



# AGRICULTURE AS THE LEADING SECTOR:

AN INDUSTRIAL POLICY FRAMEWORK

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Jakarta, January 2002

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*The views expressed in this paper are strictly personal and must not be attributed to  
United Nations Support Facility for Indonesian Recovery (UNSFIR) or any UN agency*

## **Abstract**

In the current climate of difficulty for industry there has been renewed interest in considering agriculture as a growth driver for the economy. This paper discusses firstly what such an approach entails, secondly considers whether it is appropriate, thirdly explains how it could be enacted and fourthly studies the experience of relevant countries. The value of agriculture in terms of its effects on equity, rural-urban linkages and SMEs are highlighted. Suggestions are offered for increasing the effectiveness of agricultural effort through removing supply bottlenecks, improving regulatory and incentive structure, creating the rural enabling environment, and integrating with international best practice. Finally, the experiences of a number of other countries who have successfully harnessed their agricultural resources, Malaysia, Thailand and Chile, are studied in order to obtain pointers to effective policy.

## **About UNSFIR**

The United Nations Support Facility for Indonesian Recovery (UNSFIR) is a project established by the Government of Indonesia and the UNDP to stimulate examination of policy options for the country at an important point in the country's development. The work aims to engender wide public discussion of the issues involved in order to build a new social and political consensus for effective and lasting policy implementation.

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## TABLE OF CONTENTS

Abstract	1
About UNSFIR	2
Acknowledgements	2
Introduction	4
Why should agriculture be the leading sector?	4
Historical precedents	4
Growth considerations	5
Equity considerations	9
Environment	11
SMEs	12
Rural-urban linkages	14
How can agriculture be made the leading sector?	14
Supply bottlenecks	15
Improving regulatory and incentive structure	15
Creating the rural enabling environment	16
Infrastructure	16
Services	17
Utilising international best practice	19
Conclusion	23
Bibliography	25
APPENDIX A	27

## **Introduction**

It is being increasingly suggested in Indonesian policy-making circles that consideration should be given to agriculture as the economy's leading sector. It is our intention in this piece to discuss firstly what such an approach entails, secondly consider whether it is appropriate, thirdly explain how it could be enacted and fourthly study the experience of relevant countries.

The choice of a growth driver in a developmental context is often framed as a choice between agriculture and industry. Such a dichotomy has been a topic of concern for national planners across the developing world. The writings of Arthur Lewis on the 'dual sector economy' and the Soviet experience led to a general belief in the latter half of the last century that industrialisation was the route to growth. The rural surplus needed to be transferred from agriculture to industry to be productively used. The compulsion by which such a process was enacted differed markedly in severity across nations with the Soviet case representing one extreme where villagers and rural produce were forcibly transferred to the cities.

Notwithstanding the manner in which such a transformation was achieved, countries which have industrialised have undergone dramatic political and sociological changes. These include the growth of cities with the pressures urbanisation implies, changes in family structure, and loss of insulation from global forces. It is important to realise that agriculture-led growth is not simply a catchword but implies difficult decisions about the future development of many aspects of the nation.

It should also be noted that an emphasis on agriculture does not mean sustaining the sector to act as a last resort for employment due to a downturn in industry. Such an approach without an increase in the productive capacity of the land or growth in demand for agricultural goods will simply lead to the immiserization of workers in the sector. A policy to emphasize agriculture therefore means improving its ability from both the supply and demand sides to respond to a heightened importance in the national developmental landscape.

A comprehensive framework for industrial policy includes numerous requirements, many of which influence both the industrial and agricultural spheres. These include the need for an effective education system and efficient investment mechanisms. For the purposes of this discussion we will focus on those aspects which have particular bearing on encouraging the positive growth of agriculture.

*Why should agriculture be the leading sector?*

## **Historical precedents**

It is important to understand the historical context of the policy being proposed. Measures in support of agriculture have been attempted before and not been successful. An understanding of the reasons for the failure of the sector to respond is essential to ascertain whether they can be avoided in the future. A key issue has been

the overwhelming concentration on achieving rice self-sufficiency. Other food crops such as soybean and sugar have also been disproportionately protected. In 1986-88, the nominal protection rate averaged 70 percent for sugar and 52 percent for soybeans<sup>1</sup>. These measures diverted farmers' ability to produce other crops which could be more valuable. They also appropriated government resources from encouraging other agricultural sectors towards the protection of such goods and input subsidies. As mentioned by Gonzales (1993), 'promotion of an inefficient crop...can impose high costs in production opportunities forgone for more efficient crops'.

The attempts which were made towards diversification of production through cash crops did not, on balance, achieve good results. Other than palm oil, there have not been any strong growth successes. This has been due to the failure of schemes to strengthen smallholder production and the weaknesses of state-owned larger producers. Smallholders have not been able to improve their productivity despite government assistance. As Hill (1996) highlights, 'there has been no appreciable yield increase in any of the major crops' for smallholders. The inability of measures to encourage production in the small holder sector can be attributed to a number of factors. These include the excessively capital and management intensive nature of schemes, conflicts of interest with the estates, the irregular nature of assistance over the years, and insufficient and large producer dominated R&D. The state-owned sector has benefited from substantial government assistance and yet failed to reap the reward. The causes can be traced to a lack of professionalism and competitive incentives (see Tabor (1992)) engendered by their favoured position.

The barriers to performance highlighted do not illustrate any inherent weaknesses in agriculture. The sector has had to contend with inaccurate price signals through intervention in the market, and ineffectively designed measures to stimulate production growth. Future support for agriculture can be enacted in a more appropriate manner using the failures of the past as a guide to pitfalls to be avoided.

### **Growth considerations**

The importance of agriculture to the economy is clear despite more than a decade of attention paid to rapid industrialisation. The agriculture, fisheries and food sector is by far the country's largest employer, still utilising 45% of the labour force by the year 2000<sup>2</sup>. The proportion was only eight per cent higher at the start of the last decade. Industry in the same decade increased its proportion of labour force employed from 10% to a still low 13%. Agriculture contributed the second largest share of GDP in the year 2000 of 17%. This was also only three per cent down from the 1990 figure. Industry improved its contribution to GDP in the 1990s from 21% to 26%. It is clearly not possible to have a useful discussion about growth drivers for the economy without considering agriculture as a major factor.

