INDONESIA

Strategic Vision for Agriculture and Rural Development
Indonesia
Strategic Vision for Agriculture and Rural Development
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Foreword

Rural poverty and unemployment are two of the most critical issues facing Indonesia right now and for some years to come. Food security is another critical issue that should also be given the same degree of consideration. This is clearly stated in our VISION of agricultural development for 2005-2009 “Establishment of vigorous agriculture for strengthening food security, increasing the value added and competitiveness of agricultural products, as well as increasing farmers’ welfare.”

For achieving this VISION, the Ministry of Agriculture is focusing on the following MISSIONS:

- actualizing a professional agricultural bureaucracy with high moral integrity;
- pursuing vigorous, competitive, sustainable, and environmentally friendly agriculture;
- achieving food security by increasing agricultural production, diversifying food consumption patterns, increasing purchasing power, and improving food safety;
- promoting an increase of agriculture’s contribution to the national economy through gains in gross domestic product, exports, employment, poverty reduction, and welfare;
- providing agribusiness facilities through research and development, and growth of agro-input supply systems, agrofinance, and market access; and
- advocating Indonesian farmers’ and our nation’s interests in international trade systems.

This VISION is operationalized in the Medium-Term Development Plan through the:

- national food security enhancement program,
- value added and competitiveness enhancement program, and
- farmers’ welfare employment program.

Much more importantly, we have also decided that all our efforts to attain the VISION must be based on the “spirit of agricultural development: clean and considerate.” Clean means honest and free from corruption, collusion, and nepotism. We are determined to fully practice clean and good governance. Considerate means emphatically concerned about farmers’ and public interests. We believe that only with a spirit of moral uprightness will we be successful in achieving our idealistic vision of agricultural development.

President Susilo Bambang Yudhoyono has selected the revitalization of agriculture as one of the key vehicles for the Government to reduce poverty to 8% and unemployment to 5% by 2009. We may say this is the grand strategy for the country’s economic development, and a pledge of commitment of the Government for agriculture.

This publication is a précis of the impressive Agriculture and Rural Development Strategy Study undertaken by the Southeast Asia Regional Center for Graduate Study and Research in Agriculture/International Food Policy Research Institute/Center for Regional Resources Development
and Community Empowerment consultants under funding by the Asian Development Bank. I would like to thank ADB for its support. I believe that this publication is of significant value in reaching a broad audience both within and outside Indonesia to instill an appreciation of the opportunities offered by the agriculture and rural development sector, the challenges faced by the sector, and the roles expected of different stakeholders to overcome them.

Dr. Ir. Anton Apriyantono, MS
Minister of Agriculture
Republic of Indonesia
Preface

Most of Indonesia’s poor live in rural areas and depend on the agriculture sector for their livelihood. Thus, only through accelerated rural development can Indonesia achieve its goal of halving poverty by 2015. The Asian Development Bank (ADB) is privileged to work as one of Indonesia’s partners to assist the Government in this vital undertaking.

ADB began operations in the agriculture sector in Indonesia in 1968 with two technical assistance (TA) activities – a rural credit survey and provision of advisers to the Ministry of Agriculture. By 2006, in the agricultural and rural development (ARD) sector alone we had provided $4.2 billion in project financing and $69.4 million in TA. These activities were concentrated in agricultural support services, crop production, fisheries and marine resources, livestock, tree crops and agro-industries, irrigation and rural development, and forestry and environmental management.

In 2001, the Government of Indonesia requested TA to provide inputs into its 2004-2008 Medium-term Development Plan (MTDP). ADB responded rapidly, bringing in a high-quality team of experts from the Southeast Asia Regional Center for Graduate Study and Research in Agriculture (SEARCA), International Food Policy Research Institute (IFPRI), and Center for Regional Resources Development and Community Empowerment to work with the Government to formulate realistic, effective strategies to advance agricultural and rural development. The team found that, through a strategic focus on development of human resources, institutions, knowledge, and infrastructure, and by providing an enabling environment, the ARD sector can fulfill its potential to contribute significantly to sustainable, pro-poor development of the country.

