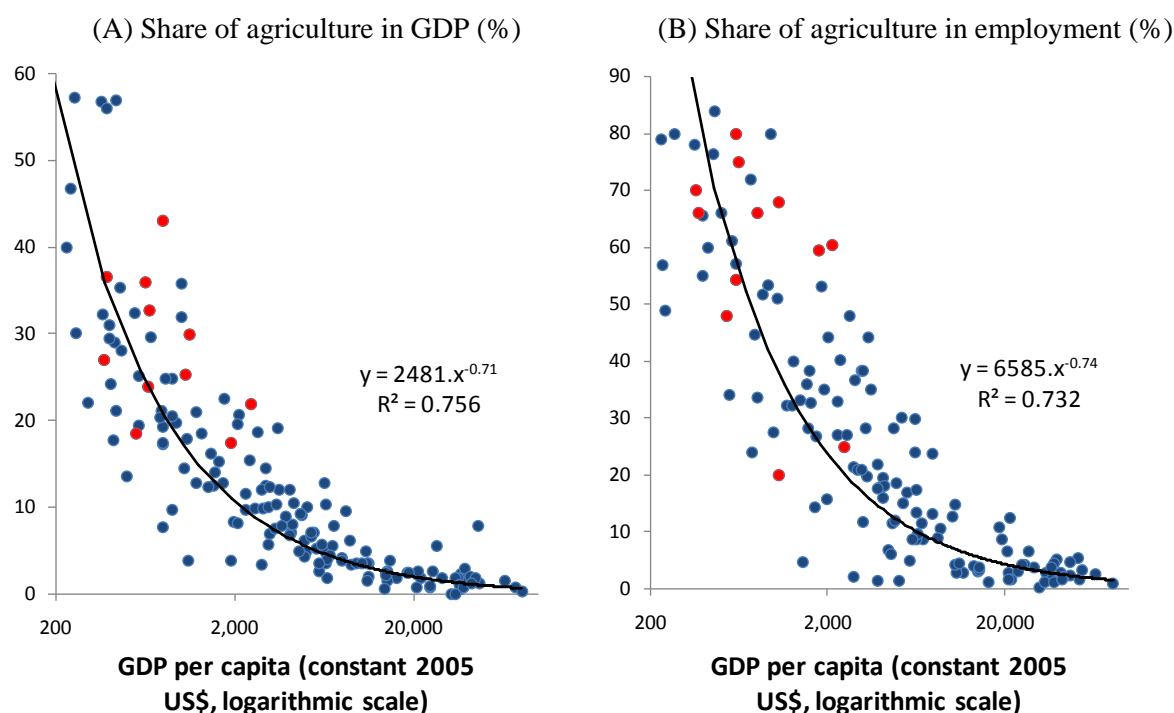
Country / country group	Agricultural land crops and pasture % of land area	Arable land crops only % of land area	Agricultural irrigated land % of total agricultural land	Tractors Number per 100 sq. km of arable land (d)	Fertilizer consumption kg per hectare of arable land	Cereal yield kg per hectare
<i>Asian LDCs</i>						
Afghanistan	58.1	11.9	5.4	1.1	4.3	2,072
Bangladesh	70.1	58.6	52.6 (a)	7.2	184.4	2,988
Bhutan	13.5	2.5	6.7 (b)	12.2	11.5	2,663
Cambodia	32.0	22.7	-	6.5	-	2,942
Lao PDR	10.3	6.1	-	7.7	-	4,082
Myanmar	19.2	16.5	24.8 (b)	9.8	6.2	3,864
Nepal	29.7	16.4	27.4 (c)	23.8	23.2	2,719
Timor-Leste	24.2	10.1	-	7.7	-	2,342
<i>Pacific LDCs</i>						
Kiribati	42.0	2.5	-	88.9	-	-
Solomon Island	3.30	0.6	-	5.4	-	4,000
Tuvalu	60.0	-	-	-	-	-
Vanuatu	15.3	1.6	-	38.5	-	571
Low income	38.6	9.8	-	15.5 (e)	25.2	1,982
Middle income	44.3	12.2	-	110.4 (f)	175.7	3,653
World	37.6	10.8	-	195.9 (g)	133.5	3,622

Source: Author based on World Bank, Agriculture and rural development data, available from <http://data.worldbank.org/data-catalog/world-development-indicators>, and FAO Statistics Investment, available from <http://faostat3.fao.org/faostat-gateway/go/to/home/E> (accessed 24 February 2014).

Notes: a 2006, b 2007, c 2008, d 2003, e 1996, f 1999, g 1998.

Agriculture, including fishing and forestry, still accounts for a sizable share in total output of the Asia-Pacific LDCs, but that share has been declining over the years. This is expected with economic development, which is associated with sectoral transformation away from agriculture to a more diversified economy dominated by industry and services. The Asia-Pacific LDCs (marked red in figure 2) fit the global pattern.

Over the past decade the majority of the LDCs in Asia-Pacific have followed the path of structural transformation as observed elsewhere. As shown in table 2, the percentage of total output in agriculture has reduced in all these countries, except for Kiribati, Solomon Islands and Tuvalu. Faster change in the share of agriculture in value added between 2000 and 2010 was experienced in Afghanistan (from 56.6% to 31.1%), Myanmar (from 58.1% to 37.6%) and Timor-Leste (from 25.3% to 4.9%). That is not the result of a decline in agriculture in absolute terms. On the contrary, with structural transformation agriculture output has increased while its share in total output reduces, as result of an even faster increase in output in industry and services.

Figure 2. Sectoral changes associated with higher incomes, 2010

Source: Author based on World Bank, World Development Indicators Database. Available from <http://data.worldbank.org/data-catalog/world-development-indicators> (accessed 28 January 2014).

Note: Asia-Pacific LDCs represented by red markers.

Table 2. Sectoral structure of total output in Asia-Pacific LDCs

Country	GDP per capita (current US\$)		Percentage of total output in						Average annual growth rate of gross value added, period 2000 to 2010		
	2000	2010	Agriculture		Industry		Services		Agriculture	Industry	Services
Afghanistan	172	566	56.6	31.1	23.0	22.7	20.4	46.2	4.7	11.9	19.8
Bangladesh	344	660	25.3	18.6	25.5	28.6	49.3	52.9	3.6	7.5	6.1
Bhutan	778	2,211	27.6	18.2	36.8	44.0	35.6	37.8	2.3	10.7	8.9
Cambodia	300	783	39.1	36.1	21.9	23.3	39.0	40.6	4.9	10.7	8.4
Kiribati	807	1,495	23.1	25.7	11.5	8.5	65.4	65.8	0.8	-1.5	2.0
Lao PDR	309	1,054	43.6	29.9	18.8	27.5	37.6	42.6	3.3	11.7	9.5
Myanmar	150	813	58.1	37.6	9.8	25.0	32.2	37.5	8.6	20.2	13.3
Nepal	247	608	37.5	35.2	17.2	15.3	45.3	49.5	3.4	2.7	4.6
Solomon Islands	820	1,283	31.5	28.9	13.2	10.2	55.3	60.9	3.8	-2.1	3.8
Timor-Leste	461	3,827	25.3	4.9	31.2	80.6	43.5	14.5	3.7	33.3	7.2
Tuvalu	1,302	3,259	18.3	22.0	13.4	9.4	68.3	68.6	0.0	2.5	2.0
Vanuatu	1,470	2,892	26.1	21.5	10.5	10.8	63.5	67.7	2.2	2.9	4.1

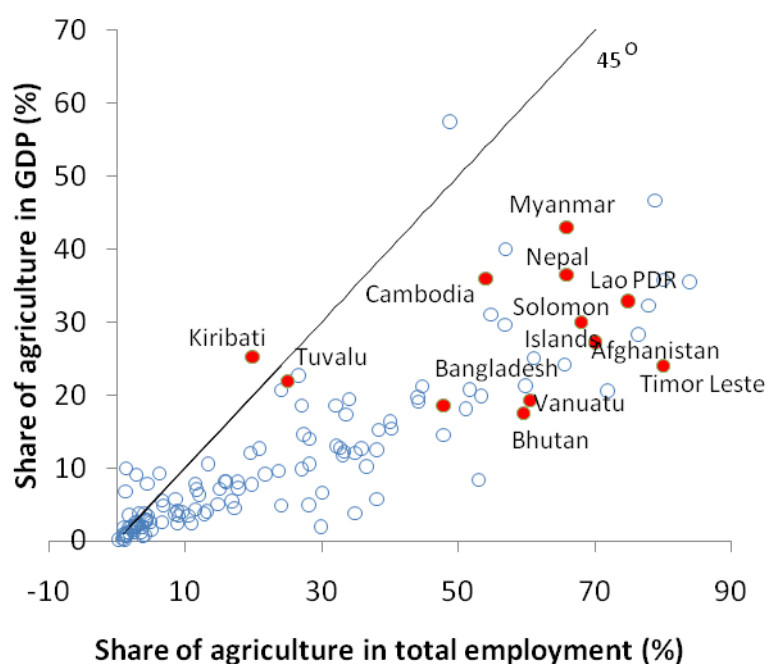
Source: Author based on data from ESCAP Online Statistical Database. Available from <http://www.unescap.org/stat/data/statdb/DataExplorer.aspx> (accessed 28 January 2014).

Notes: a) Sectoral shares in total output were calculated based on data on GDP per capita in current US dollars. Average annual growth rates of gross value added were calculated based on data of gross value added per sector in millions of constant 2005 US dollars; b) Given the low production base of LDCs and the variability of total output, the percentages of output in agriculture, industry and services and the compound annual growth rates of the three sectors refers to three-year averages.

But the changes of sectoral shares in total output are just half of the story – the other is the change in employment. In the majority of Asia-Pacific LDCs, over half of the working population are employed in the agricultural sector – as many as 80% in Timor-Leste, 75% in Lao People’s Democratic Republic and 70% in Afghanistan. In Kiribati and Tuvalu these shares are lower, but still one in every four people in these two countries is employed in agriculture. In early stages of development, industrial and services sectors grow at a faster rate, but given the higher capital intensity, particularly in industry, labour is not as rapidly absorbed by these sectors. Thus, the share of agriculture in GDP declines faster than the share of employment in agriculture.

