Institutions and Economies
Vol. 6, No. 1, April 2014, pp. 119-148

Catching-Up from Way Behind: How Timor-Leste Can Avoid the Dutch Disease?

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***Abstract*:** This paper seeks to analyse the capacity of the newly independent but petroleum rich Timor-Leste to avoid experiencing the "Dutch Disease". The historical and social circumstances of Timor-Leste has left the resource-rich country with serious challenges to break out from the resource curse with the incidence of poverty rising over the last decade and the social indicators of child mortality rates and life expectancy falling very slowly. The evidence shows that Timor-Leste is facing mounting obstacles as oil and gas, which has contributed little to direct employment, continues to dominate GDP, with cereal yields from the agricultural sector showing a trend fall over the last decade. The paper offers policy recommendations to assist the government in its efforts to bolster the non-petroleum sectors through technological capability building targeted at the productive sectors of agriculture and manufacturing in order to avoid the resource curse.

***Keywords*:** Dutch Disease, petroleum, resource curse, agriculture, manufacturing, Timor-Leste

JEL Classification: *I30, O21, O31, O51*
Article Received: 1 October 2012 ; Article Accepted: 2 March 2013

1. Introduction

Given its nascent history, rural concentration of people, high unemployment levels and a small population of 1.2 million in 2009, which is expected to grow to only 1.4 million in 2015, Timor-Leste's path towards economic development is unlikely to be identical to its immediate neighbours in the Association of Southeast Asian Nations (Asean). Timor-Leste is rich in oil and gas reserves but as with all mineral-rich economies it is no guarantee that oil and gas rents appropriated from such finite resources will be used productively to develop

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the other sectors of its economy. Since its independence in 2002, Timor-Leste negotiated with Australia to settle rights to a number of the oil and gas fields as well as territorial claims.

Devastated by the Indonesian invasion in 1975 and military insurgencies over its rule which culminated in the destruction of around 70% of the infrastructure from 1999 until its formal independence in 2002, the pursuit of self government shifted from military politics to economic politics since then. The key questions on the latter depends on Timor's capacity to translate oil rents under the sea to evolve its non-oil economic sectors to engender the conditions for economic development and poverty alleviation. It is also viable for Timor-Leste to introduce tariffs to stimulate import-substitution industrialisation as its size makes its domestic market irrelevant. Nevertheless, it can pursue some aspects of industrial policy by promoting sectors in which a potentially competitive set of firms can be stimulated. Also, Timor-Leste can pursue preferential access to important markets through bilateral relations with the developed countries and the "everything but arms" trading clause with the European Monetary Union members as it is classified under the group of least developed countries (LDC).

The political economy of Timor-Leste has for many years been defined by Portugal and Indonesia, its former colonial masters. Timor-Leste was colonised by the Portuguese until its conquest by Indonesia, which ruled the country until 1999 and subsequently obtained its independence following a United Nations-brokered agreement in 2002.

2. Political Economy of Petroleum

At the time when the Portuguese began to transform their early mercantile links in 1520 to establish formal control of Timor-Leste in 1702, economic interest was focused on sandalwood, coffee and marble. Economic interests figured prominently in the struggle to control Timor-Leste's resources with oil in particular dominating the designs of the contesting countries of Indonesia, Portugal, Australia since the 1960s. As oil deposits were discovered, the Portuguese administration offered concessions to Oceanic Exploration Corporation to develop the oil mining sector; this was until the Indonesian invasion in 1975. After over a decade of hostilities following the invasion, Australia signed the Timor Gap Treaty in 1989 to undertake joint exploration with the revenues to be divided into equal halves between the two countries. Woodside Petroleum and Conoco Phillips were granted the rights to develop oil resources in 1992 with the latter eventually taking charge of the Bayu Undan reserve. However, because of the destruction of the economy following the

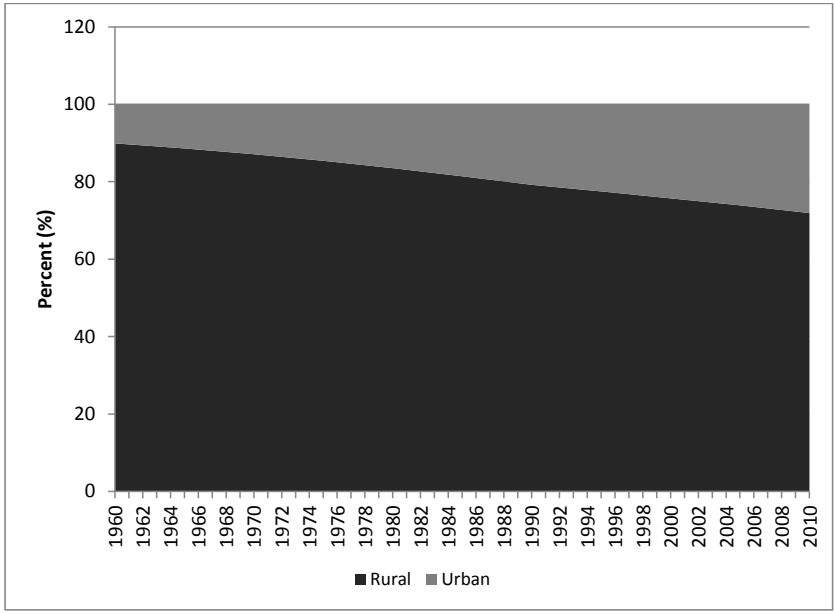
Indonesian invasion little official data exists on the amount of oil mined and exported from Timor-Leste, over the 1975-2002 period.

Australian participation became strong as independence became imminent. When Timor-Leste became independent, the Timor Sea Treaty of 2002 was amended leading to the creation of the Joint Petroleum Development Area (JPDA) from when the governments of Timor-Leste and Australia began to share oil and gas rents by a breakdown of 90% and 10% respectively (UNDP, 2011: 62). The Elang Kakatua reserve in the JPDA generated 32 million barrels of oil since it opened in 1998 and closed in 2007. The largest oilfield now operated by Conoco Phillips, Bayu Undan, was opened in 2004. However, subsequent exploitation initiatives involving Australia has proved thorny with Timor-Leste seeking 50% of the revenue with fields stretching into contested border areas. Indeed, as with the maritime border a number of the agreements are being renegotiated by Timor-Leste with Australia such as the Greater Sunrise gas field.

Proceeds of the oil revenue of Timor-Leste is transferred to the Petroleum Fund, which is reported to be audited transparently. Petroleum accounted for 62.9% of the GDP of Timor-Leste in 2012, which was only projected to fall to 60.6% of GDP in 2018 (IMF, 2013: 30). Despite intense government efforts to acquire oil mining rights and revenue, international agencies such as the Food and Agricultural Organization (FAO) and the United Nations Industrial Development Organization (UNIDO) have increasingly encouraged the Timor-Leste government to develop its non-oil resources. Given the finiteness of oil reserves, and especially the expected exhaustion of the main Bayu Undan reserve by 2023 (Nicolau *et al.,* 2005: 5), it is important that the small nation developed its other resources to support long term development.