This publication summarizes the study’s findings and recommendations to facilitate their dissemination to broader audiences both within and outside Indonesia. The original TA report was undertaken by a team of experts led by Mark Rosegrant and Ashok Gulati of IFPRI under the guidance of Arsenio M. Balisacan of SEARCA. Muhammad Ehsan Khan led the work on this publication with support from Bobur Alimov under the guidance of M. Jamilur Rahman. The original TA report was abridged by Mary Ann Asico and Claudia Ringler and edited by Stephen Banta with the help of Jo Narciso. Urooj S. Malik, Director, Agriculture, Environment and Natural Resources Division, Southeast Asia Department, provided oversight and direction in preparing the publication.

ADB is grateful for support from the former Minister of Agriculture, Dr. Bungaran Saragih, who requested the study; the current Minister, Dr. Ir. Anton Apriyantono, under whose stewardship the MTDP is being actualized; Dr. Joko Budianto, former Director General of the Indonesian Agency for Agricultural Research and Development (IAARD); Dr. Achmad Suryana, current Director General of IAARD; and Dr. Harryono, Secretary of IAARD. We look forward to a continued and productive relationship with the Government of Indonesia to realize our shared vision of a much improved ARD sector and the reduction of poverty throughout the country.

C. Lawrence Greenwood, Jr.
Vice-President (Operations 2)
### Abbreviations and Acronyms

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<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
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<td>APBN</td>
<td>central government budget</td>
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<td>ARD</td>
<td>agriculture and rural development</td>
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<td>BAPPENAS</td>
<td>National Development Planning Agency</td>
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<td>BIMAS</td>
<td>Farm Extension / Credit Program</td>
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<td>BOT</td>
<td>build-operate-transfer</td>
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<td>BPS</td>
<td>Central Statistics Agency</td>
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<td>BRI</td>
<td>Bank Rakyat Indonesia</td>
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<td>CAFC</td>
<td>community assistance facilitation center</td>
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<td>CSO</td>
<td>civil society organization</td>
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<td>DAK</td>
<td>special allocation grant</td>
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<td>DAU</td>
<td>national government funds</td>
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<td>DTK</td>
<td>group saving fund</td>
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<td>GDP</td>
<td>gross domestic product</td>
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<td>ha</td>
<td>hectare</td>
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<tr>
<td>IAARD</td>
<td>Indonesian Agency for Agricultural Research and Development</td>
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<tr>
<td>ICT</td>
<td>information and communication technology</td>
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<td>IFPRI</td>
<td>International Food Policy Research Institute</td>
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<td>kg</td>
<td>kilogram</td>
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<tr>
<td>KUM-WT</td>
<td>Karya Usaha Mandiri Wanita Tani</td>
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<tr>
<td>LFA</td>
<td>less-favored area</td>
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<td>MOA</td>
<td>Ministry of Agriculture</td>
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<td>NES</td>
<td>nucleus estates and smallholders</td>
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<td>NGO</td>
<td>nongovernment organization</td>
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<td>O&amp;M</td>
<td>operation and maintenance</td>
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<td>PAK</td>
<td>Income-Generating Project for Marginal Farmers and the Landless</td>
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<td>PDAM</td>
<td>regional drinking water company</td>
</tr>
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<td>PRC</td>
<td>People’s Republic of China</td>
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<td>R&amp;D</td>
<td>research and development</td>
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<tr>
<td>SMEs</td>
<td>small- and medium-sized enterprises</td>
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<td>SOE</td>
<td>state-owned enterprise</td>
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<tr>
<td>SUSENAS</td>
<td>National Socioeconomic Survey</td>
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<td>TFP</td>
<td>total factor productivity</td>
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<td>WUA</td>
<td>water user association</td>
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I. State of the Agriculture Sector

Agricultural Development in the Last 3 Decades

Like most other countries in the region, Indonesia started out as a predominantly agrarian economy, with agriculture contributing the largest share to gross domestic product (GDP), employment, and export earnings. Moreover, under the colonial regime, agriculture was geared toward the production of tropical export crops (sugarcane, rubber, tea), which benefited from significant investment in research and infrastructure development, while the food crop sector suffered from neglect. After independence, Indonesia, like many other new Asian countries, depended heavily on the same export crops and inherited a stagnant, low-productivity food-crop sector.