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<sup>1</sup> International Food Policy Research Institute (IFPRI) data

<sup>2</sup> BPS data

The current economic crisis has dramatically increased the significance of agriculture further. The factors which have affected industry most negatively have had far less impact on agriculture. The two principal interrelated shocks to production in the economy have been a funding constraint and increases in the cost of inputs. The collapse in the banking sector has meant an unwillingness to make new loans in sufficient quantities. Industry is more in need of such funds than agriculture as it needs to buy a greater amount of intermediate inputs. Furthermore, a higher proportion of such inputs are imported. With the crash in the value of the rupiah, affording the inputs for production has put a lower limit on the productive capacity of industry than it has on agriculture. With regard to exports, the benefits of depreciation are passed on in greater degree to the producers of agricultural goods due to their lower import consumption. The character of agriculture is likely to change with greater development as its input and import content increases. Its present structure however means that it will play a central role in attempts to overcome the current crisis.

**Figure 1**  
**Sectors of Indonesian Comparative Advantage (1995)**

(All Indonesian Export Products with Revealed Comparative Advantage Index Number of Greater Than One)

Sector	SITC	Description	1995
Agriculture	03	Fish and aquatic invertebrates	3.72
	07	Coffee, tea, cocoa, and spices	4.01
	23	Crude rubber (including synthetic and reclaimed)	15.05
	24	Cork and wood	1.03
	42	Fixed vegetable fats and oils	5.64
	43	Animal or vegetable fats and oils	8.31
	94	Live Animals	1.21
Mining	28	Metalliferous ores and metal scrap	4.29
	32	Coal, coke and briquettes	5.46
	33	Petroleum, petroleum products and related materials	2.59
	34	Gas, natural and manufactured	13.53
Manufacture	56	Fertilizers	1.94
	63	Cork and good manufactures (excluding furniture)	17.05
	64	Paper, paperboard, and articles of paper pulp	1
	65	Textile yarn, fabrics, and made-up articles	1.93
	82	Furniture and parts thereof, bedding, mattresses	1.96
	84	Articles of apparel and clothing accessories	3.14
	85	Footwear	5.26

Note: RCA in a sector j is defined as the ratio of share of world exports of Indonesia in sector j to share of total world exports of Indonesia in all sectors. RCA >1 indicates comparative advantage, RCA <1 indicates comparative disadvantage  
Source: TDRI Quarterly Review, Vol.12 No.4 December 1997

It would be prescient to consider the positive future for agriculture in the long-term. The country's comparative advantage lies in agricultural, resource-based and labour-intensive products (see Figure 1). The country will have to rely less on declining natural resources in the future. Industrialisation other than agriculture and natural resource-based production has been mainly in the form of labour-intensive manufacturing such as textiles and footwear (see Figure 2). The likelihood is that such industry will be lost over the coming decades to lower-cost regional competitors such as Vietnam and China (see Lee (2000) and World Bank (1999)). The requirement to sustain industrialisation is an increase in the value-added of Indonesian goods. Such an

outcome requires investments in infrastructure and human resources which have yet to be made and which then require a lengthy lag-time to take effect. Furthermore, the ability of such a strategy to employ sufficient numbers of such a large workforce is highly doubtful. The long-term viability of agriculture will have to be a central element in Indonesia's development strategy.

**Figure 2**  
**Value of Gross Output of Manufacturing 1999**  
**(at market prices in billion rupiah)**

ISIC Code	Description	Total Output	Percentage
31	Food, beverages and tobacco	126,552.12	23.49%
32	Textile, clothing and leather	111,261.58	20.65%
33	Wood and wood products, including furniture	52,636.62	9.77%
34	Paper and paper product, printing and publishing	31,057.42	5.76%
35	Chemicals, petroleum, coal, rubber, and plastic product	81,821.50	15.18%
36	Non-metallic mineral products, except petroleum and coal product	16,949.17	3.15%
37	Basic metals	20,104.25	3.73%
38	Fabricated metal product, machinery and equipment	92,959.85	17.25%
39	Other manufacturing industries	5,502.88	1.02%
	<b>Total</b>	<b>538,845.39</b>	<b>100.00%</b>

Source: BPS

In addition to relative gains, agriculture can witness an improvement in absolute production. This is due to increased local demand in coming years. The growing urbanisation and increase in purchasing power of the country will add to consumer demand for more and varied agricultural produce. Taking China as an example, the Ministry of Agriculture in Beijing estimated that the per capita demand for meat would increase from 28.2 (1995) to 50 kg in 2020 (Mei 1997). The demand for fruit would rise at a similar rate, from almost 31 kg to 50 kg in 2020.

Industry can play an important role in supporting the competitive advantage of agriculture. Agroindustry is already of significant importance to the industrial sector and production as a whole. Agribusiness can be considered as including primary agriculture and the animal husbandry, forestry and fisheries industries. It consists of up-stream agribusiness (economic activities which produce the means of production for primary agriculture), on-farm agribusiness (farm activities which use the means of production for yielding primary agricultural product), and down-stream agribusiness or agroindustry (economic activities which process primary agricultural product and manage their trade activities). The group as a whole has been calculated to provide 70% of the country's employment and 90% of small-scale industry and economic enterprises<sup>3</sup>. It also plays an important role in national export performance. Agribusiness contributed 20% of total exports in 1999 and 35% of total non-oil exports.

<sup>3</sup> Gumbira-Said, E and Rachmayanti (2000)

The agroindustrial sector is especially beneficial to the economy because of its shared characteristic with agriculture of low import content. Imported intermediate content has been estimated (see Figure 3) at ranging from 0.3% to 14.2% for the various agroindustry components as opposed to figures ranging from 10.8% to 32.3% for non-agroindustrial components (excluding cement)<sup>4</sup>. Such a property is of great benefit in the current difficult credit and currency position. The sector's ability to play a more productive role than some other manufacturing is seen from its higher contribution to national gross value added in many sectors as compared to non agroindustry. Agroindustry also enhances capability in generating off-farm employment in rural areas, such as delivering services (post harvest handling, transportation and marketing) and manufacturing industries (provision of input, post harvest processing, packaging and transportation). The sector is well placed to develop rapidly as inputs from agricultural production increase with greater agricultural efficiency leading to lower input costs for the sector. Growth in agroindustry would be further encouraged through an improvement in the linkage structure with agriculture.