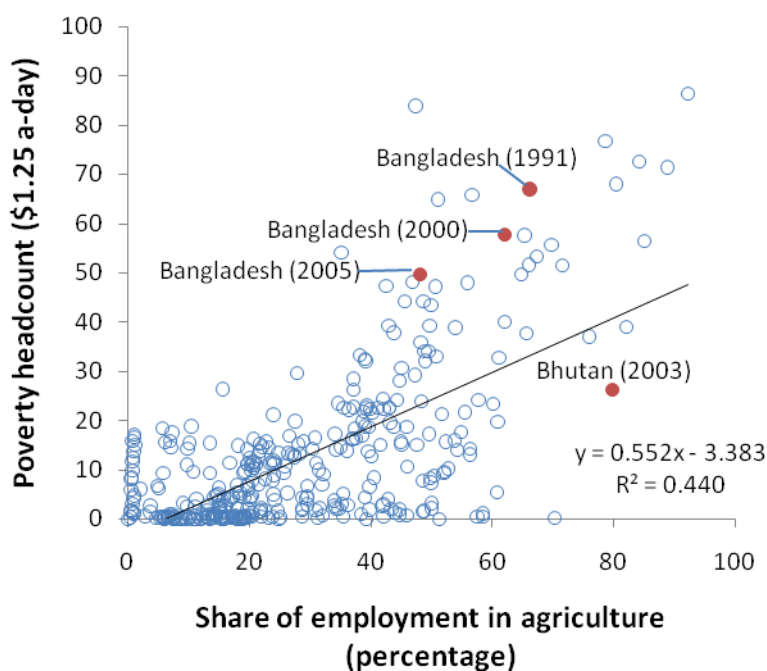
One of the factors that have contributed to continuing poverty in the LDCs is the fact that agriculture continues to offer employment and livelihoods to a larger proportion of people; yet the contribution of the agricultural sector to GDP is relatively low, thus making those working in that sector relatively poorer. Figure 3 shows the association between the shares of agriculture in GDP and employment. A great majority of countries are located below the 45-degree line, indicating that across the world the share of agricultural employment is generally higher than the share of agriculture in GDP. The exceptions are Kiribati and Tuvalu, the least populous of the group, with 102 thousand and 11 thousand people respectively,⁴ where agriculture represents around 20% of employment and GDP.

Figure 3. Share of agriculture in GDP and employment, 2010



Source: Author based on World Bank, World Development Indicators Database. (Accessed 28 January 2014).

Figure 4. In general, poverty is prevalent in countries where majority of workers are in agriculture



Source: Author based on World Bank PovcalNet and World Development Indicators Database. (Accessed 24 April 2014).

In general, poverty is prevalent in countries where the greatest majority of the working population are in agriculture (figure 4). For example, in Bangladesh poverty reduction has followed closely the movement of workers out of agriculture – In 1991 the poverty rate was 66.8% and the share of workers in agriculture was 66.4%; in 2000, poverty rate reduced to 57.8% and the share of agricultural workers declined to 62.1%; and in 2005 poverty stood at 49.8% of the population while 48.1% of workers were in the agriculture.

Structural transformation of employment out of agriculture is a key factor for the development of agriculture and increase in standard of living in rural areas.⁵ The reason is that the move out of agricultural sector usually represents a shift from low to more productive economic activities in industry and services, which further broadens the market for agricultural products. Fewer workers in agriculture also create incentives for using technology to increase the productivity per worker in that sector.

Although differing in many ways in terms of agricultural production and structural characteristics, in the majority of the Asia-Pacific LDCs, people are still largely dependent on low productivity agriculture for livelihood and employment. Agricultural productivity in the Asian LDCs will have to increase manifold if they were to achieve the global or middle income countries' average levels (table 3). The LDCs of the Pacific show higher levels of agricultural value added per worker because of the contribution of fishing, which is relatively more capital intensive, in the broad agricultural sector. An exception is the Solomon Islands where coconuts are the most important crop. Nevertheless, large shares of workers are in agricultural sector, including fishing, generating relatively much less value than workers engaged in other activities within these economies.

Table 3. Agricultural value added per worker (constant 2005 US\$)

Country/Group	2000	2011
<i>Asian LDCs</i>		
Afghanistan	428 a	359
Bangladesh	324	475
Bhutan	947	625
Cambodia	375	508
Lao PDR	432	474
Nepal	263	265
<i>Pacific LDCs</i>		
Kiribati	2,233	2,181 b
Solomon Islands	811	1,177 b
Tuvalu	4,371	4,905
Vanuatu	2,374	2,714
World	1,059	1,087
Middle income	719	954

Source: Author based on World Bank, World Development Indicators Database. Available from <http://data.worldbank.org/data-catalog/world-development-indicators> (accessed 28 January 2014).

Notes: Agriculture is defined in the broad sense to include livestock, fisheries and forestry. Data corresponds to: a – 2002; b – 2009.

The low productivity of agriculture in LDCs is such that a large share of the population engaged in the sector is able to produce only the bare minimum for their survival. Many who practise subsistence agriculture, including livestock and fishing, also barter or sell a small share of their produce. This makes the compilation of internationally comparable data challenging. Nevertheless, where data are available, the evidence shows that a large share of people living from agriculture practise subsistence agriculture. In Timor-Leste, for example, of those who work in agriculture, three-fourths are subsistence farmers.⁶ In Lao People's Democratic Republic, almost a third of the farm households practise subsistence agriculture (box 2).

The dominance of subsistence agriculture may suggest that the development challenge is to facilitate the transition from subsistence to market-oriented production. But that is not entirely correct. If all subsistence workers move to market-oriented agricultural production they would increase output from specialization, but these gains are limited by the extent of the market. For example, in the Lao People's Democratic Republic where a transition from subsistence to market-oriented production has been underway – (the percentage of subsistence households has decreased from 75% in 1999 to 29% in 2011) value added per worker in agriculture increased by only 10% and remains very low at \$474 (table 3). Greater demand for agricultural produce from neighbouring countries such as China, Thailand and Viet Nam has helped, but it was not enough to increase substantially the standards of living of agricultural workers. The vast majority of the population (over 76.6% of the labour force) still earns its income from agriculture producing only 30% of GDP (box 2).

Box 2. Role of agriculture in closing development gaps: the case of Lao People's Democratic Republic

Two agricultural censuses conducted in 1998/99 and 2010/11 show that the agricultural sector in Lao People's Democratic Republic has experienced considerable progress. Area under agriculture has greatly expanded. Arable land area has increased by 63% while the number of agricultural households has increased only by 17%, thus raising the average size of land holding per household to 2.41 hectares in 2010/11 from 1.62 hectares in 1998/99. The average size of a land parcel has also increased to 0.9 hectares from 0.77 during the same period, and land fragmentation is relatively limited with each household holding 2.7 land parcels. Almost all households own some land whereas 45% own over 3 hectares of land. Thus the majority of farm households cannot be classified as smallholders, in general a characteristic of agrarian households in developing countries in Asia and the Pacific.

Crops such as maize, soybean, cassava, starchy roots and tea have become popular among farmers due to higher demand from neighbouring countries. As a result, the dominance of rice in agricultural production has marginally declined. The 2010/11 agricultural census data show that the percentage of farm households who produce mainly for sale has increased to 30% in 2010/11 from a mere 6% in 1998/99, whereas the percentage of households that sells a proportion of their produce has increased to 71% from 35% during the same period. Thus, subsistence agriculture is practiced by 29% of farm households.

In 2010/11, 64% of households have used tractors compared to a mere 21% in 1998/99, and majority of households increasingly use machineries such as thrashers, rice mills, water pumps and generators, indicating greater degree of mechanisation. Credit facilities have been obtained by 13% of farm households, mostly from public banks and village development funds. Of those obtained credit, 45% of households have used their own land or other assets as collateral and use the funds to buy agriculture inputs (51%), farm animals (30%) and farm equipment (13%). A greater availability of agricultural information for farmers can also be observed.

This transition is facilitated by greater access to markets in neighbouring countries, technological penetration and policy changes. Greater demand for agricultural produce from neighbouring countries such as China, Thailand and Viet Nam has helped the country to increase the production of maize and vegetables. In addition, the successive National Socio-Economic Development Plans (NSED) implemented by the government have provided a stable foundation and facilitated a movement towards gradual commercialization of agriculture. For example, the fourth and fifth NSEDs implemented during 1996-2000 and 2001-2005 focused on agricultural production to meet domestic demand for rice, whereas the sixth NSED implemented during 2006-2010 focused on increasing value addition and processing agricultural products, targeting both domestic and international markets. The seventh NSED (2011-2015) stressed modernization of agriculture through the introduction of new agricultural practices, diversification of the agricultural commodity base, enhancing productivity and product quality and the sustainability of natural resources, particularly forests and land.

Notwithstanding these impressive gains, farmers still face a considerable set of constraints related to inadequate access to inputs, poor irrigation facilities, inadequate access to markets for some commodities and in remote locations, inadequate draught animals and machinery, lack of vaccinations and low commodity prices. Closing development gaps in the country will require an agricultural development strategy well integrated with industrial and

services sectors that could facilitate an agrarian transition, creating opportunities for the labour leaving agriculture to find employment elsewhere and agriculture to enhance its productivity.

Source: ESCAP Centre for Alleviation of Poverty through Sustainable Agriculture (CAPSA) based on data from Lao Agriculture Census 2010/11, Lao People's Democratic Republic Agriculture Master Plan 2011-2015, and Ministry of Planning and Investment National Socioeconomic Development Plans.

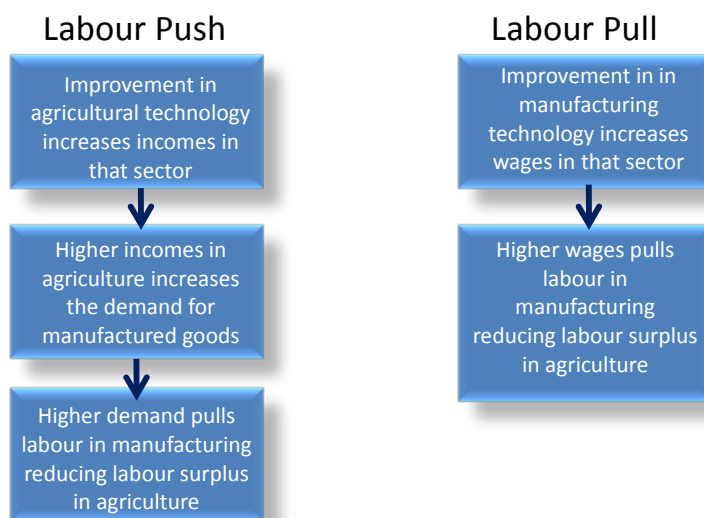
2. INTEGRATED STRATEGY FOR AGRICULTURAL DEVELOPMENT

In principle, there are two ways to develop the agricultural sector and increase agricultural productivity: through labour push and labour pull strategies (figure 5). The labour push hypothesis points to the following chain of events: improvements in agricultural technology increase incomes in that sector; higher incomes in agriculture changes consumption patterns of the workers of that sector and increases the demand for manufactured goods, pulling labour in manufacturing, which reduces labour surplus in agriculture and further increases agricultural productivity. The labour push hypothesis may be traced back to the classical four stages theory presented by Adam Smith and by Anne-Robert-Jacques Turgot in the 18th century, in which human progress follow sequentially four stages driven by capital accumulation: from hunter/gatherers, to a society of shepherds and pastoralists, to agriculture and reaching commercial and industrial society. Following that tradition, in the 1960s W.W. Rostow proposed that increases in agricultural productivity are a necessary condition for economic take-off.⁷

The second way to improve agricultural productivity is the “labour pull” hypothesis: expansion of manufacturing sector and improvements in manufacturing technology increase wages, pulling labour in that sector and reducing labour surplus in agriculture, which, if sustained, eventually would trigger increases in agricultural productivity. The labour pull channel can then be viewed as a roundabout way of increasing agricultural productivity by first promoting increases in manufacturing productivity. One famous example of models that follow the labour pull tradition is the dual economy model presented by Arthur Lewis in the 1950s, in which capital accumulation in the industry sector raises wages and attracts surplus labour from the agricultural sector. Another example is the two sector model proposed by Harris and Todaro in the 1970s, in which differences between the expected urban (industrial) real income and agricultural wages drives rural-urban migration.⁸

Surprisingly, there is no consensus on which is the best way to follow: labour push or labour pull. Given that the effect of both channels is the same in terms of shifting labour from agriculture to manufacturing, it is difficult to tease out the major contributor, if increases in productivity in the agricultural or in the manufacturing sector. Some empirical evidence, based on data from 12 industrialized economies that have completed their structural transformation out of agriculture, suggests that both channels play a role that varies over time and with a country's stage in structural transformation. Results also suggest that there is a “first pull, then push” tendency indicating that the “pull” channel mattered more for countries in their early stages of structural transformation – when the share of employment in agriculture was above 40%.⁹ That result has great implications for the choice of strategy for agricultural development in the Asia-Pacific LDCs given that in these countries, except from Kiribati and Tuvalu, the proportion of workers engaged in agriculture are above the suggested threshold of 40%.