As oil and gas mining is highly capital-intensive it does not create many jobs, and hence, contributes little directly to poverty alleviation. A number of key social indicators show that people of Timor-Leste are deeply immersed in poverty. Despite the gradual fall, child mortality (0-5 years) rates are still high with the life expectancy of 61 years in 2008. The concentration of rural population fell from 89.9% in 1960 to only 71.9% in 2010 (see Figure 1). The UNDP (2011: 41) reported that the incidence of poverty rose from 36.3% in 2001 to 49.9% in 2007 with rural and urban poverty incidence rising from 39.7% and 25.2% respectively in 2001 to 51.5% and 45.2% respectively in 2007. The incidence of poverty was 28% among wage earners, 33% among non-wage earners and 49% among farm dwellers in 2007 (UNDP, 2011: 43). Unless these figures are reversed in the near future the euphoria following political independence may be replaced by internal strife. The attempted assasination of its President, Ramos Horta in 2008, is a case in point.[1]

Figure 1: Rural-Urban Breakdown of Population, Timor-Leste, 1960-2010



Source: World Bank (2013)

Despite achieving self government and initiatives to support economic development, most people in Timor-Leste are still trapped in poverty. While petroleum revenue through the Petroleum Fund has been useful in assisting development efforts, the development of renewable non-oil and gas sectors is pertinent to uplift the living standards of the masses.

3. Theoretical Considerations

Oil and gas have been the main economic resource of Timor-Leste for several decades, which has raised fears that overdependence on it may cause the Dutch Disease. The latter refers to a phenomenon where overdependence on non-renewable resources such as oil and gas can lead to stagnation or contraction of important productive sectors. While neoclassical economists claim that even highly underdeveloped economies should pursue non-distorting economic policy by limiting the role of government to infrastructure development that is led by markets, we consider such an approach to be inappropriate as it will only lead to resource outflows without adequate development of domestic capabilities. As Lall (2001) has shown convincingly from the evidence collected from Sub-Saharan countries, countries that developed technological capabilities

have performed better economically than countries that did not. Typical of Keynesian arguments, we consider Timor-Leste to be facing severe demand constraints, and as such a liberal policy approach will create an economic equilibrium far from the point of full employment (Keynes, 1936). Hence, we examine two important arguments in this section.

3.1 Dutch Disease

A number of countries have suffered in the past when economic transactions were led by a booming non-renewable mineral sector. Whereas countries such as the Netherlands managed to avoid such overdependence by targeting their agricultural and manufacturing sectors for development, countries like Nigeria has remained dependent on oil and gas. The economic structure of Nigeria in 2010 was not very different from that in 1960 (World Bank, 2011). Despite enjoying natural endowments, Nigeria has become increasingly dependent on palm oil imports. The arguments directed at such a development was originally advanced by Corden and Neary (1982).

Corden and Neary (1982) used a three-sector model - the non-tradable sector (including services), the non-renewable booming tradable sector (minerals), and the renewable tradable but lagging sector to show how it will eventually stunt economic development. The booming sector usually refers to the extraction of oil and gas, but can also refer to all mining of minerals (e.g. gold, copper, diamonds, bauxite, tin and iron). The lagging sector generally refers to manufacturing, but can also include productive agriculture. This paper, thus, seeks to examine if oil rich Timor-Leste shows signs of reducing its dependence from the non-renewable resource of oil and gas, and to present detailed policy recommendations to ensure that the country does not fall into the Dutch Disease trap.

3.2 Technological Capabilities

The emphasis on technology as the driver of economic growth can be traced to Marx (1954) who referred to the introduction of capitalist social relations as essential to engender mass production capabilities. Whereas Marx (1954) focused on the transition to capital production organisation and competition as essential to stimulate technological change, Schumpeter (1934, 1943) advanced this argument further by differentiating technical change into creative destruction (Mark 1) and creative accumulation (Mark 11) activities. While the former refers to incremental innovations that entrepreneurs can easily handle, the latter refers to the creation of new stocks of knowledge that can only be generated in large R&D labs.

Reinert (1994) showed evidence of how it is possible for countries at the bottom of the technology ladder and enjoying very low per capita incomes to catch up technologically and eventually develop into high income economies. Indeed, Korea and Taiwan are examples of such economies that started with per capita incomes of less than US$100 in the 1960s to enjoy per capita incomes exceeding US$20,000 since 2010 (World Bank, 2011). The success stories of Korea and Taiwan are all the more interesting because of the fact that they lacked natural resources to generate foreign exchange to support their industrial policy initiatives.

While the focus on technological capability building is central to stimulating economic development in Timor-Leste, strategic targeting is important taking into account the country's economic and spatial structure. Whereas at the time of take off, Korea and Taiwan targeted selected industries for development because of the lack of resources and their small size (Amsden, 1989; Kim, 1997), Timor-Leste's tiny size makes the selection issue from the tradable non-oil sectors for promotion even narrower. However, contrary to the critics who claim that the global trading arrangement has rendered industrial policy totally irrelevant (cf Yusof and Nabeshima, 2009), others feel that Timor-Leste is simply too small and consistent with the arguments of Reinert (1994) we believe that some features of industrial policy are both possible and essential for tiny economies to grow rapidly and experience structural change into high value added activities. Given the low differentiating capacity of tourism we believe the latter can only be a complement to generate foreign exchange rather than achieving a sustained economic change.

Hence, while the Dutch Disease argument provides a powerful rationale to avoid succumbing to overdependence on oil and gas, the focus on technological capabilities is critical for Timor-Leste to stimulate economic development, which is important for poverty alleviation efforts.

3.3 Towards a Stylised Framework

Timor-Leste is an economy facing severe demand constraints as unemployment and poverty incidence are extremely high while per capita income is extremely low. Three strands of arguments are important here. The first comes from the contribution of Harrod (1939) and Domar (1946) who made the case that the incremental capital output ratio of less developed economies to be higher than more developed countries. Poorer economies facing severe unemployment will have to invest heavily into developing infrastructure before productivity begins to rise. In other words, development has trajectories that require different emphasis during different phases with capital expenditure expected to grow far more rapidly than output growth in the early phase of growth. Hence, the neoclassical growth model advanced by Solow (1956) will not be useful in

driving early growth trajectories of poor economies such as Timor-Leste. This will hold even with the new growth model after accounting for embodied technical progress following Romer's (1986) contribution to growth accounting. The attempt to remove technology from the residue estimated using the original Solow (1956) model, even if undertaken effectively, does not address the need for early developers to focus on capital expansion to develop basic infrastructure under circumstances where capital productivity will be low.

A complementary argument focused on raising agricultural productivity was articulated by Lewis (1954). Lewis (1954) and Myrdal (1957) advanced the "two-sector surplus labour" model [modified later by Ranis and Fei (1961) and Jorgenson (1967)] to explain how differences in economic returns drive movement of surplus labour from agriculture to manufacturing. This process of self-sustaining growth is assumed to continue until all surplus agricultural labour is absorbed in the expanding industrial sector (Lewis, 1954).

Second, is the need for early developers to quickly integrate into the capitalist world system to initiate growth in productive capacities (Kalecki, 1976), which is against the arguments of the dependency school.[2] The dependency school called for delinking from the capitalist system because of its "super-exploitation" that underpins the underdevelopment of countries (Baran, 1962; Frank, 1966; Amin, 1976). The underdevelopment thesis explained by surplus appropriation and transfer became popular following the failure of several developing countries to generate significant levels of GDP growth despite increasing exports of agricultural commodities (Singer, 1950; Prebisch, 1950). This came to be known as the Singer-Prebisch fallacy of composition thesis and was predicated on falling terms of trade between agricultural and manufactured products. Sarker and Singer (1991) subsequently found that developing countries had actually substantially diversified exports to include light manufactures and yet continued to face falling terms of trade. Nonetheless, the fallacy of composition or the Sarker-Singer thesis was avoided by successful exporters who focused on raising value added through technical change and diversification (see Rasiah *et al*., 2000).