**Figure 3**  
**Comparison of Cost Structure of**  
**Indonesian Agroindustries and Non A groindustries, 1990**

Type of Industry	Imported Intermediate Input	Gross Value Added
<b>AGROINDUSTRIES</b>		
Food processing	0.0360	0.2367
Fat and oil	0.0030	0.4372
Flour	0.1419	0.3631
Sugar	0.0029	0.4327
Other foods	0.0657	0.4311
Beverages	0.0100	0.4795
Cigarettes	0.0438	0.5594
Bamboo, woods, rattan	0.0188	0.4535
<b>Non AGROINDUSTRIES</b>		
Textile, garment, leather	0.1368	0.2952
Paper and its products	0.1236	0.3711
Fertilizer, pesticide	0.3230	0.2873
Chemical	0.3999	0.3307
Oil refinery	0.5004	0.3829
Mineral (non metal)	0.4351	0.4572
Cement	0.6747	0.2984
Metal Products	0.4705	0.3342
Machinery & electric eq	0.3183	0.3734
Transportation	0.1436	0.4336
Source: Erwidodo (1997)		

Industry will also play a greater role on the supply side as agriculture experiences growth. An increase in agricultural productivity through gains in knowledge will lead

<sup>4</sup> Bahri et al. (1998)

to higher input requirements for the sector. The challenge and opportunity for industrial growth and the country's fiscal position is in ensuring that such needs are met domestically rather than through imports. This will require considerable forward planning and encouragement from government for local agricultural manufacturing. The dramatic development of agribusiness among regional neighbours provides a good guide as to its potential in the Indonesian case. For example, Thailand has become the world's largest exporter of rice, rubber, tapioca, canned pineapple, and canned tuna as well as playing a dominant role in the world market for sugar, poultry, seafood, and tropical fruits.

Indonesia has great scope for expansion in the growth areas of global agricultural demand. These include fisheries and horticultural products. Fresh and frozen shrimps are already the country's highest agricultural foreign exchange earners. Fruits and vegetables have not fulfilled their full potential yet though their high growth rates (74% and 29% in 1998/99) show their future importance to the economy. Horticulture is now one of the most popular sub-sectors of production in the country. It has not been able to capitalise on this in export markets to date because of its low quality component.

### **Equity considerations**

The measure of success in development does not come purely from producing growth. High levels of inequality are untenable in any society and eventually lead to loss of support for an economic programme. The prior high growth performance of the country had been commendable for the relatively low level of inequality it engendered. The mechanism to achieve more evenly spread development however was inherently unsustainable. Economies were not developed equally within and between regions. Instead money obtained from more successful areas was redistributed to other areas through numerous central government schemes. This approach is not possible under democracy due to the dissension of richer areas in agreeing to redistribution. The recent decentralisation laws have acknowledged this fact and decreased the money contributed from the regions in general and specifically from their most lucrative natural resource earnings.

In the future more evenly balanced development must be produced at the ground level rather than achieved through central government largesse. Agriculture can play a key role in such a policy. The notion of equity needs to be considered at both the *interpersonal* and *inter-regional* levels. Present interpersonal issues stem from the dichotomy between progress at the urban and rural levels. Prior policy placed an overwhelming emphasis on industry, leading to a betterment of the standard of living in cities compared to the villages, with money being then redistributed to the latter. Levels of inequality in the country did not fall significantly throughout the years of rapid development.

*Interpersonal* inequality should be considered in an intersectoral and intrasectoral manner. Intersectoral differences stem from changes in the average standard of living between rural and urban areas. Such data often masks significant movement at the intrasectoral level. The movement of people from villages to cities is often concentrated on male workers. This increases the adult/child ratio in urban areas as compared to rural and leads to the wage level differences observed. These differences tend to lessen over time as migrant families in the cities are completed. In the Indonesian case, data from 1987-93 shows a net increase in interpersonal inequality, with a small rise in the rural-urban gap being mostly offset by a small fall in intrasectoral inequality (see Eastwood (2000)). Almost all of the net increase in inequality is accounted for by the increase in urbanisation. Urbanisation rose from 26% to 32% and since migration was towards the smaller and more unequal sector, both of the demographic components (intersectoral and intrasectoral) were unequalising.

Such trends in interpersonal inequality are not sustainable in their present form due to the limits of urbanisation through resource strain. Agriculture is by far the main sector in rural areas and therefore will drive any effort to improve conditions there. Nevertheless, one should be interested in the general betterment of the rural sector and policies aiding both industry and agriculture in rural areas should be targeted.

**Figure 4**  
**Number of Large and Medium Manufacturing Firms**  
**Java and Outside Java 1994 -1998**

Location	1994	1995	1996	1997	1998
Java	17,815	18,750	18,506	18,024	17,236
<i>Per thousand ppl</i>	0.16	0.16	0.16	0.15	0.14
Outside Java	4,611	4,624	4,491	4,362	4,187
<i>Per thousand ppl</i>	0.06	0.06	0.05	0.05	0.05
Total	22,426	23,374	22,997	22,386	21,423
<i>Per thousand ppl</i>	0.12	0.12	0.12	0.11	0.10

Source: BPS

The *inter-regional* character of development in the country is also a study in contrasts. Industrialisation has benefited Jakarta and West Java with respect to the rest of Java, and Java as a whole with respect to the other islands. (see Figure 4). The agglomeration nature of industry leads it to resist moves to be established in outlying regions. The fall over time in transport costs creates less incentive to be close to final consumers across the country. The failure of previous government encouragement illustrates the difficulty of altering the spatial nature of industry. Other than natural resources, agriculture is the mainstay of Eastern Java and all non-Java islands (see Figure 5). Indeed its role has grown in these areas over time due to increased supplies of labour through transmigration and greater development of still substantially untapped amounts of available land. Efforts to increase the growth of the regions will have to focus in large measure on agricultural factors.

**Figure 5**  
**GDP of Region at Constant 1993 Prices, by Industrial Origin, 1997 -1998**  
**(Million Rupiah)**

Region	1997				1998			
	Agriculture	%	Manufacturing	%	Agriculture	%	Manufacturing	%
Sumatra	18,433,937	50%	18,803,933	50%	18,677,647	52%	17,141,586	48%
<i>Per capita</i>	<i>0.43</i>		<i>0.44</i>		<i>0.43</i>		<i>0.40</i>	
Jawa	28,198,288	27%	74,849,970	73%	26,425,921	30%	60,246,481	70%
<i>Per capita</i>	<i>0.24</i>		<i>0.63</i>		<i>0.22</i>		<i>0.50</i>	
Bali	1,441,294	70%	630,487	30%	1,451,527	70%	607,459	30%
<i>Per capita</i>	<i>0.48</i>		<i>0.21</i>		<i>0.48</i>		<i>0.20</i>	
Kalimantan	6,395,606	40%	9,568,332	60%	6,091,822	39%	9,501,390	61%
<i>Per capita</i>	<i>0.58</i>		<i>0.87</i>		<i>0.55</i>		<i>0.85</i>	
Sulawesi	5,834,664	75%	1,904,389	25%	5,868,515	76%	1,828,623	24%
<i>Per capita</i>	<i>0.41</i>		<i>0.13</i>		<i>0.40</i>		<i>0.13</i>	
Others	4,486,424	80%	1,088,178	20%	4,374,801	81%	1,004,093	19%
<i>Per capita</i>	<i>0.38</i>		<i>0.09</i>		<i>0.37</i>		<i>0.08</i>	

Source : BPS

## Environment

The growing emphasis on environmental and social responsibility will lead to increased importance for the agricultural sector. The environmentally unfriendly nature of much of present industry will lead to pressure for change through stiffer regulations and lowered consumer demand. Particularly at risk are industries such as plywood and natural resource extraction due to their environmental components. High labour intensity manufacturing is under threat from deficiencies in social responsibility criteria. Pressure is exerted by the public both through purchasing decisions and the increasingly important role of socially responsible investing (SRI) mutual funds (see Anderson and Horne (2000)).