Figure 5. Two ways to promote structural transformation and the transition from subsistence to market-oriented production



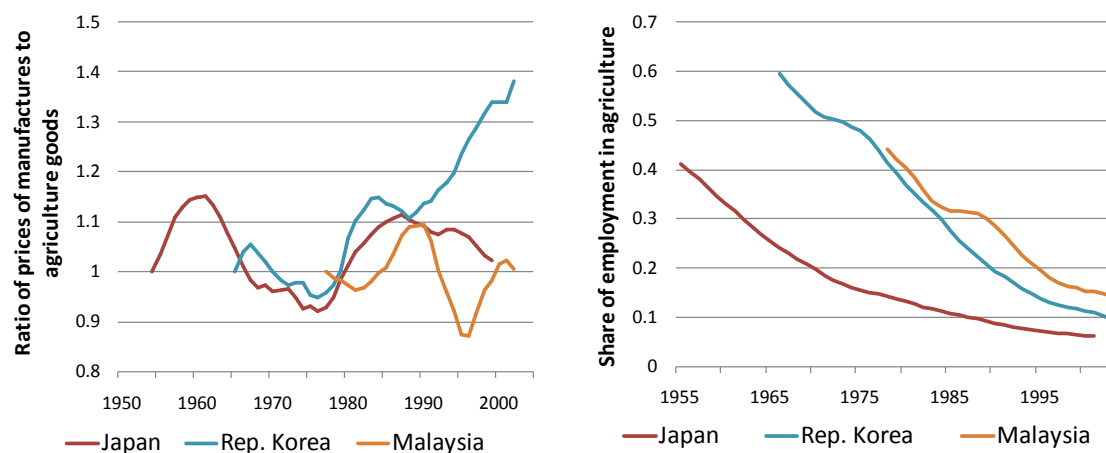
Source: Author based on Alvarez-Cuadrado and Poschke, 2011.

Similar analysis conducted for this Survey focusing on six Asia-Pacific countries confirms that both pull and push channels play a role but it is not as conclusive regarding the sequencing. The analysis was conducted by comparing the change in relative prices of manufactures and agricultural goods in selected countries of the region since 1950 with the evolution of share of employment in agriculture in the same period (figure 6). Although in the short-run a number of factors, including policy interventions, can affect the relative prices of manufactures and agricultural products, the long-term trend movement provides information about changes in relative sectoral productivity. When over the years the prices of agricultural goods decline compared with prices of manufactures, thus increasing the ratio between manufacture and agricultural prices, it suggests faster productivity growth in agriculture.¹⁰ The opposite, namely the reduction of the ratio of prices of manufactures to agricultural goods, suggests faster gains in productivity in manufacturing. Comparing the change in that ratio with the evolution of the share of employment in agriculture gives information on the channel that was playing a greater role. An increasing ratio indicates larger push effects; if the ratio was decreasing, larger pull effects were at play.

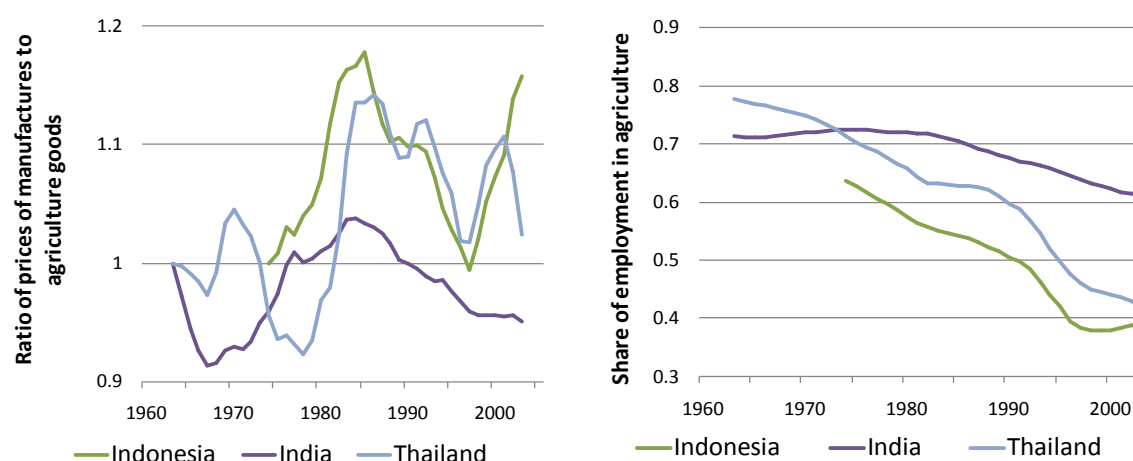
Figure 6 (A) shows the result of the analysis for Malaysia, Japan and the Republic of Korea, three countries of the region that have undergone structural transformation and reached low levels of share of employment in agriculture. In Japan, the period of rapid decline in that share (1950-1975) suggests that both channels played a role. The first part of that period (1950-1960) was characterized by increases in the ratio of prices of manufactures to agricultural goods, suggesting labour push effects. This was a period of fast mechanization of agriculture in Japan which by late 1960s had the largest number of tractors relative to arable land of all developing Asia.¹¹ In the second part (1960-1975) the ratio declined indicating a larger role of labour pull effects, coinciding with the “miracle” period of economic growth of Japan driven by industrial policy lead by the Ministry of International Trade and Industry (MITI).

Figure 6. Relative prices of manufactures and agriculture good, selected countries

(A) Countries that are advanced in their structural transformation out of agriculture



(B) Countries that have not completed their structural transformation out of agriculture



Source: Author based on data from 10-sector database of Groningen Growth and Development Centre, available from <http://www.rug.nl/research/ggdc/data/10-sector-database> (accessed on 28 January 2014).

Notes: The calculation of the ratio of prices of manufactures and agricultural goods is based on the methodology proposed in Alvarez-Cuadrado and Poschke (2011).

In Malaysia, the periods of rapid decline in the share of employment in agriculture coincided with periods of increasing manufacturing productivity (pull effect). This is more evident in the period from late 1980s until the Asian financial crisis in 1996. During that period, Malaysia was one of the “tiger” economies experiencing broad diversification and sustained rapid growth driven by manufacturing for export markets in areas such as microchips and semiconductors.

The example of the Republic of Korea is more telling for LDCs of the region because the data available cover the period from 1965 to 1975 when the share of employment in agriculture was above 40%. The figure shows that pull effects mattered more during that period, with evidence of increasing productivity in manufacturing when compared with agriculture. The Republic of Korea implemented a vigorous agricultural reform programme starting from the Farm Land Revolution Act of 1949 that was considered fundamental for the

successful structural transformation of the 1960's, when simultaneous development of agriculture and manufacturing was promoted.¹² After 1975, it is evident that increasing agricultural productivity played a larger role. During that period, agricultural policy focused on sustainable growth, a stable supply of food, higher incomes in rural areas, price stabilization of agricultural products, the modernization of agricultural marketing and the improvement of the rural living environment.¹³

In India, push and pull effects were at play from 1960 to 1985 but neither channel was successful in reducing the share of employment in agriculture, which was over 70% throughout that period (Figure 6 B). Since India embarked on liberalization reforms in the mid-1980s, increases in manufacturing productivity vis-à-vis agriculture have been associated with the decline in the share of workers in agriculture, but at a slow pace. This is perhaps due to the fact that despite liberalization reforms, India still practised widespread price control for agricultural products. Failure to implement deep land reforms may also have contributed to the lacklustre development of both agriculture and industry in India.

In Indonesia, both push and pull channels have clearly played a role to bring down the share of employment in agriculture from over 60% to below 40% between 1975 and 1995. During the 1970s and 1980s, agricultural policies focused on self-sufficiency in food production, especially rice, and agricultural development targeted increasing agricultural productivity through better techniques and intensive farming. The period of faster decline (from 50% in 1990 to 40% in 1995) is associated with steep increase in manufacturing productivity vis-à-vis agriculture. That was the period when foreign investment flowed into Indonesia, creating jobs in the modern sector of the economy, particularly into the rapidly developing export-oriented manufacturing sector.

Similarly in Thailand the periods associated with faster declines in the share of employment in agriculture (1970s and 1990s) are also the periods of fast manufacturing export-led growth. During these periods the ratio of prices of manufacturing to agricultural goods were declining, suggesting the pull factor in operation.

The analysis shows the relevance of both channels but hints the complex interlinkages in place. Both channels require the continuous increase of productive capacities in the economy to absorb the labour coming out of the agricultural sector. And that is what is usually missing in the LDCs in the first place. The level of productive capacities in many of the LDCs is such that increasing incomes, including by remittances or transfers, are usually directed to imported goods rather than creating domestic jobs. In that case, increases in agricultural productivity would simply create unemployment and underemployment in both urban and rural areas,¹⁴ while increases in productivity in few modern sectors are not enough to create the amount of jobs required to absorb the underemployed rural population. In summary, both push and pull channels require the existence of increasing productive capacities and diversifying economy that can absorb the labour released from agriculture.¹⁵

Increases in productivity, both in agricultural or manufacturing sectors, are limited by the extent of the market. It is just not viable to invest in technology to increase production when there is no market, or there is no way to reach the market, for such increment in production. Increases in local agricultural production, for example, that are not accompanied by increases in demand would only push prices of produce down. This is a fact well understood by any farmer who has harvested a bumper crop just to be faced with market prices that cannot even match the input costs.