Unstable export prices and the inability to produce enough food for the population were the major challenges of the new Government in the agriculture sector. Not surprisingly, food (predominantly rice) self-sufficiency became a key national policy goal. With uncertain foreign exchange earnings and limited ability to pay for food imports, increasing domestic food production to assure food security was a priority. Until the food problem was solved, development of the nonagricultural sectors was necessarily constrained. Labor and capital could not easily be freed from a technologically stagnant agriculture sector, and significant nonagricultural growth would have increased the demand for food.

To achieve the self-sufficiency policy goal, highly successful agricultural development initiatives and new technologies were launched in the 1970s and 1980s. Agricultural GDP grew by more than 3% per year, compared with population growth of 2.3% in the 1970s and 2.0% in the 1980s. During this period, 9.3% of the public budget was allocated to agriculture—higher than the 7.5% allocated to the sector, on average, by 40 other developing countries. In addition to government initiatives, other factors like breakthroughs in technology (notably the Green Revolution), expansion of the agricultural resource base, and human resources development contributed to success in the sector. As a result, the value of agricultural exports grew by 11% yearly, accounting for 23% of total Indonesian exports. In 1984, Indonesia temporarily achieved rice self-sufficiency. Rural poverty was reduced from 40.0% in 1976 to 21.2% in 1987. During 1984–1996, agricultural GDP grew by 3.2% per year; and rural poverty declined by 4.5% per year, reaching a low of 12.3% in 1996, but could not be fully eliminated (Irawan and Romdiati 2000).

Between 1968 and 1997, under centralized management, the bureaucracy mostly decided on and designed agricultural development, while farmers and the rural population became the objects of development. During this period of rapid agricultural growth, the Indonesian vision of agricultural development was based on *tri mata pembangunan*: integrated farming, integrated commodities, and integrated areas. Policy instruments were top-down and supply-driven, and
were implemented in the form of technology packages based on policy decisions (surat keputusan) that the minister of agriculture, as the head of the Farm Extension/Credit Program (BIMAS) Mass Guidance Program, issued. The Government also determined the farmer institution (farm cooperatives) that would channel credit and farm inputs, and assisted the National Logistic Agency for Food Distribution (BULOG) with rice procurement. During this time, called the pre-crisis period, dualism prevailed between smallholder agriculture and large estate agriculture and between the rural and urban economies. Export policy for agricultural products centered mainly on raw materials for processing industries in developed countries. The quantity of exports increased, but without significant improvement in quality or product differentiation, resulting in limited growth in rural employment opportunities and low prices for farmers. Moreover, despite large investments in agricultural technologies and rapid growth in agriculture, rural poverty could not be completely eradicated and persisted at levels above those in urban areas (Irawan and Romdiati 2000). In the 1990s, public budget allocations for agriculture decreased, disjointed urban and rural development forced agriculture to absorb additional rural workers, and agricultural GDP growth declined to 2.3% per year.

In 1997, a massive financial and economic crisis rocked Indonesia, and indeed much of Asia. It began with the rapid depreciation of the Thai currency when Thailand abandoned its pegged exchange system. The currencies of other Asian countries, including Indonesia, soon met the same fate. The financial crisis was also reflected in the stock market and real estate sector. Declines in asset values adversely affected banks and nonbank financial institutions. The outcome was a radical slowdown in economic growth and a loss of confidence by foreign investors (ADB 1998), which continued to some extent into 2002. The time since 1998 is called the postcrisis period.

Although Indonesian agriculture continued to grow throughout 1970–2002, its share in the overall economy declined from 41.0% in 1970 to 15.4% in 1996, before increasing slightly to 17.5% in 2002 as a consequence of the Asian financial and economic crisis (Appendix Tables A1.1 and A1.2). Yet agriculture remained the largest sector in the economy in terms of employment, with almost 40 million people, or 44% of the labor force, in 2001 (Central Statistics Agency [BPS] 2002a) (Figure 1.1) reflecting relatively low labor productivity in the sector. However, despite the significant structural change in Indonesian agriculture and the relative decline in the contribution of agricultural value added to GDP, agricultural value added per worker increased from about $450 in 1970 to $610 in 1980 and $688 in 1990 (at 1995 prices) (Figure 1.2). Before the crisis, agricultural value added per laborer stood at $750—relatively high when compared with the value for other Asian countries. (In the People’s Republic of China [PRC], for example, agricultural value added per laborer was $298 in 1996.) However, value added per laborer declined in Indonesia during the Asian crisis by 0.11% per year.