Agriculture can play a positive role in this new climate due to its potential for environmentally low-impact development. Although some agro-enterprises can certainly contribute to environmental degradation there is enormous opportunity for agro-enterprises to actively contribute to environmental quality while avoiding any further harmful action in other areas (see Giovanucci (2000)). Areas of possible action include:

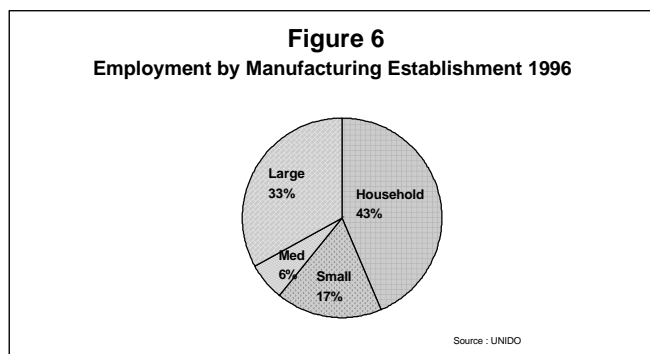
- Innovative enterprises can give value to agricultural by-products previously considered as waste and pollutants.
- Appropriate inputs can permit intensive farming and improved fertility that reduces the pressure to expand existing production areas: less pressure on marginal production lands mean less environmental degradation.

- Effective agro-enterprises make efficient use of scarce resources and coordinate the supply chain, reducing post-harvest losses and improving the efficiency of the entire food and fiber chain.
- The use of energy for processing, storage, and transportation can be significantly reduced by an efficient supply chain and more so when enterprises use renewable energy sources such as agricultural waste with which current technology can supply fuel, packaging material, and fertilizer.

Agriculture thus faces fewer barriers to expansion both from sources of future consumption and prospective investment in the new atmosphere of environmental concern. Attempts to be a full participant in new environmental trends should include a concentration on organic products and horticultural goods, and utilising the country's rich store of knowledge regarding herbal and plant-based medicine.

### SMEs

A significant feature of the Indonesian economy is its domination by small and medium enterprises (SMEs). Such entities contribute the bulk of employment in the economy (Figure 6). They have been a vibrant force for growth through their ability to grow into large firms in time (see Dhanani 2000). Development of the sector is a crucial element in creating a sophisticated economy due to its role in developing inter-industry linkages. In developed economies it is the role of SMEs to act as suppliers to final goods producers, therefore creating a permanent, vibrant and interlinked industrial base. Indonesia has suffered from the lack of a sophisticated supplier network, allowing intermediate inputs to be produced locally instead of being imported. Any medium-term policy targeting growth must include comprehensive support for the SME sector.



SME manufacturers are characterised by their relatively high agriculture and forestry based products bias (Figure 7). Food and wood products are the most prominent sectors. This leads to greater benefit for the domestic economy through purchase of inputs from and production of intermediates for the local agricultural sector. This stands in contrast to the large-scale sector which is concentrated in the manufacture of

import-intensive products such as basic and fabricated metal. Measures to promote agricultural growth will lead to higher input requirements for the sector as well as offering more cost-effective raw agricultural products. The SME sector will be the best placed to prosper from this outcome, leading to wide-spread benefit throughout the economy.

**Figure 7**

**Composition of Manufacturing Value -added by Establishment Size, 1996 (%)**

Sub Sector	Household 1-4 persons	Small 5-19 persons	Medium 20-99 persons	Large 100< persons	Total
Food	36	22	20	19	20
Wood	28	24	8	7	9
Textile	10	24	10	18	17
Paper	2	4	4	5	5
Chemical	1	3	16	13	12
Mineral	13	13	7	4	5
Basic Metal	-	-	21	10	9
Fabricated Metal	6	6	13	24	21
Other Manufacturing	4	3	1	1	1
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>

Source: UNIDO

SMEs have also proved an especially resilient section of the economy during the crisis. Post 1997, SMEs account for the bulk of the private sector. Under one measure they represent 50% of employment and 39% of GDP, with a majority of 63% of SME firms involved in agriculture-related business<sup>5</sup>. Their more positive outlook in the current climate is due in considerable part to their lower reliance on the banking sector. Research indicates that numbers as low as 17% utilise bank credit<sup>6</sup>. Firms have also ensured their survival by engaging in activities such as exploring new export markets, broadening business networks, substituting lower cost raw materials and products and concentrating on new activities with immediate rates of return. Measures in the short run to encourage the revitalisation of the economy through SMEs would benefit from utilising their link with agriculture.

<sup>5</sup> Institute for SME Finance 2001

<sup>6</sup> The Asia Foundation

## **Rural-urban linkages**

We wish to design policies which improve the condition of the rural sector. This will however also lead to a beneficial impact on urban areas. There are a number of ways in which outcomes in the two groups are linked. First, an increase in the wealth of the rural population will lead to increased consumption for manufactured goods. This will benefit urban producers and the general Indonesian economy. The attractiveness of the local market will also be a spur in attracting and retaining foreign direct investment (see ODI (1997)). The importance of local market demand is seen in the popularity of China and India as sources of new foreign entry. For example, the two countries were ranked 1<sup>st</sup> and 3<sup>rd</sup> respectively among developing countries in a recent survey of investment attractiveness to CEOs and CFOs of the world's top 1000 firms<sup>7</sup>. Home market demand provides an incentive for a producer to remain in an economy even in the face of rising wage costs. The urban services sector benefits from development in the rural sphere through its role as a central source of retail, commercial, administrative and transport products.

An improvement in rural conditions will reduce population pressure on urban areas. The country's rapid urbanisation has failed to be matched by sufficient improvements in resources (see WRI 1997). Signs of excessive strain include lack of housing, sanitation and water supply, inefficient transport, pollution and overcrowding. The funds required to effect the urban improvements required will not be available in the short run. An improvement in rural welfare will therefore be the best avenue to improving urban living conditions.