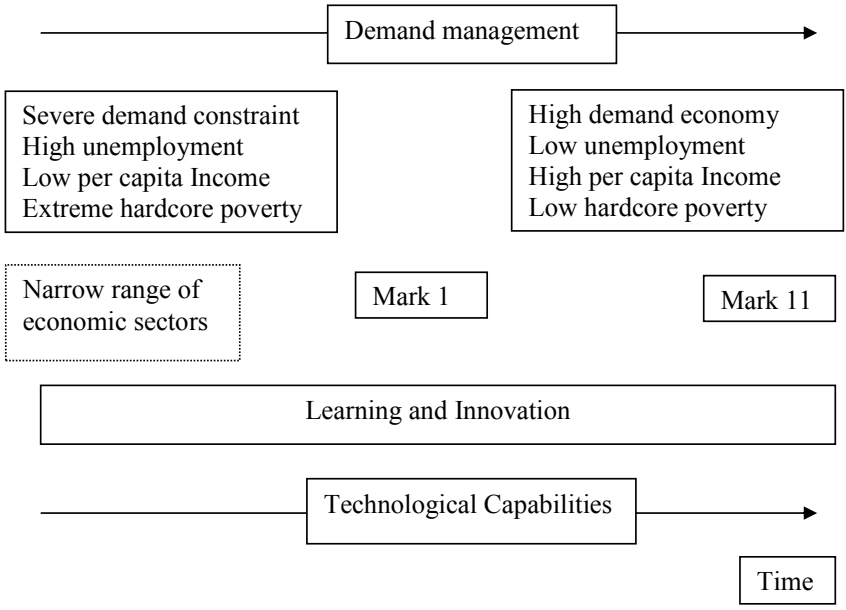
Third, borrowing from the pioneering work of Keynes (1936) and Kalecki (1976),[3] we absorb the realistic argument that Timor-Leste requires a policy framework that focuses on demand management. In doing so, we prefer Kalecki's (1976) argument that calls for nation states to target technological capability building once development finance meets essential consumption. Drawing from Marx's (1954) logic of departments 1 and 2 goods, Kalecki (1976) emphasised the gradual reinvestment into capital goods to shift the economy to technology-intensive economic activities. In doing so, Kalecki made the masterful observation that employment creation and poverty alleviation can only be sustainable in the long run if the productive forces and competitiveness

of the economy continue to rise. However, unlike typical economies with sizable population and land mass, Timor-Leste is tiny, and hence, the choice of sectors to target will be much narrower than what Korea and Taiwan pursued to propel their economies to developed status.

While Kalecki's (1971) analysis remains important, the practical application of his arguments in technological capability terms requires the use of Schumpeter's assessment of creative destruction (Mark 1) and its extension by Nelson and Winter (1982), creation accumulation (Mark 11) activities. Whereas the first refers to minor or incremental innovations related to improvements and adaptations to plant layout, machinery and equipment, inventory and quality control systems and product that entrepreneurs can easily manage, the latter refers to the creation of new stocks of knowledge to support radical innovations that can only occur in large R&D laboratories. Despite being located at the bottom of the technology ladder Timor-Leste can pursue the Schumpeterian Mark 1 and Mark 11 activities by focusing on the few sectors where it enjoys either natural or potential advantages. Figure 2 shows the stylised framework for upgrading that Timor-Leste should adopt.

As with development trajectories in general, it has to be recognised that the transition from one phase to another cannot be mechanistically differentiated.

Figure 2: Stylised Framework of Upgrading, Timor-Leste, 2012



Source: Authors

The sequence of developments will inevitably involve the evolution of economic enterprises to show significant a presence rather than completely dominate the phases. Hence, as firms in Timor-Leste move to Mark I phase a larger number of firms may still specialise on lesser technological capabilities. Also, the task of moving an underdeveloped country from the bottom of the technology ladder will be arduous and daunting with no guarantee that sincere efforts will bear fruit. Nevertheless, the history of economic development has demonstrated that it is the only route through which countries will stand a better chance to achieve economic development (see Veblen, 1915).

4. Contribution of Non-Oil Sectors

While recognising that oil and gas will play an important role to finance essential consumption and the development of the other sectors, the focus in this section is to critically examine the development of the non-oil sectors in Timor-Leste. It is the non-oil sectors associated with renewable resources that can prevent the occurrence of the Dutch Disease in Timor-Leste.[4] Hence, this section analyses the extent of development for the non-oil and gas sectors in Timor-Leste.

Table 1 shows the structure of the non-oil and gas GDP of Timor-Leste. It can be seen that services and agriculture have remained the largest sectors with no clear trends. Public services exceeded the private share in 2006-08. The lion's share of the service sector, comprising largely civil and police service, raises questions of "pseudo development" that can only be overcome through the expansion of a vibrant private sector.

The government, through heavy aid from abroad have targeted infrastructure development as a major activity, and hence, construction

Table 1: Non-Oil GDP Structure, Timor-Leste, 1993-2008

	1993	1996	1998	2000	2002	2004	2006	2008*
Agriculture	29.8	30.4	41.1	25.8	32.1	33.5	35.7	31.8
Mining(non-oil and gas)	1.0	1.0	0.6	1.2	1.2	0.9	0.6	0.5
Manufacturing	2.9	3.0	2.7	2.8	4.0	3.8	2.7	2.4
Utilities	0.6	0.7	0.8	0.9	1.0	1.3	1.5	1.4
Construction	20.9	19.9	10.6	13.7	13.3	9.4	9.1	13.0
Private Services	22.1	23.8	23.3	22.1	28.4	27.2	24.4	23.7
Public Services	21.5	20.2	20.1	33.6	20.1	24.0	26.1	28.6

Note: * - from UNDP (2011); others from ADB (2011)
Source: ADB (2011); UNDP (2011)

accounted for 13% of Timor-Leste's GDP in 2010 (see Table 1). The oil and gas sector has remained dominant with services and construction sector coming close second. Agriculture is the only tradable sector that still shows a strong share of GDP but its share has stagnated over the years. Since construction and utilities in Timor-Leste are essentially non-tradables, and non-oil and -gas mining contributes so little to GDP, we focus on agriculture and manufacturing to evaluate the capacity of these sectors to promote rapid GDP growth that is essential for poverty alleviation.

Timor-Leste recorded an unemployment rate of 3.6% in 2010 (World Bank, 2013). Agriculture (51%) contributed the most to employment among the non-oil sectors followed by services (40.2%) (see Table 2). The contribution of manufacturing (3.2%) to employment was significantly less than the construction sector (5.6%). The evidence shows that Timor-Leste is still a highly underdeveloped country where the population is largely tied to agriculture, and simple services with heavily underemployed resources in the Keynesian and Kaleckian sense.