Before the crisis (1991–1996), GDP increased by 7.9% per year, and agricultural GDP by 3.4% per year, while agricultural employment declined by 1.8% yearly and aggregate employment increased by 2.2% per year. In the period immediately after the crisis (1998–2001), agricultural employment increased by 13.3% yearly, and total rural employment increased from 35 million to 40 million (BPS 2002a). The rural sector could therefore absorb some of the people laid off in urban areas. During the same period, the livestock, fisheries, and forestry subsectors increased their combined contribution to agricultural GDP from 21% to 32% (Figure 1.3). In fact, the increased contribution of agriculture to national GDP came primarily from the nonfood subsectors, while the food subsector continued to decline.

1 Data collection and analyses were undertaken between May 2003 and December 2004; however, the publication could not be finalized in 2005 on account of the earthquake and tsunami that hit Indonesia in December 2004. The authors believe that the broad trends and patterns remain unchanged, and the study findings and proposed strategic recommendations remain valid.
Sources of Agricultural Growth and Poverty Reduction

Renewed efforts toward agricultural and rural growth will be crucial to reduce the number of poor and food-insecure Indonesian people. Rapid agricultural growth was a major contributor to the drastic reduction in poverty in the 1980s and 1990s, and in 2002 agriculture (wages and farming incomes) accounted directly for 43.0% of rural household income and two thirds of rural employment. Moreover, most of the Indonesian poor are concentrated in rural areas (see Appendix 2). However, today it is much harder to increase agricultural productivity beyond what has already been achieved: Input levels are often already high and marginal increments in yields are declining. Therefore, new investments need to be focused on productivity-driven, rather than input-driven, agricultural growth. That agriculture does not figure as predominantly in Indonesia’s economy nowadays will also make it much more difficult to attract the investment needed to move both agriculture and rural development forward.

Figure 1.1: Agricultural and Nonagricultural Employment, Indonesia, 1970–2001


Figure 1.2: Agricultural Value Added, Indonesia, 1970–2001

Source: Data from World Bank (2003).
Figure 1.3: Contribution of Subsectors to Agricultural GDP, Indonesia, 1970–1980, 1996–2001


Agricultural Output and Input Growth

Output Growth

After attaining rice self-sufficiency, albeit temporarily, in 1984, the Government shifted to the development of the manufacturing sector. The Government also began to promote estate crops (specifically palm oil and cacao) as well as fisheries for export, and hybrid poultry for domestic consumption (see Appendix 3). While in the 1980s, the expansion of agricultural export commodities was typically under the nucleus estates and smallholders (NES) scheme—with 80% of the area allocated for smallholders—in the 1990s, economic deregulation policies allowed domestic and foreign private companies to lease the estate plantations, increasing the average size of production units.

Despite the successes in other subsectors, progress in agricultural diversification was relatively slow. Food crops still dominated agricultural GDP (more than 50%), with more than 60% of major food crops (rice, maize, and soybean) being produced in Java, while agricultural development policy making was highly centralized and biased toward rice. Only the livestock subsector significantly increased its contribution to agricultural GDP, from 6% in 1970 to 11% in 2002. By the 1990s, agricultural GDP growth was slowing, exacerbated by a decrease in the public budget for agriculture and by nonsynergistic urban and rural development, which forced agriculture to absorb additional rural workers. During the financial and economic crisis, the national economy contracted, but agriculture sector growth remained positive (albeit low). In this period, agricultural employment and the share of agriculture in GDP increased (Appendix Tables A1.1 and A1.2).