### *How can agriculture be made the leading sector?*

Before attempting to provide answers to this question, it is important to see whether or not agriculture can be made as the leading sector. Analysing the 66 × 66 Input-Output table for Indonesia in 1998 published by BPS (2000), as shown in Appendix A, the median of multiplier coefficient of the agricultural sector (1.014) is slightly higher than that of other selected sectors excluding agroindustry (1.007). This indicates that an equal increase in final demand to each of these sectors will induce a slightly higher increase in GDP through agriculture than through the other sectors. The backward linkage coefficient of agriculture (1.260) is also slightly higher than that of the other sectors (1.233), suggesting that growth in the former would induce its upstream sectors to grow slightly more intensively than the latter would. The coefficients for selected activities in agroindustry, however, are considerably higher compared to the aforementioned sectors. Such activities have medians of multiplier and backward linkage coefficients of 1.062 and 1.840, respectively. It is only in terms of forward linkage coefficient that the other sectors are better than agricultural and agroindustry sectors. Based on all these figures, it can therefore be concluded that agriculture can be made the leading sector particularly if development efforts are strongly integrated between this and agro-industrial sectors.

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<sup>7</sup> AT Kearney FDI Confidence Index, Feb 2001

What emerges from our discussion is the value to the nation of raising the relative profile of agriculture significantly. A suitable approach towards achieving this is to maximize the latent potential of the sector. In many spheres, industry can both benefit from and contribute to the success of agriculture. In other areas, agricultural growth can be attained without harm to other parts of the economy, a necessary condition to ensure support from all national actors and to remain attuned to the powerful global forces of openness and liberalisation. The elements of successful policy would include:

- § removing supply bottlenecks
- § improving the economy's regulatory and incentive structure
- § creating the rural enabling environment, and
- § integrating with international best practice.

### **Supply bottlenecks**

Agriculture's ability to benefit from any positive changes in the economic environment is dependent on the removal of all present supply constraints. The major indication of such barriers is the steadily declining productivity of production in non-rice sectors. These barriers are present in both the estate and smallholder groups. The latter generally have lower yields but compensate for this through their lower operating costs. The two groups often share some characteristics due to the presence of 'large smallholders' and small plantations (see Hill (1996)).

Estates in the state-owned sector need to pursue a more market-driven approach to their affairs. Cost control and management decisions should be enacted in a transparent and effective manner. Within the smallholder group, productivity must be increased through the effective dissemination and use of technology. Enough resources need to be devoted and in a sufficiently diffuse manner in order to reach targeted parties. Past policies have suffered from a lack of targeting at ground level (see for example Supriadi et al. (1998)). Local needs must be accurately identified through a focused presence on the ground to ensure the appropriateness of technology.

A substantive issue is the lack of comprehensive upstream linkages between smallholders and the processing factories. This leads to loss in value for smallholder produce through low quality content. Measures should be taken to increase communication, interaction and information flow between the two parties through the facilitation of government bodies and the set-up of industry associations widely distributed across rural regions. This allows for effective business dealings between smallholders and large scale agribusiness and agroindustry. The agribusiness system in Indonesia can be developed by a system of joint ventures or partnership with various business entities such as input suppliers, machinery and equipment suppliers, farmers and agroindustry.

### **Improving regulatory and incentive structure**

The government can play a strong positive industrial policy role in improving the climate for agriculture by rationalising the country's regulatory and incentive structure. An important element is the deregulation of controlled trading and marketing arrangements, and the dissolution of monopolies and cartels across the economy. Prior to the crisis there were restrictions in a number of agricultural sectors with the most

important being the clove monopoly, import restrictions on sugar, wheat, garlic and soybeans and interprovincial trading of cashewnuts, oranges and vanilla. Under the IMF Letter of Intent terms, all agricultural controls other than in rice are to be disbanded. This is a powerful measure because of the improvement in conditions for producers engendered by competition and freedom to produce in response to market requirements. The removal of land use regulations regarding producer crop choices will allow farmers to concentrate on the items which are most lucrative.

An important issue to consider is the relative importance of staples as compared to other crops. Favourable policy for such items has led to skewed production choices for farmers. Scope for the production of goods in which farmers would have greater advantages in the local and international markets is curtailed. Diversification should be encouraged from low-value staple production into higher value agricultural goods.

A general approach with regard to institutionalising effective agricultural policy would be to ensure policy neutrality with respect to the sector. The country has in the past displayed policy emphasis on the industrial sector. For example exchange rates were maintained at a high level to ensure better intermediate prices for industry while disproportionately affecting agricultural exporters (see Daryanto 2000). An approach of 'levelling the playing field' would allow agriculture to respond dynamically to market forces and allows for more robust development.

## **Creating the rural enabling environment**

### ***Infrastructure***

The long term intention of policy should be to create a prosperous, well- rounded rural economic sector. This ensures effective support of agriculture resulting in its technological progress to its maximum potential. A consideration of agriculture in this context encompasses agricultural production and attendant industrial production including agribusiness. Measures need to be taken to target improvement in all aspects of support to business in rural areas. Infrastructural development is an integral part of such measures. Upgrading is needed of transport facilities, communications, housing, health, sanitation, irrigation and processing capabilities.

The transport improvements will especially benefit outlying non-Java islands whose development is constrained to production for the local market due to lack of connection with the centre. Improved communication allows access to a far larger consumer base. It also allows production according to the area's comparative advantage, negating the need to produce all local consumption goods.

Communications are one of the clearest areas in which rural areas are disadvantaged from competing effectively with their urban counterparts (see Figure 8). The development of new cost-effective technologies has led to reasonably high technology being a realistic resource for most communities. The need for access to technology is growing continuously as the 'digital divide' threatens to become a chasm. The benefits of using services such as radio, telephones and the internet include being able to connect to accurate prices for produce, market forecasting, establishing climate conditions, and the empowerment of rural communities to participate in regional and

national decision-making. Efforts have been made in these areas across the developing world and proved highly successful (see IFPRI (2000)).

**Figure 8**  
**Number of Telephone Subscribers by Regional Division**  
**1997-1999**

Regional Division	1997	%	1998	%	1999	%
I (Medan)	689,299	14%	759,178	14%	821,243	14%
II (Jakarta)	1,856,544	38%	2,016,885	37%	2,133,168	36%
III (Bandung)	489,966	10%	542,255	10%	587,552	10%
IV (Semarang)	387,094	8%	465,338	9%	516,986	9%
V (Surabaya)	813,601	17%	893,805	17%	993,080	17%
VI (Balikpapan)	215,616	4%	249,956	5%	274,218	5%
VII (Ujung Pandang)	404,075	8%	477,842	9%	539,403	9%
<b>Total</b>	<b>4,856,195</b>	<b>100%</b>	<b>5,405,259</b>	<b>100%</b>	<b>5,865,650</b>	<b>100%</b>

Source : BPS

An acceptable level of health and sanitation are necessary conditions for rural workers to apply themselves to productive tasks with the same efficacy as urban residents. For example, rural women and children are required to spend significant amounts of time fetching water during the day in the absence of running water supply. Water-borne diseases such as diarrhoea still infect and kill in large numbers. The public sector will have to take the lead role in providing an adequate living and working environment for rural workers and their families.