Table 2: Non-Oil Employment Structure, Timor-Leste, 2010 (Thousands)

	Rural-Urban			Gender		
	Urban	Rural	Total	Male	Female	Total
Agriculture, forestry, fishing	13 (18.6)	115 (63.5)	128 51.0	88 51.5	40 50.0	128 51.0
Mining & Quarrying	0 (0.0)	1 (0.6)	1 0.4	1 0.6	0 0.0	1 0.4
Manufacturing	3 (4.3)	5 (2.8)	8 3.2	3 1.8	5 6.3	8 3.2
Construction	7 (10.0)	7 (3.9)	14 5.6	13 7.6	1 1.3	14 5.6
Services	47 (67.1)	54 (29.8)	101 40.2	67 39.2	34 42.5	101 40.2
Total	70 (100.0)	181 (100.0)	251 100.0	171 100.0	80 100.0	251 100.0

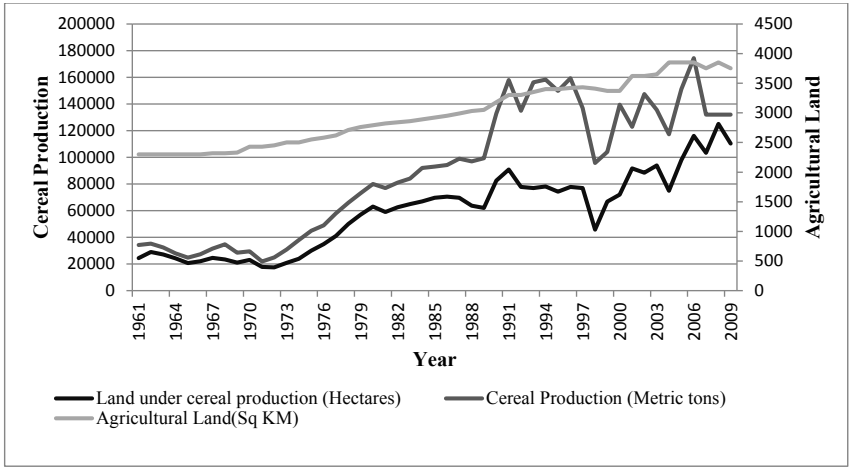
Note: Figures in parantheses refer to percentage of vertical total.
Source: Calculated from UNDP (2011: 35)

4.1 Agriculture

By far the most important non-oil sector is agriculture. Yet, agricultural production in Timor-Leste has shown considerable fluctuations over the period

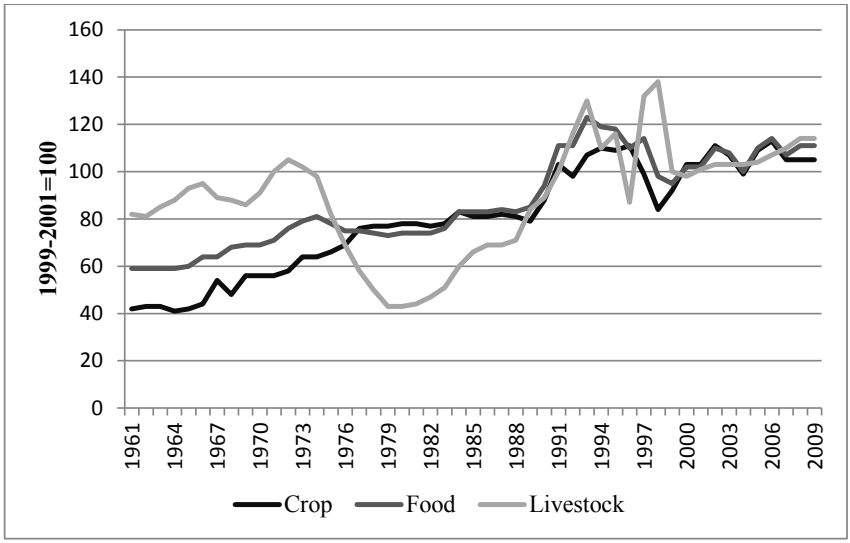
1961-2010. While agricultural land had continued to grow over this period, land under cereal production fell sharply in 1995-98 following insurgency (see Figure 3). Cereal production fell sharply from 1996 as a consequence before rising in trend terms until 2009. Whereas crop and food production rose in trend terms over the period 1961-1993 and 1961-1996 respectively, livestock production fell sharply over the periods 1972-1979, 1992-95 and 1997-98 (see Figure 4). Crop and food production, and livestock show a fluctuating and steadily rising trend over the period 1999-2009. Despite the general improvement, all three agricultural items are at a significantly lower base than the peak achieved for food in 1993, crop in 1996 and livestock in 1997. More significantly, Timor-Leste's cereal yield has shown a trend fall from 1998: declining from 2,095 kilograms in 1998 to 1,276 kilograms in 2009 (see Figure 5). This contraction has occurred at a time when the Ministry of Agriculture officials of Timor-Leste reported that Timor-Leste only met 80% of its food demand from domestic production.[5]

Figure 3: Agricultural Land and Cereal Production, Timor-Leste, 1961-2009



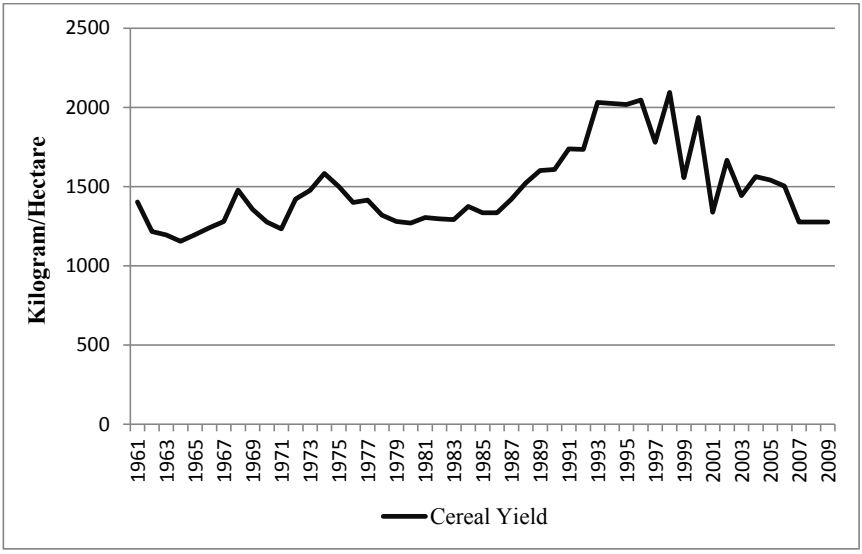
Source: World Bank (2013)

Figure 4: Production Index of Selected Agriculture Goods, Timor-Leste, 1961-2009



Source: World Bank (2013)

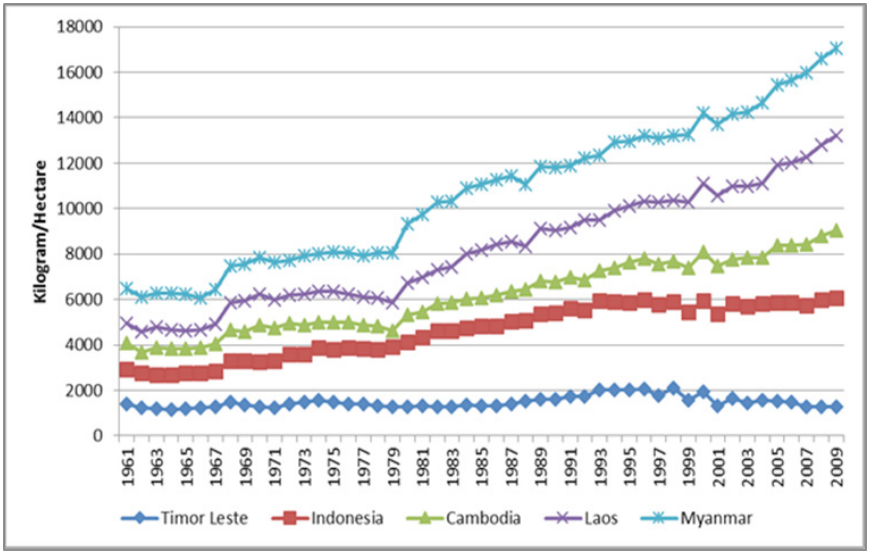
Figure 5: Cereal Yield, Timor-Leste, 1961-2009



Source: World Bank (2013)

Production of cereal in Timor-Leste since 1998 has been extremely low when compared with the comensurate crop yield in its former occupier, Indonesia, and the LDCs of Cambodia, Laos and Myanmar (see Figure 6). While Indonesia shows the highest yield, the gap in cereal productivity between the latter LDCs and Timor-Leste has begun to widen since 2000. Even war-torn Cambodia has since 1998 showed dramatic improvements in cereal yield. The dramatic fall in cereal productivity coming after the departure of Indonesia shows that domestic technological capabilities have not caught up with technological capabilities achieved by the comparable LDCs of Cambodia, Laos and Myanmar. It is little wonder that food production in Timor-Leste is inadequate to meet domestic demand.