However, in LDCs, domestic demand alone would not foster increases in productivity. Levels of income are simply too low. Therefore, LDCs need to rely on trade to extend the market and drive increases in both agricultural and manufacturing productivity. Trade in agricultural products requires compliance with a complex set of regulations for food safety and animal and plant health, issues that in the WTO are under the Agreement on the Application of Sanitary and Phytosanitary Measures and Agreement on Technical barriers to Trade. Countries can set their own scientific-based standards, which are higher than the international standards, and producers have to comply with these standards to be able to reach developed countries' markets. The perishable nature of agricultural products also imposes specific requirements in terms of storage and transportation of those goods. In comparison, trade of processed goods can be carried out in a much simplified way, which indicates the advantages of adding value to agricultural production through processing.¹⁶ Historically the demand for agricultural goods reaches saturation at much lower levels of income than the demand for manufacture and services.¹⁷ Therefore, there is a larger scope for extending the market of agricultural products through agro-based processing activities. As discussed in the ESCAP Survey 2012, the past decade has seen a commodity boom with increasing demand for primary goods as input in manufacturing powerhouses in Asia.

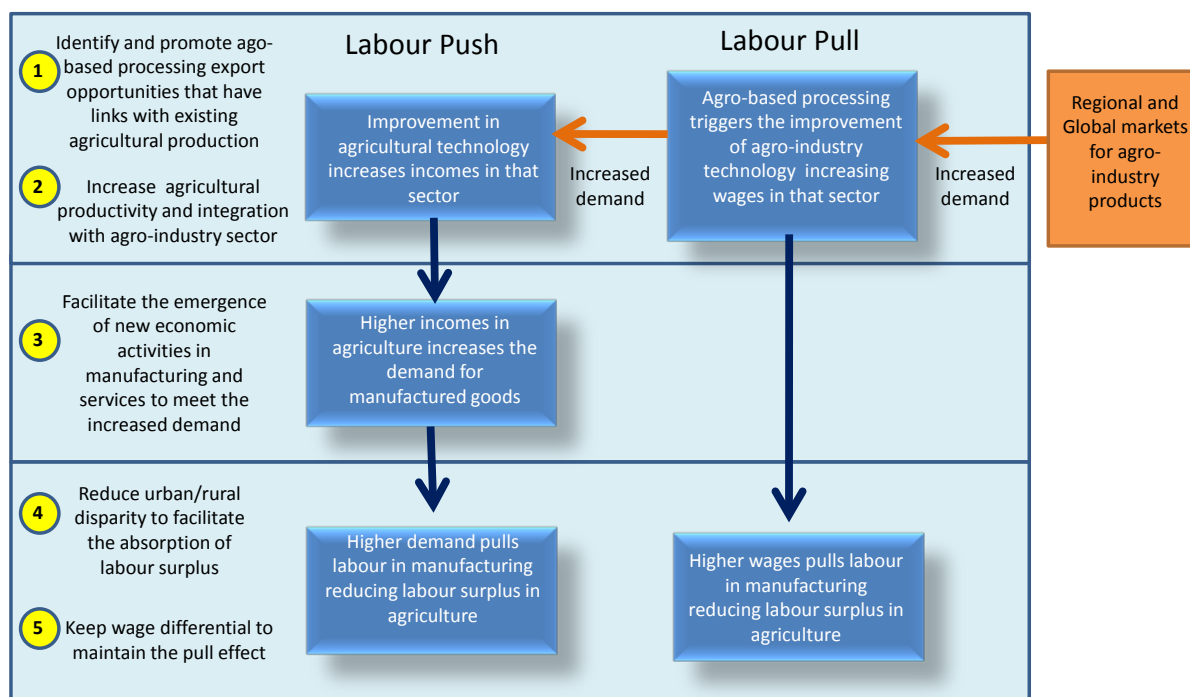
An extra factor related to demand is that agricultural producers face fierce competition from developed and large developing economies. The main reason is that the agricultural product is the quintessential commodity. A bushel of corn will be priced the same in the international market regardless if it was produced using high productivity techniques in the USA or using labour intensive methods in Nepal. Add to that the impact of agricultural subsidies in developed countries, which makes competition by agricultural producers in poor countries very challenging. On the other hand, manufacturing goods can be more easily differentiated and producers in LDCs tend to compete with their counterparts in other developing countries. That distinction can be minimized if LDCs make use of preferential trade access such as European Union Everything But Arms initiative, or if they diversify the agricultural produce towards niche goods such as organic farming products.

If these interlinkages between agriculture and manufacturing, especially agro-based processing activities, and the role of demand are taken into consideration, both pull and push factors could be put at work in promoting agricultural development in the LDCs of the region. Policies that facilitate the emergence of productive economic activities in dynamic industries and services that use agricultural products as inputs, and that at the same time raise agricultural productivity, combine the benefits of pull and push channels and have the potential of creating a virtuous cycle. That is an integrated strategy for agricultural development illustrated in figure 7, which is based on agricultural development strategies advocated time and again by ESCAP.¹⁸

Such strategy is composed of five steps. First, government and private sector should identify and promote export opportunities in agro-based processing activities (agro-industries) that have links with existing agricultural production. Such approach echoes the 1950s unbalanced growth strategies of economic development with the promotion of backward linkages: investment in agro-industries creates demand and encourages investment in the production of the required agricultural inputs.¹⁹ The strategy focuses on developing the manufacturing and services sectors without neglecting agriculture, which will be the beneficiary of the investment through backward linkages.²⁰ Perhaps the most difficult aspect in operationalizing such strategy is the identification of the export opportunities in agro-industries. These are economic activities that do not exist in economy but that have the

potential for becoming a new source of comparative advantage. The next section will provide an example on how the identification problem could be tackled analytically.

Figure 7. Integrated strategy for agricultural development



Source: Author.

The second step is to increase agricultural productivity to meet the demand created. That would require dissemination of sustainable agriculture technologies and best practices and investment in infrastructure to reduce transaction and transport costs, minimize post-harvest loss, provide storage/refrigeration, and better marketing facilities. Some of the infrastructure such as rural roads could be built using labour-intensive techniques that would also help reduce labour surplus in agriculture. As discussed in the ESCAP Survey 2013, that could be part of a programme to provide employment for all through government interventions acting as employer of last resort. Examples of such programmes in the context of least developed countries are the “Employment Generation for the Hard-Core Poor” in Bangladesh, that target extremely hardcore poor who are completely or seasonally unemployed such as marginal farmers living in subsistence, and the ILO employment-intensive rural infrastructure works approach in Timor-Leste which is nationally funded and integrated into the Government’s rural infrastructure investment programmes.

Higher productivity in agriculture would raise incomes in rural areas and would shift consumption patterns towards manufactured goods. Higher agricultural productivity also means lower staple food price and therefore cheaper wage good which helps expansion of manufacturing. The third step is therefore to facilitate the emergence of new economic activities in manufacturing and services to meet that demand. An important qualifier is that the focus should be on new economic activities. Increased demand for existing goods and services outside agriculture could be easily met by market mechanisms. The challenge is to address the demand for products that are not currently produced in the economy, but could be economically produced if an enabling environment is provided. One of the first conditions is an environment conducive to business sector development: rule of law, private property rights,

easy to do business, etc. This may also require some protection conditional on eventual graduation into export markets. The other is to create space for infant economic activities to emerge, particularly in tradable goods. But identification of economic activities to promote becomes an intractable challenge and macroeconomic interventions that promote tradables, such as through exchange rate policies, may be the best approach.

Following the logic of an integrated pull and push approach, increased demand from workers in agriculture and increased wages of manufactured jobs would attract labour to manufacturing and out of agriculture, creating additional incentives for increasing agricultural productivity. But for that to work, the fourth step is to address disparities between urban and rural populations to facilitate the transition of workers from agriculture to manufacturing. The higher the disparities, the lower the capability of people to make the transition and the lower the human capital of workers released from subsistence agriculture, which reduces their prospects of finding jobs in industry and services. That is one of the reasons why the 2013 Survey proposed a package to universalize education and basic health.

The fifth step is to tackle the challenge of surplus labour in subsistence agriculture. Subsistence holds the wage rate in manufacturing at a lower level, reducing the “pull effect”. Wages policies are therefore needed to keep the wage rates in manufacturing from falling behind productivity gains. That would have an additional benefit of maintaining the domestic demand at pace with the increases in productivity and therefore creating the condition for the emergence of a more diversified economy. In the absence of such policies, all the gains in productivity in the LDCs would be accrued by the consumers in their trading partners instead of becoming a source of domestic growth.

3. POLICY PRIORITIES FOR LDCS IN ASIA-PACIFIC

This section attempts to provide some policy options that LDCs in Asia-Pacific could consider in applying an integrated strategy for agricultural development. The following analysis is an example of the chain of thought that governments and private sector could together follow through. It is not complete and it is not meant to be used as a “one-size-fits-all” formula but only as an indicative example of a possible way to strategize the promotion of labour push - pull factors for accelerating agricultural development.

Identify new export opportunities in agro-industries with links to existing agricultural produce

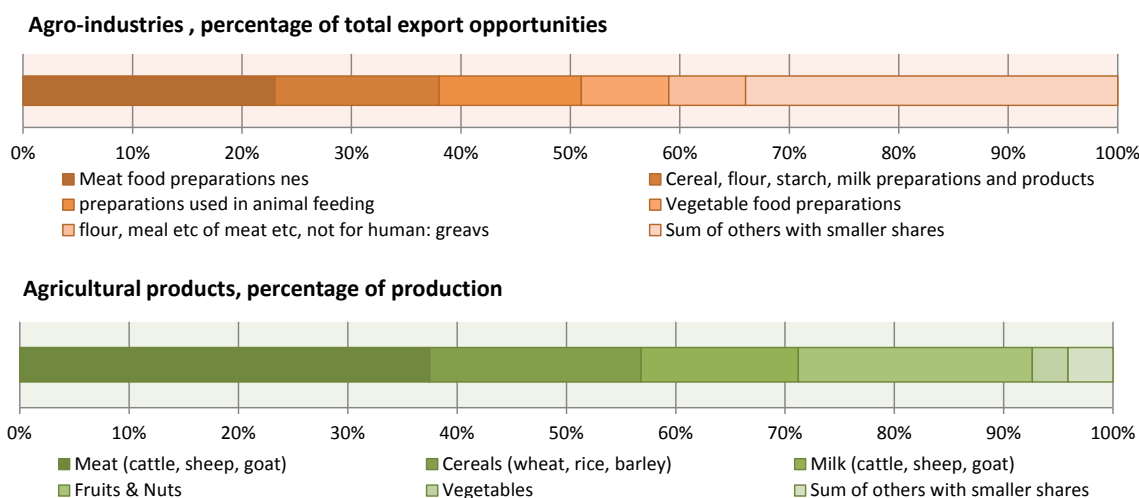
The identification of strategic new export sectors is usually made through a consultation process between government and the private sector. There is no consensus on the technique to use in this process, which is usually carried out in an *ad hoc* manner. This section applies an analytical methodology that considers the level of existing productive capacities of the countries to infer the potential new product opportunities considering the demand in regional and global markets.²¹

The application of that methodology suggests clusters that have the highest export opportunity potential for new products in the South Asian LDCs (figure 8). In the case of Afghanistan, the potential new agro-industries that are particularly promising are meat food preparations and cereal, flour, starch, milk preparations, given the composition of existing agricultural production with high shares in meat, cereals and milk. In Bangladesh the agro-industries of meat, fish and vegetable preparations present the higher share in total export opportunities and linkages with existing agricultural production. Cereals, and paddy rice in