Between 1970 and 2001, meat production increased by 0.7 million tons. Broilers accounted for almost all of this increase (67%), followed by beef cattle (16%) and native chickens (14%). Pork, a regionally limited product, contributed only 3%. The share of beef in meat production declined from 28% in 1985 to 22% in 2001, while the share of broilers increased from 16% to 40%. The share of native chickens remained high, at 18%, making it the third largest meat source in Indonesia.

The marine fisheries subsector grew much faster (5.3% yearly) than inland fisheries (3.2%) during 1971–2000. In the inland fisheries subsector, inland culture rose in importance, accounting for 69% of inland production in 2000, more than double its share in the early 1970s. Between 1980 and 2000, the inland pond area increased by 2.7% yearly, mostly outside Java, and primarily for domestic consumption of milkfish and export production of shrimp (Appendix Table A1.3).
Use of Inputs

Land Use

The sawah (lowland) rice area in Indonesia covered 7.8 million hectares (ha) in 2000, including 4.5 million ha of irrigated area, yielding 4.6 tons of mill-dry unhusked rice per hectare. The remainder was rain-fed area, with average yields of 3.0 tons/ha; and swamp and tidal swamp areas, with yields of 2.3 tons/ha. Between 1980 and 2000, the lowland area increased by 0.7 million ha, of which 0.5 million ha was irrigated (Appendix Table A1.3). Because of declining investments in irrigation, it is doubtful that such increases can be achieved in the future.

In the mid-1980s, the agricultural diversification policy promoted estate crops and fisheries (shrimp, tuna, and cakalang) for export, and hybrid chickens for domestic consumption. The area for oil palm and cacao increased by more than 10% yearly from 1980 to 1996. It reached 3.8 million ha in 1999 as a result of strong world market demand (Akiyama and Nishio 1996). Of the 10 million ha of expansion in estate crop area, around 7 million ha was developed by smallholders, less than 10% through NES, and about 3 million ha by private companies and state-owned enterprises (SOEs, or BUMN).

Use of Labor

Employment in agriculture declined slowly during 1970–2000, from 66.4% in 1970 to 53.8% in 1990 and to 44.0% in 1996. In the postcrisis period, the contribution of agriculture to GDP reached 17.3%, and rural employment rose from 34.8 million (41% of total employment) in 1997 to 39.7 million (44%) in 2001, or back to the level of 1996 (BPS 2002a). The data suggest that agriculture can and did function as a buffer in times of crisis.

In absolute terms, agricultural employment in Java declined from 22.5 million in 1976 to 15.5 million in 1997, while rural nonagricultural employment increased from 9.1 million to 15.1 million. Hence, total rural employment was almost unchanged, at 31.6 million in 1976 and 30.6 million in 1997. Outside Java, agricultural employment increased from 11.9 million to 18.0 million during the period, while rural nonagricultural employment increased from 2.7 million to 8.8 million. Thus, total rural employment outside Java increased from 14.6 million to 26.9 million, and the share of agriculture in overall Indonesian rural employment declined from 68% in 1976 to 53% in 1997 (BPS 2002a).

Figure 1.4 and Table 1.1 present the land-to-labor ratio for agriculture for Indonesia and other Southeast Asian countries. Except for Malaysia, where agricultural labor contracted sharply throughout 1980–2000, land-to-labor ratios declined during the period in the Southeast Asian countries presented here. In 2000, Indonesia’s land-to-labor ratio was lower than those for Malaysia, Philippines, and Thailand, but above Viet Nam’s rate. In Indonesia, the land-to-labor ratio has been highest for Kalimantan, followed by Sumatra and Sulawesi, and has been much lower for Nusa Tenggara and particularly Java. While the ratio has been basically stagnant in Java, it has increased slightly in Sumatra, has fluctuated...
in Sulawesi, and increased rapidly in Kalimantan in 1995–2000 as a result of a rapid increase in land area.

Fertilizer Use

One of the most dramatic changes in developing countries has been the large increase in the use of chemical fertilizers and agricultural machinery. During 1980–1997, on average, fertilizer application rates almost doubled from 51 kilograms (kg)/ha to 97 kg/ha in the group of developing countries (Figure 1.5). Asian application rates are typically much higher than the developing country average. However, rates vary considerably by country. In Indonesia, the rate actually declined in 1995–2001 to 75 kg/ha, a level similar to that of the Philippines. The decline in application rate in Indonesia could be a result of reduction in fertilizer subsidies, increased diversification into estate crops, and the Asian crisis. Application rates in Malaysia and Viet Nam were substantially higher, reaching levels similar to those in developed countries.