Figure 6: Cereal Yield, Selected Countries, 1961-2009



Source: World Bank (2012)

The main agricultural crops in Timor-Leste are paddy, coconut, cassava, sweet potato, corn, coffee, fish and cattle, pigs, goats and poultry products (SOGES, 2009). The key products that should be promoted include Timor-Leste's food-based crops such as paddy, cassava, sweet potato and corn, cash crops such as coffee, soybean, peanuts, green beans and coconuts, fish, cattle, pigs, goats and poultry products. Other products such as candlenut, cashew nuts and animal hides and skin are also available but have not been cultivated

on significant commercial scale. A significant amount of the coconuts, cassava, sweet potato and peanuts actually rot in the countryside since there is lack of infrastructure connectivity to bring them to Dili and the other urban locations.[6] The government announced in 2008 to step up the production of paddy, cassava, sweet potato and corn to meet the demand in Timor-Leste (SOGES, 2009). Bamboo cultivation was identified in 2007 as a commercial crop to support renewable material in the manufacture of furniture.

The FAO (2003) classified Timor-Leste as one of the cheapest producers of coffee in the world, primarily because of growth of "forest coffee" in a near-wild state. Producers bear no overheads, provide no inputs with no pruning or replanting, and the only on-farm cost borne is weeding and harvesting. Because it grows in a semi-wild state and no chemicals are used, it qualifies as organic coffee. The hybrid varieties of Arabica and Robusta coffee are also cultivated in Timor-Leste. The Cooperativa Café Timor (CCT) has the capacity to produce 600 metric tons of fresh coffee a day (SOGES, 2009: 91).

A survey in 2001 suggested that there were between 4,300-6,000 fishermen operating in 960 groups in 75 fishing centres around the coast of Timor-Leste. The government issued licences to foreign fisherman in 2008-10 to increase the landing of fish in Timor-Leste. Most fishermen use small boats equipped with gillnets, traps and hooks and lines fishing within 300 meters off the shore (Timor-Leste, nd.). Shellfish and other seafoods are harvested from the reef flats by women. In some areas, beach seines are also used. Off-shore fishing licences were granted to foreign fishermen to complement rising domestic demand.

During the time of this research in 2009, the boats, skills of fishermen and equipment used by Timor-Leste fisherman were obsolete, and hence UNIDO (2009) recommended that the government offer better boats and training, and ice factories, transport vehicles and development and demonstration centres focused on acquiring and adapting cutting edge fishing, maintenance, process and management techniques to support value addition in the industry. Unless the technological capabilities of fishermen are improved, much of the sea fish will be captured by fishermen from Indonesia, and Thailand.

Over half of the animal products for food were imported, though Timor-Leste also exported cattle in 2010. The field observations by the authors in 2009 showed that the technological capabilities in the animal slaughtering, meat sorting and packing and processing industry in Timor-Leste were highly underdeveloped. The lack of abbatoirs to slaughter cattle, goats and pigs is one of the reasons why these animals are moved to West Timor where they are slaughtered before some of them are imported back (see SOGES, 2009: 24).[7]

With GDP projected to grow by 6.2% over the period 2010-20, the demand for animal meats, eggs and milk will only rise. While the supply of hides and skins in Timor-Leste is inadequate to warrant a full-scale leather processing industry, the government should issue licences for the establishment of ice factories and refrigeration houses to promote the live stock industry. Animal hides can still be exported to West Timor for scale reasons and the amount produced in East Timor was uneconomic, and hence, did not warrant its processing into leather domestically.

The last competitive analysis of production in Timor-Leste undertaken by FAO (2003) suggests that the technological capabilities achieved by Timor-Leste are so low that the country is not ready for the introduction of new crops:

> *Timor-Leste is not currently in a position to successfully manage the introduction of new commercial crops on any significant scale, and furthermore, the returns and the more immediate impact would be much higher from exploiting/enhancing existing crops and rural enterprises, for which there is already some investment, a skills base, and which have very low productivity and therefore easy to make rapid progress* (FAO, 2003: 3).[8]

However, while we largely support the views of the FAO and the officials of the Ministry of Agriculture, Fisheries and Forestry[9] of Timor-Leste that the government should focus on the existing crops of coffee, coconut, green beans, soybeans and peanuts, new initiatives should not be discouraged as is the case with the planting of bamboo for the manufacture of furniture is a new and successful development that began in 2007. In line with this approach – which proved successful when Chile introduced salmon farming in the Southern provinces to evolve technological capabilities targeted at alleviating poverty since the 1980s (see Katz, 2006; Rasiah and Vinanchiarachi, 2012), - the government of Timor-Leste identified a number of agricultural products (including new ones) for import-substitution, and for domestic consumption and exports (see Table 3). The efforts to build infrastructure - better roads, refrigeration, storage and use of better seeds to raise output and yield of both the old and new crops – should be encouraged. It is important that UNIDO's (2009) recommendation, to stimulate growth in value added through the extension of the agricultural value chain to include industrial processing through sorting, pooling, drying and packaging, is followed.

Table 3: Products Identified for Promotion, 2009

Imported products	Domestic market	Export market
Rice, soybean, chicken meat, beef meat, eggs, sweet potato, cooking oil, chicken feed meal, fish and fruits	Rice, coconut oil, soybean, vegetable, corn, beef, sweet potato, fish, chicken meat, feed meal for chickens and pigs, and eggs, bamboo products and teak products	Coffee, green beans, peanut, cattle, bamboo products and teak products

Source: Adapted from SOGES (2009: 91).

SOGES (2009: 91-92) recommended that agri-business be promoted in downstream, on-farm, upstream and agricultural activities. A strategy currently promoted by the government is to introduce zoning on the basis of product specialisation to appropriate scale economies. The Economic Development Minister reported to us that he is keen on imitating the one village one production experience of Thailand but it should be examined carefully as it might cause the usual problems associated with monoculture.

Bamboo appears to be a promising product following UNIDO's (2009) efforts to support its farming and processing on a commercial scale. The main centre targeted at developing bamboo and bamboo products has enlisted technological support from abroad to diversify and deepen the industrial activities associated with bamboo. The supply of rattan and candlenut is considered sporadic and too highly dispersed for its export to be economical (FAO, 2003).

4.2 Manufacturing

Timor-Leste is essentially an agrarian economy, endowed with rich gas and oil resources with little industrial development. Due to its size, it lacks the scale to support heavy industrialisation.The share of manufacturing in GDP is not only small, it has actually shown a trend fall since 2000 (see Table 1). However, small scale manufacturing is still desirable as it is essential for engineering support, light consumer goods and complementary activities to support the engines of growth. The industrial focus should be on absorbing cutting edge knowhow through adapting and adopting best practices.

Because the commodity value addition policy framework in the country is limited to the natural resource segments only, the government should support participation in designing, customisation, packaging and processing. Because of the small size and rural orientation of Timor-Leste, the realisation of the value addition explained in Figure 2 will require the implementation of strategies to stimulate upgrading into the higher value added stages shown in Table 2. Natural

resources as well as the potentially economically important products in the country should then be subjected to value addition through sorting, processing and packaging, maintaining quality standards with complementary support from adapting and re-engineering, maintenance and repair manufacturing activities. The development of the value chain of the selected products should also be enhanced through infrastructure development.