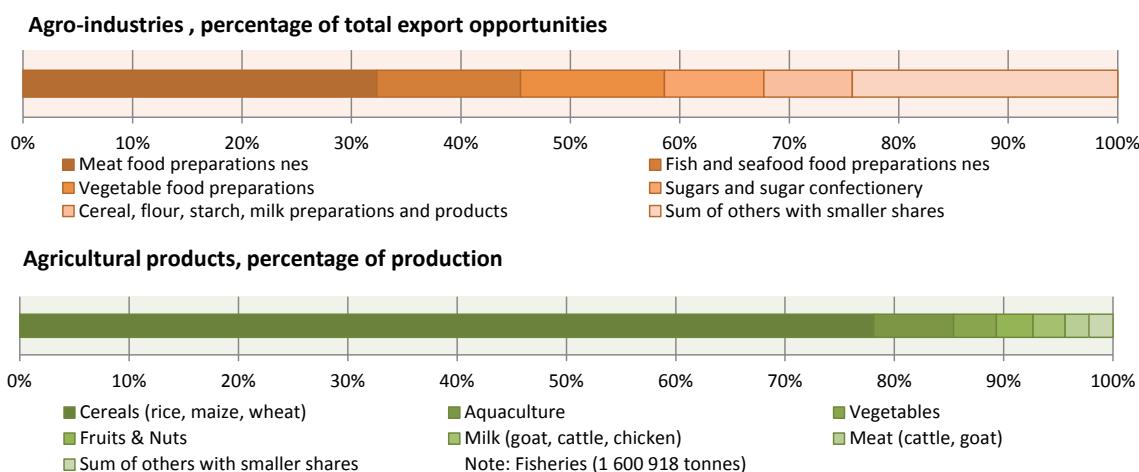
particular, account for the largest share of agricultural production in value but the associate agro-industry offers less export opportunity than those mentioned above. In the case of Bhutan, the agro-industries related to cereal, flour, starch, milk preparations and meat food preparations present the higher export opportunities and backward linkages with existing agricultural production, particularly if they exploit the niche markets for chilli seasoned food. In Nepal the potential new agro-industries with higher share in the total export opportunities are related to animal feeding preparations, meat and vegetable food, and cereal, flour, starch, milk preparations.

Figure 8. Potential new agro-industries with higher export opportunities and linkages with existing agricultural production, South Asian LDCs

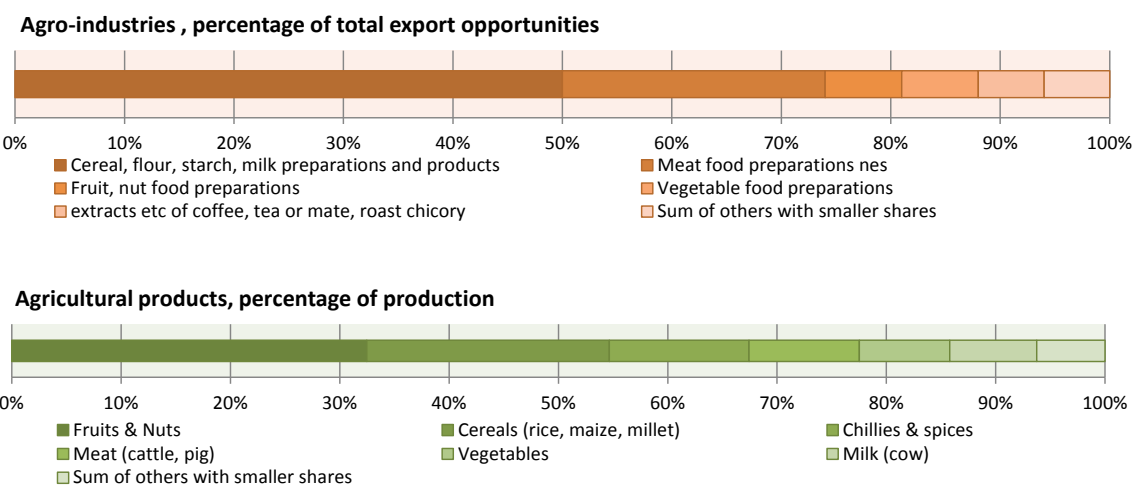
(a) Afghanistan



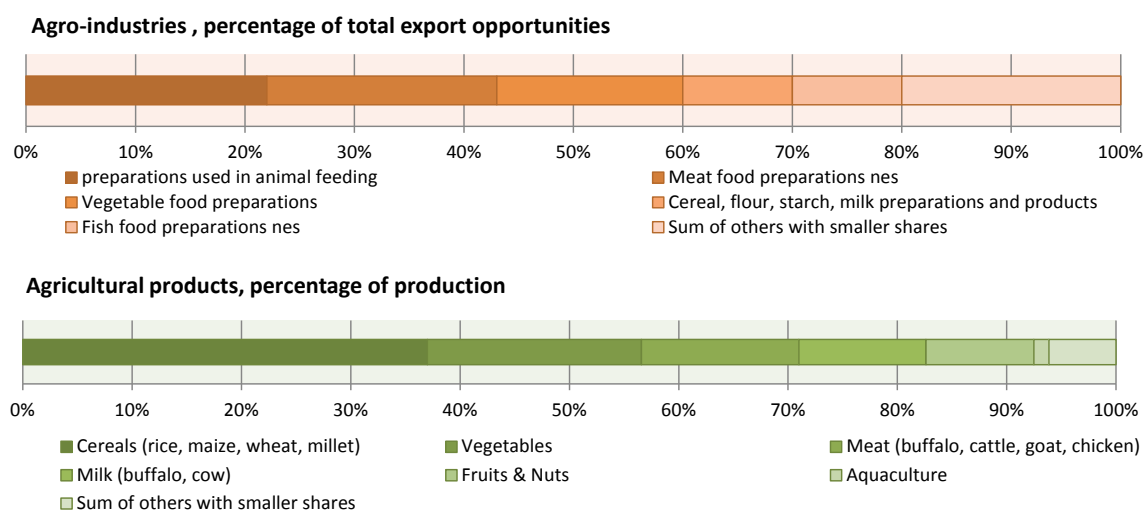
(b) Bangladesh



(c) Bhutan



(d) Nepal



Source: Author based on Freire (2013, 2014) and data from the United Nations Commodity Trade Statistics Database (COMTRADE), FAO STATs Food and Agricultural commodities production and FAO Fishery and Aquaculture Global Statistics (accessed 19 February 2014).

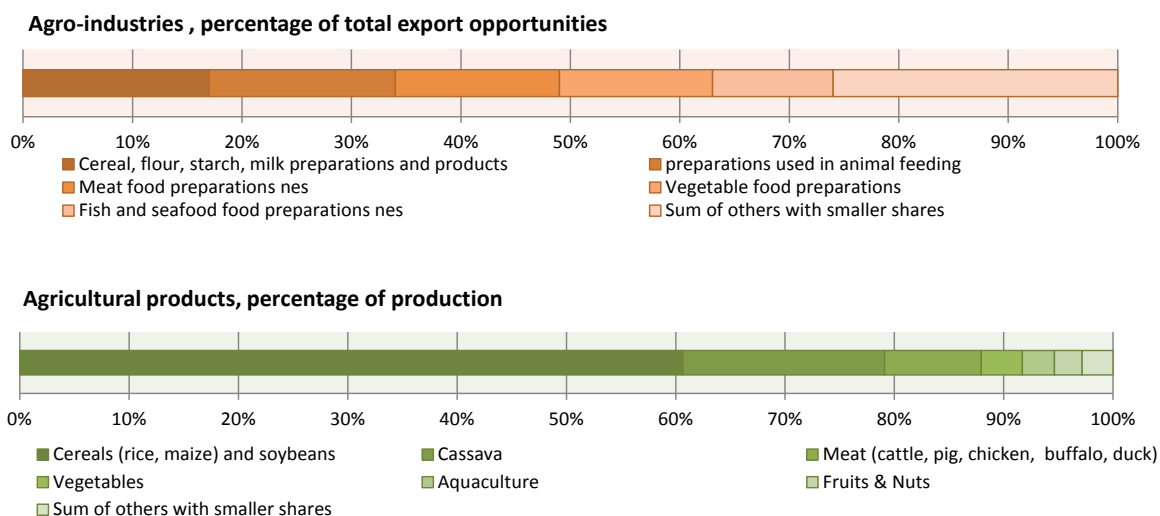
Notes: On methodology, see endnote 21. Agricultural products show the percentage of production in value among the 20 most important food and agricultural commodities for each country in 2012. Data on fisheries and aquaculture refers to 2011.

Figure 9 shows the result of the analysis for the LDCs in South-East Asia. It suggests that the potential new agro-industries in Cambodia with higher potential export opportunities are preparations of cereal, flour, starch and milk, preparations used in animal feeding, meat and vegetable food preparations. In Lao People's Democratic Republic the top three potential new agro-industries that link with the existing production are related to beverages, meat food preparations and cereal, flour, starch, milk preparations. Meat processing also has the potential for domestic market in the medium term, particularly bearing in mind the expected shift in the pattern of consumption of food in these two countries as income per capita increases. The top two potential new agro-industries with over half export opportunities for Myanmar are cereal, flour, starch, milk preparations, and meat food preparations. Timor-Leste differs from the other South East Asian LDCs because it shares many of the structural challenges of LDCs of

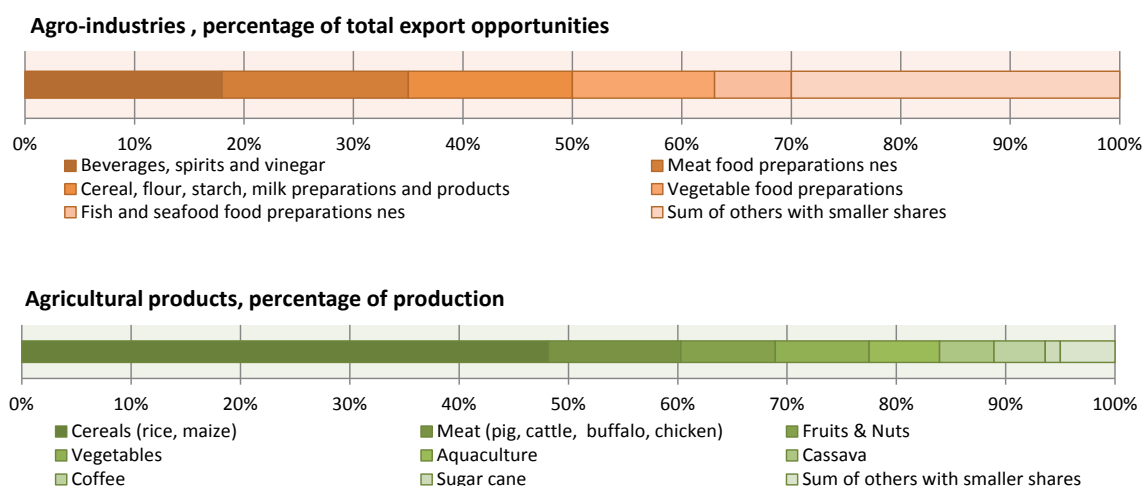
the Pacific in terms of remoteness. The country is also going through a process of nation building, including infrastructure and institutions, and it has very little productive capacities, even when compared with the levels of other LDCs. The analysis for that country suggests that the top two potential new agro-industries with higher shares of export possibilities are cereal, flour, starch, milk preparations and extracts of coffee, the country’s main export. Agro-industry of fish food preparation also presents high exports opportunities and could foster the development of fisheries and aquaculture, which are currently incipient.