Fertilizer application rates have also varied substantially in Indonesia due to significant regional soil and crop production differences and to varied market access and infrastructure for transporting surpluses and inputs. While the application rate reached 285 kg/ha in Java in 2000 (up from 265 kg/ha in 1985), the rate averaged only 117 kg/ha in Sumatra, with the highest levels in West and North Sumatra; 109 kg/ha in Sulawesi, with the highest level in South Sulawesi; 98 kg/ha in Nusa Tenggara; 35 kg/ha in Kalimantan; and 23 kg/ha in Maluku and Papua. Over the period, application rates declined slightly in Nusa Tenggara and Kalimantan, but increased in the remaining regions (Figure 1.6).

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Table 1.1: Land-to-Agricultural Labor Ratio and Growth in Economically Active Population in Agriculture, Selected Southeast Asian Countries, 1980–2000

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<tr>
<td></td>
<td>ha/worker</td>
<td>% per year growth per agricultural worker</td>
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<tr>
<td>Malaysia</td>
<td>2.22</td>
<td>4.32</td>
<td>-0.39</td>
<td>-1.12</td>
<td>-1.37</td>
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<tr>
<td>Philippines</td>
<td>1.00</td>
<td>0.86</td>
<td>1.44</td>
<td>1.31</td>
<td>1.07</td>
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<td>Thailand</td>
<td>1.06</td>
<td>0.87</td>
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<td>0.98</td>
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<td>1.00</td>
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<td>Viet Nam</td>
<td>0.35</td>
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<td>2.39</td>
<td>2.10</td>
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<td>Indonesia</td>
<td>0.75</td>
<td>0.68</td>
<td>2.42</td>
<td>1.81</td>
<td>1.01</td>
<td>1.76</td>
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<td>Sumatra</td>
<td>2.01</td>
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<td></td>
<td>1.51</td>
<td>1.59</td>
<td></td>
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<tr>
<td>Java</td>
<td></td>
<td>0.39</td>
<td>-1.73</td>
<td>2.71</td>
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<td>Bali and Nusa Tenggara</td>
<td>1.07</td>
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<td>-0.56</td>
<td>0.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kalimantan</td>
<td>5.77</td>
<td></td>
<td>2.13</td>
<td>0.76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sulawesi</td>
<td>1.89</td>
<td></td>
<td>1.41</td>
<td>4.02</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Growth rates are 3-year centered moving averages for Southeast Asian countries only.

Figure 1.5: Average Fertilizer Application Rates, Developing Countries and Selected Southeast Asian Countries, 1980–2001

Note: Including nitrogenous, phosphate, and potash fertilizers. Land is measured as arable land plus permanent crops.
Machinery Use

Compared with other Southeast Asian countries, in 2000 Indonesia had a relatively low number of tractors per thousand workers; only the Philippines had an even lower ratio (Appendix Table A1.4). Like the rates of fertilizer application, access to tractors varies considerably among the islands in Indonesia, somewhat in correlation with the land-to-agricultural labor ratio. But while the land-to-labor ratio in 2000 was highest in Kalimantan, access to tractors was highest in Sulawesi (Figure 1.7). Unlike fertilizer application rates, the number of tractors in use per agricultural worker varies considerably across periods within regions. Nusa Tenggara had the highest tractor availability in 1985, but its rank declined to fourth out of five by 2000, as Sumatra, Java, and Sulawesi islands increased tractor use per agricultural worker more rapidly.

Land and Labor Productivity

Table 1.2 gives the values for land and labor productivity, measured as the value of aggregate agricultural output per hectare and per agricultural worker, for selected Southeast Asian countries for 1980 and 2000.

In Indonesia, land productivity increased, on average, by 2.0% per year in 1980–2000, while labor productivity increased more slowly, by 1.5% yearly. Similar trends were observed in Thailand, while growth was slower in the Philippines. In Viet Nam, very rapid land productivity growth was higher than labor productivity growth, while in Malaysia, labor productivity growth prevailed.