With the exception of a handful of medium size firms, the hundred-odd enterprises in Timor-Leste are small and micro-sized (UNIDO, 2009).[10] Efforts must be taken to stimulate value addition in the sector and through growth in other sectors. The requisite meso-organisations must be established to coordinate macro-level policies effectively to reach the micro-level enterprises.[11]

Timor-Leste's complementary interface between agriculture and construction is a positive factor. For example, the government has embarked on developing two of the ports identified by the FAO (2003) for the landing of fish. While its construction is absorbing most of the costs, the maintenance of warehouse facilities (including refrigeration) has required engineering support to undertake minor boat and ship repairs.

The dismal performance of manufacturing is also a consequence of an underdeveloped private sector. The private sector in Timor-Leste is still tiny so much so that public services contributed more to value added than private services in 2006-08 (see Table 1). The Institute for Private Sector Support (IADE) and the Business Development Centres train over 3,000 people each year but the results have not been encouraging (SOGES, 2009).

5. Avoiding the Dutch Disease: An Agenda for Action

Given the heavy dominance of the oil and gas sector and the low contribution of the non-mineral sectors to the GDP, the government must take steps to develop the renewable productive sectors, such as, agriculture and manufacturing. Although the nascent government of Timor-Leste still needs considerable assistance from international organisations, such as the World Bank and the United Nations agencies to meet basic needs of the poor, the Petroleum Fund should be used to finance the development of technological capabilities in the renewable sectors. As the political economy of economic development of the successful developers has demonstrated (see McFarlane, 1984; Rasiah and Ishak, 2001; Reinert, 2007), the government must make key decisions on the strategies, policy response and institutional direction essential to reinvigorating the non-oil sectors.[12]

Agriculture should be the main focus over the next decade with a complementary emphasis on rural industrialisation, which must be strongly supported simultaneously to stimulate economic synergies in the renewable economic sectors. The economic sequence of shifting from low value added

to increasing returns industries, as argued by Young (1928), Kaldor (1967), Chang (2003) and Reinert (2007), must be followed if Timor-Leste is to catch-up economically with the developed countries. There must also be a strong focus on training to ensure greater success from programmes that are aimed at fostering agriculture-based demand-creating industrialisation.

5.1 Towards a Policy Typology to Initiate Catch-up

We developed a typology by taxonomies and trajectories to help policy coordination by the Ministry of Agriculture and the Ministry of Industry of Timor-Leste. The evidence shows that farms and firms in Timor-Leste are highly underdeveloped with cereal productivity much lower than Cambodia, Laos and Myanmar, and way below that of its neighbour Indonesia. Hence, Timor-Leste easily fits into the first stage of initial conditions shown in Table 2.

The main policy focus of the Ministry of Agriculture and Ministry of Industry is to coordinate and stimulate farms and firms to systematically move up the value chain by targeting the pillars of basic infrastructure, high-tech infrastructure, network cohesion and regional and global integration simultaneously (see Table 4). Introduced as the systemic quad, Rasiah (2009) advanced this typology to transform economies from underdeveloped status to developed status through technological capability building and clustering. Timor-Leste emerged from the civil war with highly damaged basic infrastructure; its economic links with other systemic pillars are also highly underdeveloped.

At the time of the fieldwork in 2008-09, the government was planning to build basic infrastructure to establish links between the rural households and the towns, basic port facilities, support for agriculture and access to basic health, schools, utilities and shelter, and services (such as banking and information communication technology). Phases 1 and 2 will experience high incremental capital output ratios as the government will have to build basic infrastructure with little output returns. The government had also plans to stimulate foreign direct investment (FDI) inflows and were seeking foreign sources of knowledge (such as bamboo cultivation and furniture making from Assam, India) (see UNIDO, 2009).

As Timor-Leste moves through phases 1 and 2, efforts must be taken to stimulate catch-up activities in fishing technology, farming technology to raise cereal productivity as well as export crops such as coffee, candlenut, animal slaughter and packing. While the focus now should be on the learning phase, efforts should be taken gradually to stimulate catch up to phases 3 and 4 through the participation of both domestic actors and assistance from foreign actors. Phases 3 and 4 can be classified as creative destruction activities that Schumpeter (1934) referred to as Mark 1 activities. Entrepreneurs are capable

Table 4: Typology of Policy Framework

Phases	Basic Infrastructure	Hi-tech Infrastructure	Network Cohesion	Integration in Regional and Global Markets
Initial Conditions (1)	Political stability and underdeveloped basic infrastructure	Emergence of demand for technology	Social bonds driven by the spirit to compete and achieve	Linking with regional and global markets
Learning (2)	Expansion of roads, drainage, canals, schools, hospitals, power supply, water supply, security with better customs and bureaucratic coordination	Learning by doing and imitation	Expansion of tacitly occurring social institutions to formal intermediary organisations to stimulate connections and coordination between economic agents	Access to foreign sources of knowledge, imports of material and capital goods, and FDI inflows
Catch-up (3)	Smooth links between economic agents	Creative destruction activities start here through imports of machinery and equipment, licensing and creative duplication	Participation of intermediary and government organisations in coordinating technology inflows, initiation of commercially viable R&D	Licensing and acquisition of foreign capabilities. Upgrading synergies through technology imports. Emergence of strong technology-based exports
Advanced (4)	Advanced infrastructure to support meet demands of economic agents	Developmental research to accelerate creative destruction activities.	Strong participation of intermediary and government organisations in coordinating technology inflows, initiation of commercially viable R&D	Access to foreign human capital, knowledge linkages and competitiveness in high tech products
Frontier (5)	Novel infrastructure developed to save resources costs	Basic research. R&D labs to support creative accumulation activities	Participation of intermediary organisations in two-way flow of knowledge between producers and users	Connecting to frontier nodes of knowledge, and competitive export of high tech products

Source: Adapted from Rasiah (2007) and Rasiah and Vinanchiarachi (2012)

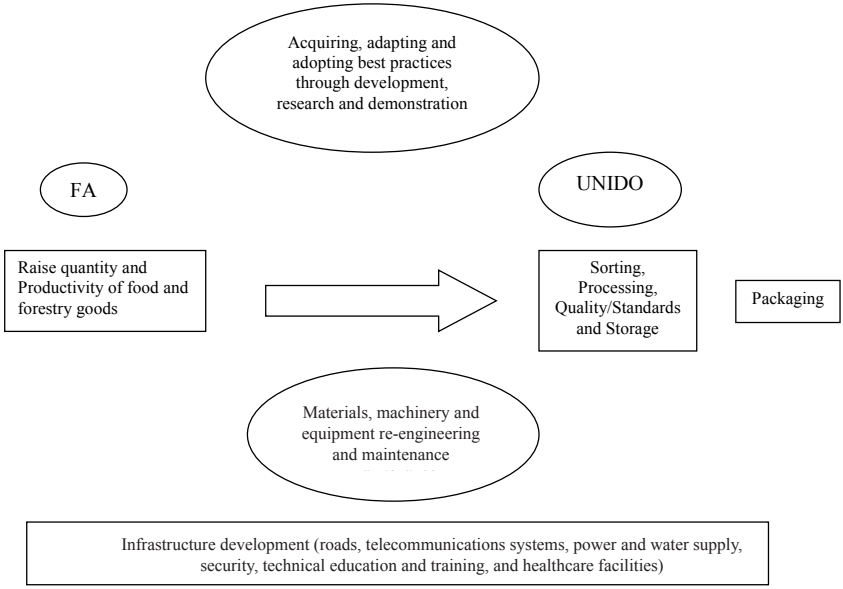
of achieving catch-up to levels 3 and 4 with the right institutional framework, i.e. prioritisation of quick licensing, build up in meso organisations, such as training, standards and testing organisations, and incubators to solve collection action problems.