Figure 9. Potential new agro-industries with higher export opportunities and linkages with existing agricultural production, South-East Asian LDCs

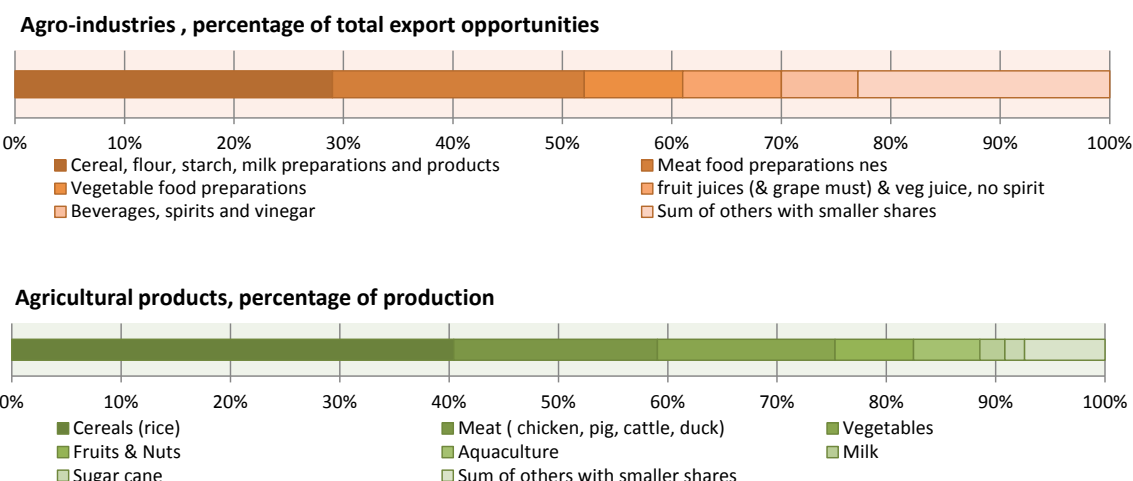
(a) Cambodia



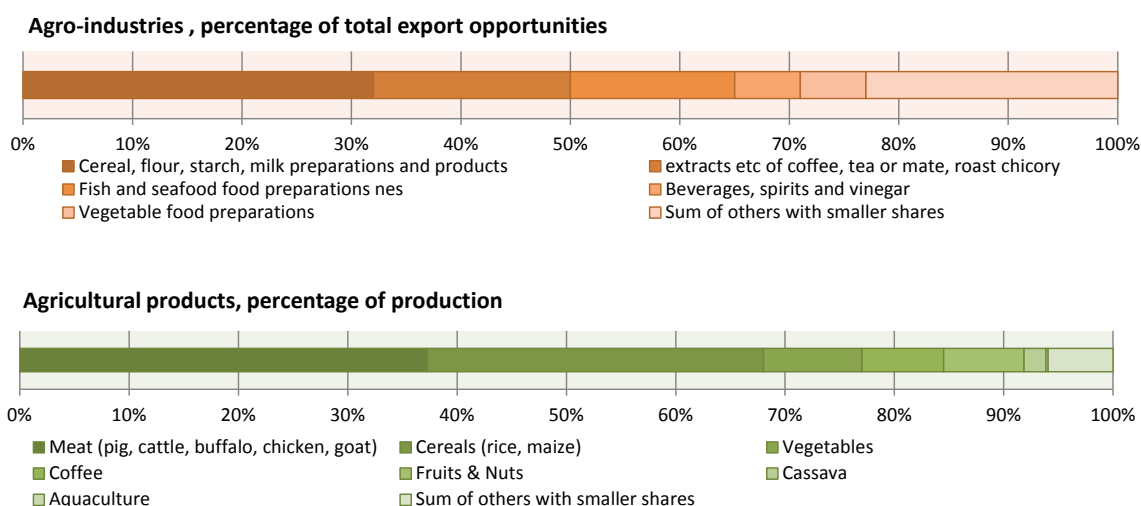
(b) Lao People’s Democratic Republic



(c) Myanmar



(d) Timor-Leste



Source: Author based on Freire (2013, 2014) and data from the United Nations Commodity Trade Statistics Database (COMTRADE), FAO STATs Food and Agricultural commodities production and FAO Fishery and Aquaculture Global Statistics (accessed 19 February 2014).

Notes: On methodology and data, see note of figure 8.

The case for an integrated strategy for agricultural development is perhaps even stronger in the LDCs of the Pacific. The main employment opportunity offering higher wages is in services, particularly tourism, which is not able to absorb the surplus labour of agricultural subsistence workers. The alternative for many is to work abroad and to send back remittances. The promotion of viable agro-based processing activities providing local food to tourism sector could create productive jobs out of subsistence agriculture and increase demand for existing agricultural products, including fisheries, and may have a great impact in reducing rural-urban disparities in these island states.

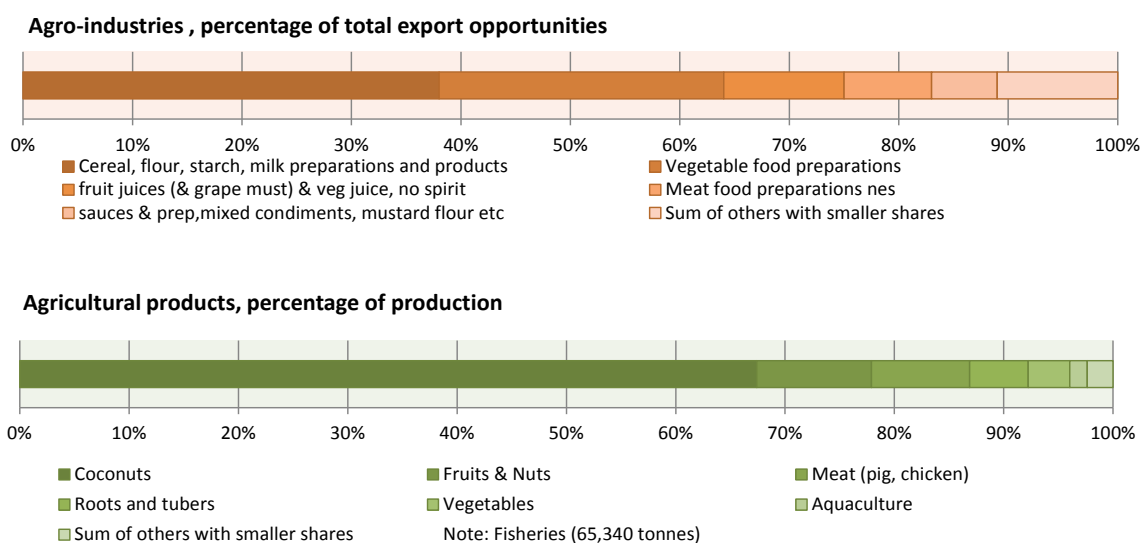
The result of the analysis of potential new agro-industries applied to the Pacific LDCs is shown in figure 10. In Kiribati, none of these potential agro-industries could generate backward linkages with fishing activities or coconut production, the existing economic specializations of the country. On the other hand, subsistence farming grows food crops like

bananas, breadfruit, and papaya, and agro-industries in vegetable, fruits and nuts food preparations could facilitate the transition from subsistence to market-oriented agricultural production. Solomon Islands has a larger population (over 500 million) that can support a more diversified economy. The top five potential new agro-industries with higher share of total export opportunities are cocoa preparations, flour and starch products, fish food preparations, fruit juices and vegetable food preparations.

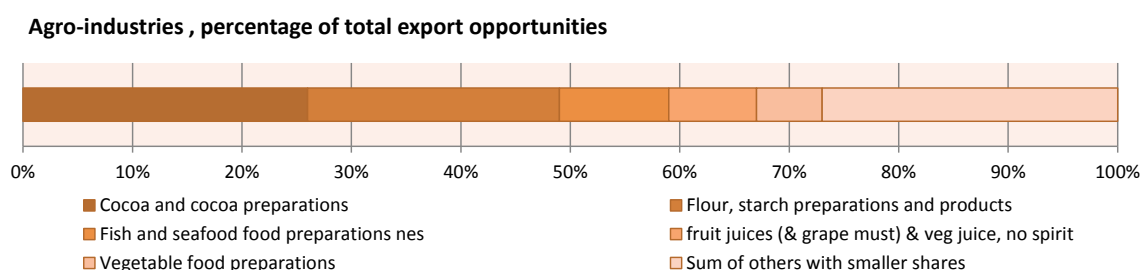
Tuvalu, on the other hand, faces a particular challenge in term of its small population (11,000 people). With such a small number it becomes very difficult to build productive capacities. Its main sources of foreign exchange come from fishing license fees paid by foreign fishing fleets, the “.tv” internet domain name lease, remittances, ODA and income received from the Tuvalu Trust Fund (TTF) which was established in 1987.²² The result of the analysis shows that new agro-industries in flour, starch preparations and products, and sugars and sugar confectionery present higher opportunities and backward linkages with the few existing production. Vanuatu has a more diversified economy, including meat production and export. The top potential new agro-industries resulting from the analysis reflect that fact: meat food preparations and flour, starch, milk products.