### *Services*

The rural sector will not be able to play a complete and effective role without the development of a more sophisticated economic structure. This requires a comprehensive service sector to support the growth of rural agriculture and industry. Services of especial importance are construction, transportation and finance. Lack of transportation services (see Figure 9) is a considerable impediment to efficient performance of rural business. Unreliable timetables, low vehicle numbers and vehicle diversity, as well as poor integration of services and planning are the primary factors underlying high rural transport costs and service gaps. The effects on business are to increase the costs of inputs into production and to increase delivery costs to the end-user. Further effects include the adverse impact on children's schooling decisions through excessive costs of transportation and lengths of travelling time.

**Figure 9**  
**Number of Registered Motor Vehicles by Region and Type**  
**2000**

Province	Passenger Cars	Per Capita	Buses	Per Capita	Trucks	Per Capita	Motorcycles	Per Capita
Sumatra	417,989	0.010	126,520	0.003	386,564	0.009	2,671,030	0.062
Jakarta	1,237,778	0.148	311,627	0.037	397,076	0.048	2,212,961	0.265
Rest of Java	1,008,720	0.009	136,221	0.001	640,508	0.006	6,152,188	0.055
Bali+	130,879	0.012	18,546	0.002	70,983	0.007	857,752	0.080
Nusa Tenggara								
Kalimantan	97,906	0.010	21,314	0.002	87,725	0.008	882,735	0.081
Sulawesi	112,484	0.010	40,704	0.003	100,198	0.007	657,011	0.046
Irian Jaya+	33,157	0.010	11,348	0.003	24,080	0.007	129,340	0.040
Maluku								
<b>Total</b>	<b>3,038,913</b>	<b>0.015</b>	<b>666,280</b>	<b>0.003</b>	<b>1,707,134</b>	<b>0.008</b>	<b>13,563,017</b>	<b>0.067</b>

Source: BPS

The lack of sufficient financial services has been a perennial problem for rural areas. Access to credit should underpin business in rural areas in the same manner as it does urban areas, allowing investment and risk diversification. Measures in the past have focused on subsidized credit and state-sponsored banks to encourage borrowing. However these measures, in common with experience across the developing world, have proved highly ineffective in achieving their aims. Money fails to reach the most needy due to the mismanagement and corruption which is inevitable in a highly managed system. Those who are in possession of such credit fail to repay with unacceptably high frequency due to the perceived grant nature of such money. This also means that money obtained is also not put to the most productive use as a sufficient return on the amount is not necessarily required.

Effective methods of credit provision will have to be sustainable, easily accessible, non-bureaucratic and responsive to innovations in finance. The international development of micro-finance is highly pertinent to Indonesian requirements. The country already has a well-established tradition of micro-finance which has been reasonably successful. However, there is considerable scope for improvement in coverage of regions and of borrowers. It is not possible for all eligible persons to borrow because of access difficulties and unrealistic terms and collateral. Distances to nearest administrative centres can be daunting as can prudential banking regulations. According to a study by SMERU (Social Monitoring & Early Response Unit) 'too often only traders, those individuals on fixed- incomes, and members of the local elite are able to comply with the strict conditions of prudential banking which are enforced'. Attention also has to be paid to the special circumstances of much rural earning, being seasonal or environment-dependent in nature.

### *Utilising international best practice*

An important guide to future policy making should be the experiences of other countries who have shared a similar reliance on agriculture in their formative years and have encouraged the sector effectively as part of an overall effective growth strategy. Three countries which have displayed experiences of note are Malaysia, Thailand and Chile.

The most relevant regional examples to study are the Malaysian and Thai cases because of their high degree of correspondence to the Indonesian situation in terms of products and markets. Malaysia has achieved good performance in the tree crop sector over the last few decades, primarily rubber and palm oil. The country is the world's third largest rubber producer and the foremost producer of palm oil. Though output is falling in raw rubber production, impressive gains are being made in the diversification of both industries. The production of raw rubber is dominated by smallholders whilst that of palm oil is characterised by estates. A continuing problem is that of smallholder performance which lags behind the estates as evidenced by the wide productivity gap between the two groups (see Aziz and Basiron (1998)). The efficient development of the estates has been facilitated by their private sector control, allowing for good management practices and responsiveness to cost and demand changes.

The government has spurred performance by developing a R&D base. It established research centres for rubber (MRB) and palm oil (PORIM) with a public-private structure and complete independence from state control. Producers are required to provide a portion of their earnings to the bodies. They in turn ensure that their research is directly relevant to the needs of producers by including industry representatives in their supervisory committees. The state sponsorship of research has ensured that work is undertaken which includes a public good component, is too costly for smaller producers, or is of a long-term nature which is not cost-effective for private research.

Within the scope of industrialisation, policy has increasingly evolved to consider agriculture as a positive companion to industry through the development of attendant functions. The government has attempted to ensure maximum returns from particular sub-sectors by encouraging downstream linkages. PORIM established the Advanced Oleochemicals Technology Centre to facilitate research into this downstream palm oil sector. This allowed for the development of a domestic industry utilising new innovations which require palm oil. Malaysia has emerged as the largest producer of oleochemicals in the ASEAN region and the second largest in the Asia Pacific after Japan. R&D undertaken in rubber has offered a wide base for its uses, covering general as well as industrial rubber goods. The rubber industry now witnesses higher sales from processed rubber than its raw counterpart. Indeed the downstream sector has developed to the extent that raw rubber is imported to the country to meet the demands of the industry. Malaysia is now in the novel position of being the world's sixth largest importer of rubber. The country is one of the world's leading exporters of rubber gloves, threads and catheters as well as having a presence in many other processed good items.

Specialised manpower has been developed through training programmes under the auspices of the research institutes. PORIM holds courses such as the Intensive Diploma in Oil Palm Management & Technology, Diploma in Palm Oil Milling Technology and Management and Palm Oil Mill Laboratory Conductors Course. Teaching expertise is drawn from the institutes and industry.

Marketing is another area in which the government has been pro-active in ensuring the international prospects of some agricultural sectors, mainly palm oil and forest products. The Malaysian Palm Oil Promotion Council (MPOPC) plays an important role in the promotion and marketing of palm oil. Although it is not involved in actual market transactions, the Council is actively involved in market missions, and seminars and exhibitions world-wide. Besides its publications, which are distributed throughout the world, it also provides educational programmes for government officials, manufacturers, traders, the media, nutritionists and consumers. This body is funded by a tax on palm oil exports and had a 1998 budget of about \$4.4 million<sup>8</sup>.