The Schumpeterian creative accumulation activities as advanced by Nelson and Winter (1982) will become eventually important as the farms and firms in Timor-Leste attempt to break out from level 4 creative destruction activities to reach creative accumulation activities in phase 5. Public R&D labs to support entrepreneurs running small farms and firms, and internalised in large farms and firms will be critical as there is a push to shape the technology frontier in the sectors prioritised through the production of new stocks of knowledge. Conforming to evolutionary thinking, the choice of sectors should be left open as dynamic transformation often result from evolution from unexpected consequences developed through emerging economic agents operating in Timor but integrated in the global economy. Nevertheless, the focus of the frontier firms generating new stocks of knowledge will essentially lead to high income growth in Timor-Leste.

Institutional reinvigoration and creation should be targeted at macro instruments and meso-organisations that are connected and coordinated with the micro-level units to solve collective action problems and insulate the economy from external shocks (see Figure 7). The Meso-organisations should play a key role to support macro-micro interactions (see Katz, 2006). The broad activities recommended are: (i) enabling the business environment for industrial policy support; (ii) promoting clustering and business linkages; and (iii) promoting the participation of rural and female members of society.

Investment laws (involving local and foreign owners) and procedures, incentives and grants as well as setting up and strengthening of infrastructure facilities should constitute the aspects enabling the business environment in Timor-Leste that are necessary to make industrial policy work. The key products identified for promotion should then be juxtaposed against the most suitable areas of concentration where they are to be pooled for processing, maintenance work and for the installation of development and demonstration centres. A mapping of existing and missing components for the development of integrated clusters around the selected products should then be carried out. Programmes to involve and empower the rural population with a special emphasis on women and youths – including coordination and training – are vital. The final institutional mechanism that must be started is a committee that evaluates ex ante, monitors and appraises ex post the rural development strategies to ensure that it is effectively implemented and is always upgraded to meet the changing needs of the population.

Figure 7: Value Adding Food and Forest Products, Timor-Leste



Source: Authors

Given the lack of strong market-based transactions in the rural areas, the creation and strengthening of the business environment is one of the earliest priorities that the government of Timor-Leste should adopt. Infrastructure, investment and land tenure, business friendly incentives and grants, and law, security and order are critical aspects of the enabling business environment.

5.2 Clustering Initiatives

The promotion of clustering activities around the selected products will be important to generate economic synergies at one level and its appropriation by the rural people of Timor-Leste at another level. The clustering process should adopt Best's (2001) explication of the concept – i.e. that it should drive differentiation and division of labour rather that gravitate around particular product specialisations.[13] The overlapping complementary activities such as machinery and equipment manufacturing, incremental process engineering activities and the transport equipment (e.g. buses, trucks and ships) can be targeted to cross-support several products. The following will be the four key activities that should be developed to support clustering in Timor-Leste.

It is important to map the value-chain of products selected for promotion – upstream planting until harvesting in the farms, and pooling, transport and storage, and subsequently processing and packing before it is moved for wholesale and retailing activities. This constitutes the commodity chain. It is necessary to understand that typically, specialised activities in a value-chain are pursued in different locations.

Efforts must be taken to identify the missing and underdeveloped components of value- chains through a mapping process. Value-chain and cluster experts are important to undertake this activity, and to also identify the concentrations of production that are current as well as those that can be potentially developed for specialisation. Mapping will integrate the value-chain with the complementary support activities, and linkages to the macro-, meso and micro organisations to complete the cluster.

A major task is to identify the macro-, meso- and micro-organisations that can support introduction and sustenance (including upgrading) of the promoted products (see Table 3). The direct and indirect linkages between these organisations will constitute the Timor-Leste cluster with sub-locations (zones) providing different specialisations. The identification of the roles by macro, meso and micro against the promoted products, and complementary suppliers should be carried out by a team of cluster experts.

The zoning of the areas for crop and livestock farming should take place after taking into account the aspirations of the community-determined decisions as well as the geographical suitability of the locations for products identified (see SOGES, 2009). The government has taken a step in the right direction by engaging the masses in the decision making process as well as creating the post of rural development officers whose prime tasks will be to act as the interface between the government and the rural masses. The rural development officers should also act as the information bridge between the rural people and government instruments. They should in addition be encouraged to participate in active discussion with the rural elders on social and economic topics that are important for the development of the rural community. Among the immediate tasks awaiting them should be engaging the rural masses to shape the product-based zoning process.

The mapping of missing components such as machinery and equipment engineering, repair and maintenance should enable the introduction of the missing components, the strengthening of weak components and the reorganisation of the structure to generate more synergies to support all industries in Timor Leste. This framework, which is recommended by Rasiah (2009) should be preferred over other approaches because Timor-Leste does not provide sufficient critical mass of firms or people for supporting product-based specialisation in such complementary activities.

It is important that the Ministry of Economic Development and the Ministry of Agriculture take charge of the coordination of the upgrading processes in Timor-Leste - the acquisition and development of best practices for diffusion to the farmers, processors and distributors through centres manned by trained agricultural officers.

A generic "technological roadmap" and a set of sector-specific technology roadmaps that spells out sequentially the movement of capabilities in the promoted products alongside the type and nature of interventions, monitoring and appraisal mechanisms are important to ensure that the targets set are met. Sector specialists can actually undertake such activities. Multilateral assistance could be directed at supporting this process by identifying and selecting sector specialists to undertake it.

Six development and demonstration centres using the framework presented in Figure 2 should be established to drive knowledge acquisition and diffusion for value addition. The current bamboo demonstration centre should be expanded and its scope deepened to participate in adapting and re-engineering activities of forestry products. The remaining five centres should be equipped to play similar roles in their respective product areas.

The current bamboo demonstration centre should be transformed into a forest product processing and demonstration centre. It should also target the development (primarily adaptive engineering) and demonstration (including training) of teak and other forest products. The current framework of absorbing knowledge and training from the Guwahati centre in Assam (India) should be extended to connect with similar centres in Thailand and China. Products turned out by the centre were exhibited at the Malaysian International Furniture Festival (MIFF) in Kuala Lumpur in 2011. Participation at international exhibitions is critical to penetrate coveted market destinations.

Replanting is one of the recommended development options but peripheral lands that do not compete with food and other related crops should be given priority. The terrain for bamboo is often steep and hilly land that is not suitable for most other crops. Collection should be based on monetising the inventory on the basis of grades for farmers and other villagers to bring them to collection points.

Overall, the six processing development and demonstration centres should attract best practices from the world for adaptation and adoption in Timor-Leste. The support of Asean should be enlisted to seek best practices for adapting and adopting in Timor-Leste. Monitoring, continuous improvement, problem solving and appraisal should be carried out to ensure that the centres are indeed value adding and meeting the needs of the rural people of Timor-Leste.

Best practice farming technology of importance to Timor-Leste that international organisations could tap from its own experiences include the mini hand held plowing machines, bore-hole technology-based irrigation instruments.