Figure 10. Potential new agro-industries clusters with higher export opportunities, percentage of total export opportunities, Pacific LDCs

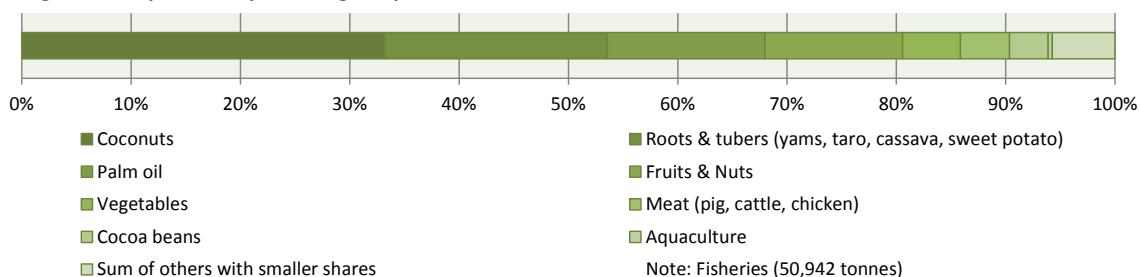
(a) Kiribati



(b) Solomon Islands

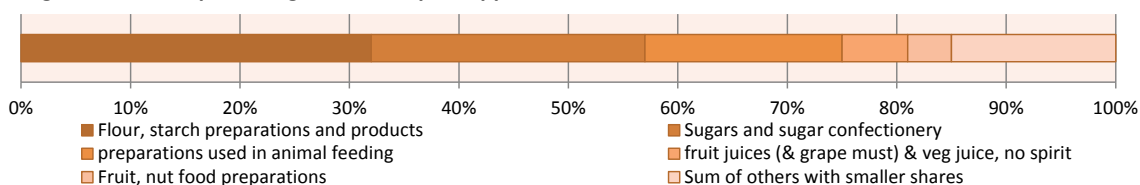


Agricultural products, percentage of production

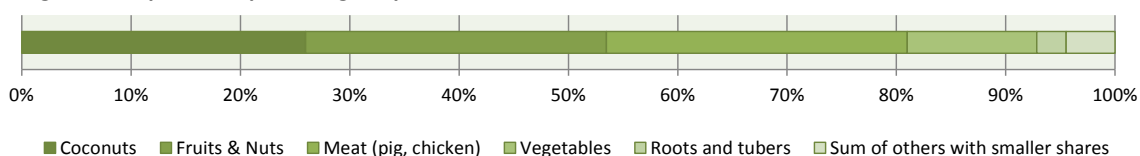


(c) Tuvalu

Agro-industries , percentage of total export opportunities

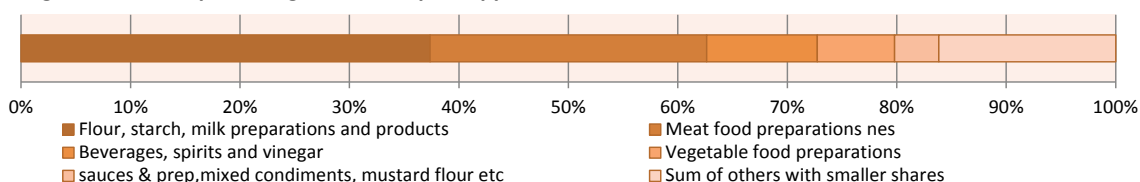


Agricultural products, percentage of production

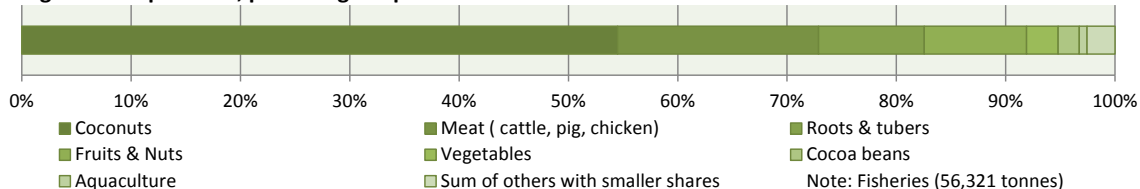


(d) Vanuatu

Agro-industries , percentage of total export opportunities



Agricultural products, percentage of production



Source: Author based on Freire (2013, 2014) and data from the United Nations Commodity Trade Statistics Database (COMTRADE), FAO STATs Food and Agricultural commodities production and FAO Fishery and Aquaculture Global Statistics (accessed 19 February 2014).

Notes: On methodology, see note of figure 8.

Facilitate the increase of agricultural productivity and integration with agro-based processing sector

As highlighted in the ESCAP Survey 2012, the main drivers of increased agricultural productivity in the context of LDCs are the dissemination and application of simple new agricultural technologies that are not capital intensive. In that connection, the Network for Knowledge Transfer on Sustainable Agricultural Technologies and Improved Market Linkages in South and Southeast Asia (SATNET), a project funded by the European Union and implemented by the Centre for Alleviation of Poverty through Sustainable Agriculture (CAPSA), ESCAP's regional institution, in collaboration with partners is creating a portfolio of sustainable agriculture technologies and best practices useful to poor and smallholder farmers. Some of these technologies with highest potential are presented in box 3.

Box 3. Technologies that make a difference for farmers and the environment

Vermitechnology is a simple process, which uses earthworms to produce good quality compost in a short time through organic waste recycling. It can be used for managing biodegradable wastes – biomass or organic materials that can be degraded or composted. A tank of 5x1x1m allows about 500kg of wastes to be composted, producing about 250 to 300kg of compost during approximately one month.

Planting crotalaria – a genus of herbaceous plants and woody shrubs commonly known as rattlepods – is a simple technique to control chili damage caused by nematodes. While most of them are beneficial to ecosystems, root-knot, cyst and lesion nematodes are pests annually responsible for billion dollar crop losses. Planting crotalaria before chili production, especially species called sunn hemp, short flower rattlebox and showy rattlebox, proved to be effective in temperate areas.

Leasehold riverbed vegetable farming allows local landless and land poor families to form groups and lease unused riverbed land for market-oriented production of gourd vegetables such as pumpkin, cucumber and melon during the dry season. Riverbed farming can produce 16,500 kg of gourd vegetables per hectare. Practiced in the Terai of Nepal – on riverbed land with marginal and sandy soils, which is expanding due to more extreme hydrological patterns – it enables small-scale farmers to adapt to climate change and earn additional income.

Essential oil distillation units use steam distillation to extract oil from raw plant material, especially medicinal and aromatic plants, such as wintergreen, mint, chamomile, citronella, eucalyptus and lemongrass. High prices can be obtained for such oils in international markets. Practiced in Nepal, the technology consists of a distillation tank, a condenser, a receiver and a heat source, which can be disassembled into parts and carried to less accessible areas such as remote, mountainous regions.

IPM of eggplant fruit and shoot borer (EFSB) – the most destructive pest of eggplant – proved to be a sustainable alternative to chemical pesticides in eggplant cultivation. The technology utilizes a community-based approach using healthy seedlings, resistant cultivars, prompt and regular removal of infected fruits and shoots, and EFSB sex pheromone traps. The combination of these practices kills male adult moths and withholds chemical pesticide use to allow populations of native natural enemies to thrive and suppress the pest.

Source: ESCAP Centre for Alleviation of Poverty through Sustainable Agriculture (CAPSA).

Results from SATNET assessment show that these technologies are sustainable livelihood options for small scale farmers and thus can be especially useful for poor and vulnerable groups in LDCs. The technologies rely little (if at all) on external inputs, make use of natural biological processes for the benefit of the users, do not produce waste material that pollutes the environment, and require few assets such as capital and land to be implemented. Technologies with these characteristics that are more relevant for the agricultural products identified in step one above as potential for backward linkages could be disseminated and promoted through extension services.

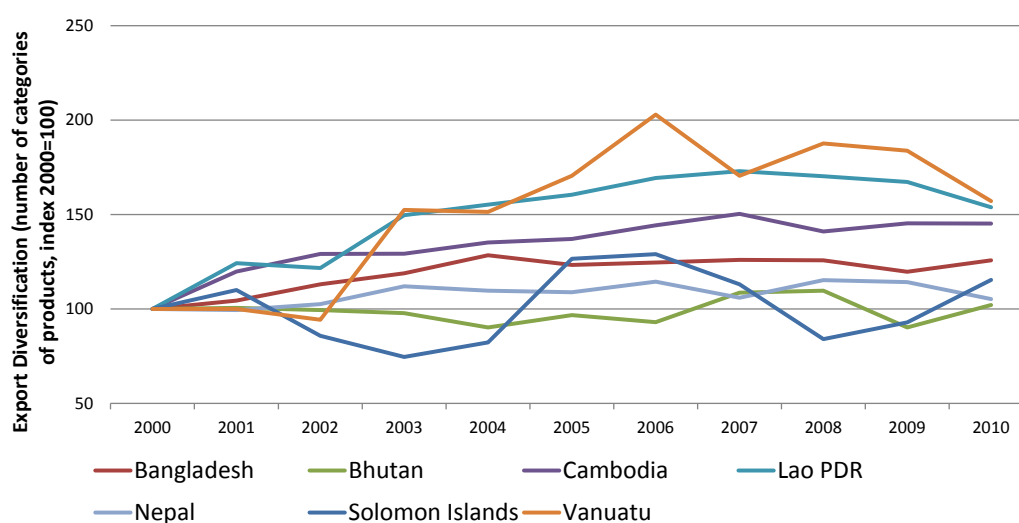
The increase of agricultural productivity should be accompanied by better integration with agro-industry sector that is generating the demand for the agricultural products. Such integration, as is presented in Part 2 of this Survey, requires improved connectivity. New technologies can also help in reducing distances. As highlighted in ESCAP Survey 2012, mobile phones are helping small farmers get market-related information and could also be used to facilitate the linkage between producers of agricultural products and these in agro-industries clusters that use their produce as inputs.

Facilitate the emergence of new economic activities

The third step in the integrated strategy of agricultural development is the facilitation of the emergence of new economic activities to meet the demand of increased agricultural and agro-industry workers' incomes. This channel of demand from the agricultural and agro-industry sectors towards manufacturing is more relevant for the most populous Asian LDCs: Bangladesh, Cambodia, Nepal and Lao People's Democratic Republic.

Figure 11 shows the evolution of export diversification as a proxy for the emergence of new economic activities in LDCs of the region in the period from 2000 to 2010. The figure suggests that the economic environment in Cambodia and in Lao People's Democratic Republic have facilitated the creation of more new economic activities compared with the other LDCs. First part of the past decade was more conducive to business and the trend stabilizes; but loses steam after the global financial crisis in 2008. Bangladesh and particularly Bhutan and Nepal have shown less dynamism in terms of new economic activities.

Government and the private sector should jointly identify the bidding constrains for increasing private investment in new economic activities. The ESCAP Survey 2011 highlighted some of the policy priorities for LDCs to build productive capacities and facilitate the diversification of their economies. These policy priorities include maintaining a macroeconomic environment focusing on expanding employment opportunities, creating required productive infrastructure, providing support services to small and medium-sized enterprises (SMEs) in technology, marketing and export market development, and providing financial services and products, especially for SMEs. Exchange rate policies also play an important role in terms of structural change between tradable and non-tradable sectors, therefore they should also be considered to facilitate the emergence of a diversified economy in LDCs.

Figure 11. Evolution of export diversification

Source: Author based on data from the United Nations Commodity Trade Statistics Database (COMTRADE).

In the case of the LDCs in the Pacific region, the smallness of Kiribati and Tuvalu and their lack of productive capacities make it very challenging for the governments of these countries to foster increases in economic diversification with the emergence of new economic activities to meet new domestic demand. The prospects for Solomon Islands and Vanuatu are better in terms of potential for diversification. Vanuatu has shown 50% increase in the categories of products it exported in 2010 when compared with 2000. Solomon Islands, on the other hand, has experienced great volatility. Essential for all LDCs in the Pacific is the improvement of connectivity within the Pacific and with the rest of the world. With better connectivity, new and more opportunities would open for business sector development focusing on exports. The second part of this Survey discusses how regional cooperation could support the development of connectivity.

Reduce rural-urban disparity to facilitate the absorption of labour surplus

To facilitate the transition of workers from agriculture to dynamic industries and services, governments should reduce the large urban/rural disparity in the provision of public services, particularly in the areas of health and education. As mentioned, large disparities hamper the capability of people to make the transition. Low human capital of workers released from agriculture reduces their chances of finding jobs in industry and services.