Public Spending on Agriculture

Before the 1997 financial and economic crisis, trade and macroeconomic policies in Indonesia generally favored agricultural development. Careful macroeconomic policy management resulted in a relatively stable real exchange rate, about equal to the medium-term equilibrium rate. Rice trade and price policy, including producer floor prices set at remunerative levels, promotion of private sector domestic trade, and even exports of domestically procured rice to reduce domestic supplies and maintain adequate producer price incentives in the late 1980s, contributed to sustained increases in rice production over nearly 3 decades (Ellis 1993, Timmer 1997). Nonetheless, an Asian Development Bank (ADB) review of Indonesia’s agriculture sector strategy in 1997/98 found that government controls on and subsidies for various inputs and products, together with controls on interprovincial trade, had led to a misallocation of resources.
Table 1.2: Land and Labor Productivity, Selected Southeast Asian Countries 1980–2000

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$/ha</td>
<td>% per year</td>
<td>$/agri worker</td>
<td>% per year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>338.6</td>
<td>504.4</td>
<td>3.95</td>
<td>2.87</td>
<td>−1.54</td>
<td>2.02</td>
</tr>
<tr>
<td>Malaysia</td>
<td>526.1</td>
<td>604.0</td>
<td>−0.20</td>
<td>1.30</td>
<td>0.73</td>
<td>0.78</td>
</tr>
<tr>
<td>Philippines</td>
<td>579.1</td>
<td>782.2</td>
<td>0.28</td>
<td>2.26</td>
<td>1.18</td>
<td>1.49</td>
</tr>
<tr>
<td>Thailand</td>
<td>407.6</td>
<td>639.0</td>
<td>1.38</td>
<td>2.14</td>
<td>3.76</td>
<td>2.35</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>366.3</td>
<td>864.5</td>
<td>6.17</td>
<td>4.01</td>
<td>2.68</td>
<td>4.21</td>
</tr>
</tbody>
</table>

Note: Values are for net agricultural production defined as gross production minus feed and seed. Growth rates are 3-year centered moving averages.

Expenditure Size and Trends

Government expenditures in Indonesia are titled either routine or development expenditures. Routine expenditures are recurrent costs or operating funds, while development expenditures are capital investments, including project funding financed through foreign assistance. The development budget is particularly important for agriculture and irrigation. Figure 1.8 presents total development expenditures by the central Government in 1983/84–2000, as well as the contribution of agriculture and irrigation, including relevant support services, to total expenditures during this period.
Development expenditures averaged Rp19 trillion in the 1980s and increased to Rp24 trillion in the 1990s, but declined in the latter half of the 1990s, dropping sharply in 1999/2000 as a result of the Asian crisis. Agriculture and irrigation accounted for about 13% of development expenditures in the 1980s and for 12% on average in the 1990s. In the same period, development expenditures on transportation, mostly roads, increased from 16% to 18% of all government expenditures. Health expenditures were very low throughout the 1980s (3% of government expenditures) and 1990s (4%). Development expenditures for education were somewhat higher, at around 12% of capital expenditures. The decline in development expenditures was more than

**Figure 1.9: Education, Health, Agriculture, and Transportation Expenditures, Selected Southeast Asian Countries, 1985–2000**

Notes: Data are 3-year centered moving averages except for Thailand in 1995. For Indonesia, for 1985 and 1986, only development expenditures are included; agriculture refers to agriculture, irrigation, natural resources, and environment; transportation includes tourism. For the Philippines, agriculture includes agrarian reform and natural resources; transportation includes communications. For Malaysia, data include current and capital expenditures; agriculture includes rural development; transportation includes communications. For Thailand, agriculture includes forestry and fisheries, and transport includes communications.

made up for by a rapid increase in routine expenditures during the crisis, largely in the finance subsector (Appendix Table A1.5).