There are a number of current challenges in Malaysian agricultural policy. One is to improve the competitiveness of smallholders. The proposed solution is to amalgamate the producers to improve efficiency and quality of output. A second concern is the low relative value of planting rice as compared to other crops. The country has a 70% self-sufficiency target but hopes to achieve this level of domestic food production by concentrated planting in areas where two crops are possible. An added threat to the survival of this sector is the pressure from liberalization through AFTA in 2003 and increasing globalization. The cost of production of local paddy is US\$171/MT as compared to US\$144/MT in Thailand, US\$118/MT in Vietnam and US\$92/MT in Indonesia<sup>9</sup>.

The Thai experience has been characterized by the perennial importance of rice, coupled with increasing diversification and success in a number of other agricultural fields. As well as being the world's top exporter of rice, it leads in canned pineapples and fresh orchids, is the third biggest exporter of rubber (after Malaysia and Indonesia) and is the fourth biggest exporter of cane sugar. In agro-industries, it is a leading exporter of canned fruits, tuna and frozen prawns. Rice has maintained a special position in policy due to its staple good status for the population and its employment of a large part of the rural sector. The country has been able to far exceed production for its own requirements through buoyant exports. Farmers have responded to the high worldwide demand for rice by expanding the land frontier over time, though yields in the sector remain among the lowest in Asia. They have begun to rise over recent years due to better irrigation and flood control measures. Government policy has supported production through R&D into new varieties and minimum prices enforced through government purchase.

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<sup>8</sup> US Department of Agriculture Foreign Agricultural Service, Aug 15 2000

<sup>9</sup> US Department of Agriculture Foreign Agricultural Service, Malaysia Grain and Feed Annual 2001, Feb 16, 2001.

Thai agricultural policy is noteworthy for the manner in which it has established the country as a leader in a number of sectors other than the traditional ones of rice and rubber. This has been achieved initially through an increase in land cultivated and subsequent improvements in yield as the land frontier reached its limit. Diversification can be separated into two periods. The first from the 1950s till the 1970s, resulted in the growth of upland field crops, mostly cassava, maize, and sugar. Growth was spurred by increases in the land frontier and world demand for such goods. Government supported such change through large public investment in roads and primary irrigation. The expanded road system, for instance, brought many farmers previously producing subsistence crops into contact with external markets. This significantly boosted the farm-gate prices of cash crops and provided access to substantial areas of uncultivated land.

The second wave of change has resulted in the establishment of the fruits, vegetables, oilseeds, tree crops, beef, poultry, swine, dairy cattle, and prawns sectors. Many of these sectors are more technology-intensive than older sectors. The government has encouraged the move into higher value-added products by revising its Investment Promotion Acts in 1972 and 1977 to promote capital-intensive processing on a broad scale. For instance, the 1972 Act allowed firms to import machinery and intermediate goods at tariff-free world market prices. In return, they were required to export around 80-100% of their total production. A consequence of such policies has been the rapid growth in the value-added food industry.

Government policy has been characterized in the past by a willingness to let the private sector make production decisions, with the state playing an enabling role of providing adequate resources. There has been an increasing trend in the 1990s towards directing production to selected high-value products through subsidized credits and inputs though the success of such policies is currently a matter of debate.

Current challenges for agriculture include the end of the land frontier, falling prices and labour shortages. Continued low productivity on the farms has resulted in a steady increase in inequality. Though absolute poverty has fallen rapidly, the great majority of the country's poor live in rural areas. There is a need to replace the growing of low-value staple crops in greater degree with the new high-value products such as fruits, vegetables and aquaculture. There is increasing challenge to comparative advantage in primary staple production from countries such as Vietnam and Burma. Agroindustry will need to be developed further to ensure that the country can offer a higher quality, differentiated product which is further up the value chain as compared to its competitors.

Chile has been exemplary in the manner in which its agroindustrial sector has contributed to its dynamic growth in the last few decades. Total agricultural exports doubled between 1990 and 1997 to a figure of US\$4.7 billion, representing an annual growth rate of 12%<sup>10</sup>. The country has been a traditionally strong producer of fruits and vegetables and this has been maintained along with strong development in agroindustry. It is the southern hemisphere's largest exporter of fruit, the world's second largest of salmon, and has large forestry, fishing and wine industries. The

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<sup>10</sup> Data from Ministry of Agriculture, Chile.

composition of exports is 35% forestry, 43% agro-industry and 25% fresh fruit and vegetable. This performance was supported by positive government policy. It encouraged foreign investment in fresh and processed fruit industries and the grasping of trade opportunities for Chilean produce. Forward looking action from agroenterprises was important to secure these benefits. They targeted quality markets and products and an efficient industry association allowed firms to negotiate effectively with government to promote their export interests and maintain close relations with growers. Good logistics were a crucial element in allowing the country to access its main markets who are all of considerable distance away. The country is a major supplier of US, European and Asian consumers. The three groups account for 26%, 26% and 20% respectively of the country's exports.

The government's role has been seen in the investment in people at various levels of the agribusiness process: agricultural technician; farm manager; specialist in post-harvest handling; agribusiness manager, and so on. The state has also made extensive use of free trade instruments to stimulate demand for local production. In the 1990s it signed free trade agreements with Mexico, Venezuela, Colombia, Ecuador and Canada. Eventually it agreed an arrangement with MERCOSUR and the EU in 1996 and joined APEC in the same year. The result has been 95% of exports to Mexico, Venezuela, Colombia, Ecuador and Canada facing no tariffs in the short and medium term. The government has committed significant additional resources to the required modernization of the sector, including special assistance for the groups and areas most likely to be affected by these agreements. The agricultural trade balance has responded positively to such actions, exhibiting a rise from US\$1.6 billion to US\$3.0 billion between 1990 and 1997.

An especial concern of the government is the improvement of the productivity of the smallholder sector. The government has taken action in support of small farmers through expanding and improving the coverage of existing technical assistance and credit programmes as well as creating new mechanisms to help this subsector compete with the commercial sector such as through improved irrigation (FAO 1998). The Agricultural Development Institute (INDAP) of the Ministry of Agriculture reaches a large number of small scale farmers through an extension program which is publicly funded and privately executed through private technology transfer firms. Community based INDAP offices, with community representatives, select firms through competitive bidding and supervise and evaluate performance. Farmers sign annual contracts with a firm and are expected to contribute up to 30% of program costs. Diversification assistance to medium and large scale farmers is entirely private funded and executed by a private farmer's group.