Technological capability building must be targeted at value adding operations and include the following areas of focus:

1. Machinery, equipment and components (UNIDO)
2. Materials – raw and intermediate (UNIDO and FAO)
3. Organisational structure (UNIDO and FAO)
4. Process layouts (UNIDO and FAO)
5. Seeds, fries, stock (FAO)
6. Time management (UNIDO and FAO)
7. Emphasis on corporate social responsibility (UNIDO and FAO)

Coffee processing has already evolved in Timor with the wet processing facility employing 380 permanent staff working for CCT and around 3,000 seasonal workers a day using 100 trucks (30 owned by CCT), and the dry processing factory in Dili employing on average 700-800 female workers for sorting green beans from August till February. CCT has a grinding facility at Manleuana producing 250gm packets of ground coffee (SOGES, 2009: 91). Coffee cluster specialists should be consulted on whether international standards on farming, processing, packaging and export are met, and whether an expansion in existing capacity is desirable.

Entrepreneurship should be promoted in Timor-Leste by both introducing business-friendly guidelines, support and feedback mechanisms to improve delivery but also made the prime outlet for enabling and strengthening the private sector. Because of the focus on rural areas and the lack of market participation, the government should identify selected locations where the agricultural and forest output (especially perishable goods) can be pooled and sold.

The government can temporarily own these market outlets until private entrepreneurs purchase them. Price regulation and deregulation – to correct market failures – will be necessary on the one hand to shield the poor rural buyers and on the other hand to minimise market volatility.

Eventually the focus of industrial support must be to enable the private sector to participate in it. Given the lack of a critical mass of industrial firms, government initiative must be targeted at stimulating entrepreneurs. The focus on rural entrepreneurship, with extension into urban areas should be supported to encourage their participation in all the promoted products in the country. The promotion of agri-business by SOGES (2009) is shown in Table 3. We have added beef, fish and sweet potato for import-substitution and dropped candlenuts from this list because of a lack of critical mass in particular locations while the commercial cultivation of fruits lacks take up.

5.3 Empowering the People

The framework of industrial development envisaged must connect with the rural people. Outside the public sector, the largest single sector employer at the moment is the coffee industry with around 100,000 workers engaged in seasonal picking jobs (SOGES, 2009: 86). It is believed that around 40,000 people were employed by the private sector in 2006-2008 (World Bank, 2007).

The rural development officers should be targeted at improving the entrepreneurial participation and technical skills of rural population, women and young people in competitive productive activities by strengthening relevant support institutions and service providers. The government should continue to promote human security by supporting entrepreneurship to enable disadvantaged population to seize economic opportunities based on market mechanisms and entrepreneurial initiatives, with special emphasis placed on those who are poor.

The government of Timor-Leste is already adopting UNIDO's entrepreneurship curriculum development programme that is targeted at least developed countries.[14] Among them is the introduction of practical entrepreneurship curriculum programmes in academic and vocational schools. It should capture a large number of youth, both girls and boys from the rural areas, and enable them to develop a positive attitude towards entrepreneurship, business and self-employment and acquire personal competencies such as creativity, innovativeness, resourcefulness, planning and leadership. It should prepare them to apply entrepreneurial knowledge and skills to enable them to identify business opportunities in their communities and to start and operate small businesses.

The expansion of the private sector should form the main plank to absorb the unemployed and underemployed people of Timor-Leste. It should help create and increase income, generate savings and investment and raise consumption across the rural population of the country. Supporting the private sector growth include developing massive entrepreneurial human resource development and the quick establishment of the trust of entrepreneurs to the formal rules of business with the enforcement of simple and basic business laws. Multilateral assistance should be provided to improve the capability of the Timor-Leste government to make the market work better for the entrepreneurial initiatives and human resource development.

The government of Timor-Leste should adopt both the open entrepreneurial model as well as the artisanal cooperative model *a la* Emilia Romagna (Italy) (see Best, 2001) to support the growth of the private sector. Where small scale artisanal skills are important – which is common even in the retailing of farm produce for the rural population – artisanal cooperatives should be initiated.

Such cooperatives should then be organised to drive their own training, standard setting, management and upgrading activities.

6. Conclusions

Despite its infancy, the evidence is clear that Timor-Leste is facing serious challenges in its efforts to check poverty through developing the non-oil sectors of the economy. Cereal productivity has declined over the last decade while the social indicators have only shown a slow improvement since colonialism ended. Also, the public sector has become the dominant part of services since 2006 demonstrating that the private sector has hardly evolved. With non-renewable petroleum sector increasing and retaining its share at the expense of falling contributions by the productive sectors of agriculture and manufacturing in GDP since 2006, the case can be made that Timor-Leste has not escaped the trap of Dutch Disease.

There are important policy considerations that the government of Timor-Leste should look into to escape the resource curse syndrome. The existence and discovery of new oil and gas reserves is helpful as the Petroleum Fund continues to finance infrastructure development and alleviation of poverty but the development of the country depends very much on structural change and upgrading in the productive sectors of agriculture and manufacturing. While the major international organisations, such as the World Bank and United Nations Agencies (in particular FAO and UNIDO), have important roles to play, the survival and economic expansion of Timor-Leste will very much depend on the government taking control of the situation with dynamic policies targeted at developing the renewable but productive sectors of agriculture and complimentary rural industrialisation to support long-run improvements to the standard of living of the people.

Notes

* This study relies extensively on interviews by the authors conducted with key officials of the government of Timor-Leste in 2008-09 when they were involved in preparing the "Rural Industrial Development Report" for the United Nations Industrial Development Organization (UNIDO). The views expressed are that of the authors and in no way represent those of UNIDO. The late Osman-Rani was a fantastic colleague of mine who despite his scholarly accomplishments remained a humble person. The authors are grateful to Imran Faruqi, Country Director, United Nations Industrial Development Organisation who provided the necessary contacts in Timor-Leste. We are grateful to Muhammad Ikmal Mohd Said and an anonymous referee for their constructive comments. We wish to also acknowledge the

assistance of Eusebio Guterrus, Ligia Viera Do Amaral and Agistinho Da Costa Mendonca who shared important unpublished information on Timor-Leste to us. The usual disclaimer applies.

1 Sydney Morning Herald (2008) "Ramos-Horta wounded", February, 11, 2008.

2 There are variations of this model, such as the "dependency model" based on neo-Marxist thinking of capitalist system exploitation, and the "dualistic-development model" based on the notion of dualism between rich and poor groups/regions (see Rasiah, 1995). Some versions of these models enjoy support from anti-globalisation analysts (see Stiglitz, 2003).

3 Kalecki's work predates that of Keynes but was inaccessible to us because they were published in the Polish language.

4 Some economists consider the domination of minerals in an economy as the 'curse of resources' (see Sachs and Warner, 1997). Economies endowed strongly with mineral resources that have avoided Dutch disease include Australia, Canada and Norway

5 Interview by the authors on 4-8 May 2008 in Dili.

6 Direct observation by the authors over the period July 18-27 of July 2009.

7 Interview with government officials by the authors on August 20, 2009 in Dili.

8 The FAO (2003) called for more serious evaluation of other commercially viable products such as oil palm at a later stage.

9 Interviews by the UNIDO team at the Ministry of Agriculture, Fisheries and Forestry on 7 May 2009.

10 Interviews with the Ministry of Economic Development carried out by the authors over the period 4-8 May 2008.

11 See Padmanand and Vinanchiarachi (2009).

12 Given the tiny size of Timor-Leste and the high cost of food compared with competing countries such as Cambodia we do not think garments can be an export winner for Timor-Leste (see Rasiah, 2009).

13 Porter's (1990) product specialisation framework of clusters does not provide the differentiating qualities critical for driving industrial synergies (see Rasiah, 2007).

14 Interview conducted on August 21, 2011.

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