Huge improvements in health outcomes have been registered in some of the least developed counties of the region. For example, under-five mortality rates in Bangladesh, Cambodia and Nepal have declined more than 40% between 2000 and 2010.²³ However, there are large rural-urban disparities. Under-five mortality rates in rural areas are higher than in urban areas by 22% in Bangladesh, 46% in Cambodia, and 79% in Nepal.²⁴ Disparities are also found in relation to under-five mortality underweight. For example, the rate in rural areas is 16% higher than in urban areas in Bangladesh and Nepal.²⁵ Similar development gaps between urban and rural areas are found in indicators of levels of literacy.

Closing these disparities would require renewed investment in rural development. ESCAP has argued for forward-looking macroeconomic policies to address these developmental gaps. Estimates of the required public investment to provide a set of policies to

enhance inclusiveness, which includes universal basic social services in education and health but also provision of an employment guarantee for a limited number of days (100 days) in a year, income security to older persons and persons with disabilities and ensuring energy for all by 2030, suggests that LDCs will need significant external assistance from development partners to complement their domestic resource mobilization efforts.

Keep wage differential to attract labour surplus out of agriculture

LDCs are characterized by a “dual economy” with large share of workers on subsistence agriculture, which holds the wage rate in manufacturing at a lower level. Although this reduces wage costs in manufacturing and may be seen as an advantage for firms trying to compete in the international market based on cheap labour, it in effect puts to a halt the structural transformation out of agriculture. Low wages in manufacturing reduce the “pull effect” of attracting the labour surplus out of agriculture. That is the expected outcome based on pull factor theories such as Arthur Lewis’ model, in which higher urban wages attract surplus labour from the agricultural sector, and Harris and Todaro two sector model in which positive differences between manufacturing and agricultural wages drives rural-urban migration.²⁶

Keeping manufacturing wages low also puts to a halt the domestic demand channel for additional increases in productivity in that sector. Increasing incomes change the pattern of consumption of the workers towards more value added products and, in more populous LDCs, create the opportunity for increasing productivity and diversification of the economy.²⁷ Without that domestic demand channel, LDCs can only rely on exogenous demand through trade. Governments should use wage policies to make sure that workers receive the benefits for their increase in productivity.²⁸ Otherwise, all productive gains will be accrued only by the consumers in their trading partners.

In Bangladesh, for example, the current minimum wage is about \$38 a month, whereas according to the Centre for Policy Dialogue, a Dhaka-based research organisation, a basic diet that meets the needs of a family of three alone costs about \$67 a month.¹ This level of wage is by all standards below what would be a natural wage rate based on the productivity of the garment sector, the main manufacturing activity and the backbone of the country’s economy.

4. CONCLUSIONS

The development of agriculture and increase of agricultural productivity should play a larger role in closing development gaps in the LDCs in the Asia-Pacific region. But countries should avoid the trap of focusing only on increasing productivity in the agriculture as if there would be no linkages with the other economic sectors. Similarly, focusing exclusively on increasing productivity in manufacturing and services and completely neglecting agriculture is an approach doomed to increase the already large rural-urban inequalities. A better strategy is to consider agricultural development in an integrated manner that is mindful of agricultural and agro-industries linkages and the need to promote structural transformation of the economy. Governments in LDCs should play a developmental role and take ownership of this the process with the support from developmental partners.

¹ Anis Chowdhury, Looking after workers is smart economics, New Age online edition, Thursday, November 28, 2013.

References

- Alvarez-Cuadrado, Francisco and Markus Poschke (2011). Structural Change Out of Agriculture: Labor Push versus Labor Pull. *American Economic Journal: Macroeconomics* 3 (July 2011): 127–158.
- Bhagwati J. N. (1958). Immiserizing Growth: A Geometrical Note, *Review of Economic Studies*, No. 3, pp. 201-5.
- CAPSA-ESCAP (2012). *Agricultural Transformation: Lessons from Brazil, Indonesia and the Republic of Korea*. Edited by Upali Wickramasinghe, Saifullah Syed and Hermanto Siregar. CAPSA Working Paper No. 106.
- Freire, Clovis (2013). Strategies for Structural Transformation in South Asian Countries, *Seoul Journal of Economics* 26, No. 3 2013: 311-336,
- _____ (2014). *Methodology to Identify Opportunities for Development-Oriented Quality Innovation: Application in the Case of Least Developed Countries*, in: Latif Al-Hakim and Chen Jin, eds, *Quality Innovation: Knowledge, Theory, and Practices*, IGI Global, USA
- Harris, John R., and Michael P. Todaro (1970). Migration, Unemployment and Development: A Two-Sector Analysis. *American Economic Review*, 60(1): 126–42.
- Hidalgo, C., Klinger, B., Barabasi, A-L., and Hausmann, R. “The product space conditions the development of nations.” *Science* 317 (No. 5837 2007): 482-487.
- Hidalgo, C., & Hausmann, R. “The building blocks of economic complexity.” *PNAS*, 106 (No. 26 2009): 10570-10575.
- Lewis, W. Arthur (1954). Economic Development with Unlimited Supplies of Labour. *Manchester School*, 22(2): 139–91.
- Ministry of Finance, Timor-Leste (2013). *National Statistics Directorate, Ministry of Finance. Population and Housing Census 2010*.
- Rostow, W. W. 1960. *The Stages of Economic Growth: A Non-Communist Manifesto*. Cambridge, UK: Cambridge University Press.
- United Nations Conference on Trade and Development (2013). *The Least Developed Countries Report 2013: Growth with employment for inclusive and sustainable development*. Sales number: E.13.II.D.1.
- United Nations Department of Economic and Social Affairs (2012). *Ex-ante impact assessment of likely consequences of graduation of Tuvalu from the least developed country category, 2012 triennial review*. CDP2012/PLEN/9A.
- United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), 1964. *Economic Survey of Asia and the Far East 1964: Economic development and the role of the agricultural sector*. Bangkok. Sales Number 65.II.F.1.

- _____ (1969). *Economic Survey of Asia and the Far East 1969: Strategies for agricultural development Intra-regional trade as a growth strategy*. Bangkok. Sales number: E70.II.F.1.
- _____ (1975). *Economic and Social Survey of Asia and the Pacific 1975: Rural development, the small farmer and institutional reform*. Bangkok. Sales number: E.76.II.F.1.
- _____ (2008). *Economic and Social Survey of Asia and the Pacific 2008: Sustaining Growth and Sharing Prosperity*. Bangkok. Sales number: E.08.II.F.7.
- _____ (2011). *Economic and Social Survey of Asia and the Pacific 2011: Sustaining dynamism and inclusive development: connectivity in the region and productive capacity in least developed countries*. Bangkok, Sales number E.11.II.F.2.
- _____ (2012). *Growing Together: Economic Integration for an Inclusive and Sustainable Asia-Pacific Century*. Bangkok.
- _____ (2012b). *Economic and Social Survey of Asia and the Pacific 2012: Pursuing shared prosperity in an era of turbulence and high commodity prices*. Bangkok. Sales Number E.12.II.F.9.
- _____ (2013). *Economic and Social Survey of Asia and the Pacific 2013: Forward-looking macroeconomic policies for inclusive and sustainable development*. Bangkok. Sales number: E.13.II.F.2.
- _____ (2013b). *Minimum wage policies to boost inclusive growth*. MPDD Policy Briefs, No 16, August 2013.
- _____ (2013c). *Asia-Pacific Trade and Investment Report: Turning the Tide Towards Inclusive Trade and Investment*. Sales number E.14.II.F.2.

United Nations Economic and Social Commission for Asia and the Pacific, Asian Development Bank and United Nations Development Programme (2009). *Achieving the Millennium Development Goals in an Era of Global Uncertainty: Asia-Pacific Regional Report 2009/10*. Bangkok.

Endnotes

¹ See in particular ESCAP, 1964; ESCAP, 1969; ESCAP, 1975 and ESCAP, 2008

² Agriculture corresponds to the divisions 1-5 of the International Standard Industrial Classification (ISIC, revision 3) and includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production.

³ Fishing is an economic activity that is more related to hunter and gathering than agricultural practices.

⁴ ESCAP Online statistical database.

⁵ For example, ESCAP estimates based on panel data of 142 economies in the period from 1961 to 2012 covering agriculture value added per worker (constant 2005 US\$), employment in agriculture (% of total employment), GDP (constant 2005 US\$), and total population from World Bank World Development Indicators (accessed on 5 February 2014), shows that the reduction of 10% of share of employment in agriculture increases the value added per worker in the sector by 3% while the effect of the increase of 10% output in agriculture is only 2% increase in value added per worker.

⁶ Ministry of Finance, Timor-Leste (2013).

⁷ W.W. Rostow (1960).

⁸ See Arthur Lewis (1954) and Harris and Todaro (1970).

⁹ Alvarez-Cuadrado and Poschke, 2011.

¹⁰ The analysis is based on internal terms of trade but the result may be considered as similar to Bhagwati's (1958) immiserizing growth argument and when read in conjunction with income elasticity of demand, the result is similar to the Prebisch-Singer hypothesis.

¹¹ ESCAP (1964).

¹² See CAPSA-ESCAP (2012).

¹³ Ibid.

¹⁴ A situation akin to Bhagwati's hypothesis of immiserizing growth

¹⁵ UNCTAD (2013).

¹⁶ According to the ESCAP-World Bank Trade Cost database (available at: <http://www.unescap.org/tid/artnet/trade-costs.asp>), comprehensive non-tariff intra and extra regional trade costs of agricultural goods are much higher than those of manufacturing goods (ESCAP, 2013c).

¹⁷ This fact was initially observed as related to food products – as income rises, the share of income spent on food falls, even if actual expenditure on food rises - but is well known for all types of products. That observation is known as Engle's law, named after the statistician Ernst Engel who first observed the relation between the share of income spent on food and the level of income.

¹⁸ See ESCAP (1964) and ESCAP (1969).

¹⁹ The unbalanced growth doctrine argues that economic development requires unbalanced sectoral growth. Albert O. Hirschman formulated the theory behind that economic development approach and introduced the concepts of backward and forward linkages.

²⁰ For example, ESCAP (1969) noted that in several countries that had increased their efforts in agriculture, supporting emphasis was given to agro-industries which process agricultural commodities or provide inputs for farm production.

²¹ Potential new agro-industries are identified by assessing possible technological trajectories using product space maps (Hidalgo and others, 2007) and applying the method of reflections proposed by Hidalgo and Hausmann (2009) to quantify the set of productive capacities required for their production. The methodology presented in Freire (2013, 2014) also considers the effect of export opportunities using an index inspired in the export opportunity index proposed in ESCAP (2012).

²² DESA (2012).

²³ ESCAP (2013)

²⁴ ESCAP/ADB/UNDP (2009).

²⁵ Ibid.

²⁶ Lewis (1954) Harris and Todaro (1970).

²⁷ Pasinetti (1993).

²⁸ ESCAP (2013b) argues that a minimum wage policy, if designed carefully along with supportive adjustment measures, boosts workers' income and improves long-term job prospects without adversely affecting businesses.