The role of private-public partnerships through effective industry associations has been very important. For example, medium/large producers and exporters of fruit linked with the government to create a multidimensional strategy of market promotion and standards implementation forming a Coordinating Committee for Fruit and Vegetable Producers and Exporters. The committee along with the National Agricultural Association, formed a "code of good practice" for production, processing, and distribution of fruit for export. They work with the Ministry of Agriculture to influence the country's health and safety laws, and infrastructure provision (better road, port, and storage facilities). The group also seeks to be an interface with powerful

supermarket chains which dominate the domestic market. The goals are to differentiate the country's fruit product, create a clear international identity, and to raise quality, hygiene, and storability of the fruit. The process requires tradeoffs and the need for continuous adjustment and debate. It is therefore well served by such a forum that reflects needs along the chain (Giovanucci (2000)).

These policies have contributed to a marked improvement in the lives of those in the rural sector. Rural poverty fell from 51% in 1986 to 31% in 1996. However, inequality levels in the country remain high. Current challenges are to continue to improve the lives of small farmers and to reduce inequality in the country. This is being attempted through improvements in the value added of small farmers through increased planting of technology intensive crops. Facilitation is provided by investing in irrigation and sanitation.

**Figure 10**  
Aspects of Effective Government Policy

	<u>Infrastructure</u>	<u>R&amp;D &amp; tech transfer</u>	<u>Agroindustry emphasis</u>	<u>Public/Private Partnership</u>
Malaysia	x	x	x	x
Thailand	x	x	x	
Chile	x	x	x	x

There are a number of lessons which emerge from the performance of our neighbours. The role of government is clearly a very important one in terms of guiding the direction of progress (see Figure 10). It serves to create a positive climate for business in the rural sector through adequate infrastructure, services and information. Innovation is particularly encouraged through extensive R&D and technology transfer arrangements which are often intended to be private sector-led. The growth of agro-industry has been targeted as one of the principal sources of sustainable development in agriculture due to its high-value added nature and ability to capitalise on existing agricultural comparative advantage. Industry therefore provides one of the most important supporting and complementary roles to agriculture. Government is seen to play a backseat role in micromanagement in an effort to let responsiveness to market forces provide the dynamic impetus for productive change. This allows diversification to evolve in order to maintain the competitiveness of the agricultural sector as a whole in a rapidly evolving global marketplace.

### *Conclusion*

We are in the midst of a period of considerable change in economic policy making- a situation which offers both perils and opportunity. In addition to the formulation of a new approach to growth in the democratic era, it has been necessary to contend with an economic crisis. Avenues which were previously open in terms of action are now closed- equality through financial redistribution, protection to certain sectors, and generously affordable and available credit. These changes have occurred at the time of

greatest difficulty due to the loss of a decade of output growth. Furthermore, while the crisis lingers on, the rest of the world continues to develop and contribute to the evolution of new global economic trends. Policies are required which will return the country to a growth path in the shortest time possible while taking account of the new constraints and environment seen both locally and internationally. They must also be the best approach for the long term, ensuring the foundations for a new sustainable growth paradigm for the nation.

Agriculture should play a central role in effective planning for the foreseeable future. Its importance derives partly from its disproportionate contribution to employment, especially in the poorest parts of the country. The health of the sector must therefore be maintained not to disadvantage the majority of the population. The value of the sector however reaches much farther in terms of the benefits it offers the country. Prosperity in this area benefits all industry and workers through the increase in gross wealth and consumption, control of urbanisation, foreign exchange export contributions and non-import dependent satisfaction of increased and varied domestic demand. The sector is well-placed to continue to develop under changing global conditions whilst other areas of comparative advantage come under increasing threat.

Reliance on agriculture is especially necessary under the current economic circumstances. The currency, import-dependence and credit situations mean that manufacturing production will face continued difficulty in recovering. Agriculture-led growth has become the most promising means out of the current impasse because of the lack of such barriers in the sector. A dynamic approach to agriculture will support industrial recovery through the growth in the demand for agriculture-related inputs and increased supply of agricultural raw materials for industry, and more generally through the increase in the size of the home market. Industrial policy has a pivotal role to play in the successful achievement of this beneficial cycle of outcomes. It can establish a level playing field in terms of incentives and regulatory structure, support SMEs and agribusiness, and encourage well-developed linkages between the agricultural and manufacturing spheres. The hope for the future should be one of all sectors being truly supportive of one another, ensuring that each can capitalise on its particular strengths, in order to ensure rapid and equitable development for all citizens and regions.

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*APPENDIX A*

Multiplier, Backward and Forward Linkage  
Coefficients of Agricultural Sector

No. Sector / Commodity	Output Multiplier Coefficient	Backward Linkage Coefficient	Forward Linkage Coefficient
1 Paddy	1.019	1.245	1.978
2 Legumes	1.028	1.236	1.111
3 Corn	1.021	1.251	1.139
4 Roots	1.005	1.115	1.048
5 Other Foodcrops	1.044	1.119	1.143
6 Rubber	1.083	1.269	1.396
7 Sugarcane	1.686	1.821	1.966
8 Coconut	1.22	1.376	1.652
9 Oilpalm	1.0004	1.159	1.063
10 Tobacco	1.002	1.44	1.205
11 Tea	1.003	1.753	1.056
12 Gloves	1.118	1.574	1.165
13 Fibre crops	1.008	1.223	1.027
14 Other Plants	1.002	1.212	1.011
15 Livestock	1.039	1.158	1.388
16 Slaughtering house	1.002	1.227	1.08
17 Poultry and Products	1.004	1.306	1.372
18 Wood	1.008	1.443	1.727
19 Other forest products	1.0001	1.969	1.101
20 Fishery	1.026	1.729	1.142
Median	1.0135	1.26	1.1425
Standard deviation	0.1554	0.2548	0.3072

Multiplier, Backward and Forward Linkage  
Coefficients of Selected Industrial Sectors

No. Sector / Commodity	Output Multiplier Coefficient	Backward Linkage Coefficient	Forward Linkage Coefficient
1 Food Processing Industry	1.024	1.827	1.188
2 Oil and Fat Industry	1.174	1.852	1.231
3 Rice Milling Industry	1.099	2.191	1.32
4 Flour Industry	1.087	1.705	1.352
5 Sugar Industry	1.001	1.666	1.596
6 Other Food Industry	1.036	1.996	1.442
Median	1.0615	1.8395	1.336
Standard deviation	0.0632	0.1949	0.1484

Multiplier, Backward and Forward Linkage  
Coefficients of Other Sectors

No. Sector / Commodity	Output Multiplier Coefficient	Backward Linkage Coefficient	Forward Linkage Coefficient
1 Construction	1.012	1.577	2.298
2 Trade	1.012	1.237	4.314
3 Restaurant and Hotel	1.0001	1.685	1.011
4 Communication	1.002	1.173	1.27
5 Financial Institution	1.07	1.229	1.742
6 Government and Defence	1	1.229	1
Median	1.007	1.233	1.506
Standard deviation	0.0270	0.2177	1.2648