According to data published in 2003 on the ADB Asian Resources Information Center Web Site, in Indonesia the share of expenditures in the agriculture and irrigation sector as well as those in the service sector linked with agricultural growth (education, health, and transportation) declined in 1985–2000 (Figure 1.9). Moreover, Indonesia’s expenditures in education were significantly below those of neighboring Southeast Asian countries and continue to decline. Indonesian expenditures in agriculture and transportation were comparable with those of Malaysia, Philippines, and Thailand in the 1980s and 1990s, but dropped sharply in 2000 as a result of the crisis.

**Agriculture and Irrigation Expenditures**

Expenditures in agriculture and forestry accounted for 14% of all government expenditures on average in 1970–1985, and declined to 9% on average in 1986–2000. The latter average, however, masks an even further decline in 1995–2000 to only 5% of government expenditures. The share of agricultural expenditures (including forestry, irrigation, and the environment) in agricultural GDP averaged 7% in 1970–1985 and 6% in 1986–2000. As a result of the Asian crisis, expenditures in agriculture, forestry, and irrigation dropped by half in real terms.

Indonesia’s expenditures in agriculture as a share of total government expenditure have been below those of the PRC, India, Thailand, and Viet Nam, particularly in more recent years (Appendix Table A1.6). As a share of agricultural GDP, Indonesian agricultural expenditures are similar to those of the Philippines and the PRC, but lower than those of India and Thailand (Appendix Table A1.7).

**Agricultural Research Expenditures**

Despite high rates of return, there is a major underinvestment in agricultural research and extension in most developing countries. Research and development (R&D) investment, both public and private, as a portion of agricultural GDP in developing countries reaches only 0.6%, compared with 5% for developed countries (Byerlee 1998).

With relatively low spending on agricultural research, Indonesia ranks near the bottom of Asian countries in agricultural research spending relative to agricultural GDP and total government expenditures on agriculture (see Appendix 4).

**Irrigation Expenditures**

Indonesia’s irrigation development budget (including flood control, river management, and swamp reclamation) from 1994/95 to 1999/2000 was of the same order of magnitude as its agricultural development budget, averaging around Rp1.5 trillion in real terms. Since the mid-1990s, real development expenditures for agriculture and forestry have exceeded those for irrigation. Irrigation expenditures have generally been the highest for any category, except in some years (for example, 1984/85 and 1987/88) when the fertilizer subsidy exceeded irrigation investments.

Direct irrigation expenditures include new system construction, system rehabilitation, operation and maintenance (O&M), and other water resources expenditures. Expenditures in the irrigation budget that are not directly associated with irrigation include those for river and flood control and for swamp improvement. Real irrigation expenditures in Indonesia (excluding flood, river, and swamp expenditures) almost doubled between 1987/88 and 1995/96 to Rp1.4 trillion before declining to slightly less than Rp1.0 trillion after the Asian crisis. Over this period, irrigation expenditures composed roughly 70% of the irrigation and water resources budget. O&M expenditures have varied somewhat, but typically represent around 6–
9% of the budget. According to the Medium-Term Development Plan, however, up to 30% of the irrigation infrastructure is degraded.

**Productivity Growth**

Factor accumulation has been the primary source of growth in East and Southeast Asian economies, while total factor productivity (TFP) growth has been a low to moderate contributor to economic growth. But TFP growth is becoming an increasingly important source of economic growth as these economies continue to grow. Although the wide range of results makes generalization difficult, Indonesia, Malaysia, and Singapore seem to have relied relatively more on input-driven growth (with strong input quality improvements in the latter two countries), while technology-driven growth has been more heavily relied on in Hong Kong, China; Republic of Korea; and Taipei, China. In the past 2 decades, many East and Southeast Asian countries have begun a shift in emphasis from capital accumulation to technology-based growth (Rosegrant and Hazell 2000).

In addition to capital and labor accumulation, fiscal discipline, market-oriented policies, open trade policies, investment in education, and institutional quality have also been crucial for economic growth, supporting both factor accumulation and productivity growth. Industrial policy has been less important to economic growth and may have negative long-term effects (Rosegrant and Hazell 2000).

**Sources of Productivity Growth**

According to Fuglie and Piggott (2003), annual agricultural output growth of 3% in Indonesia in 1961–1982 was mostly resource-based. In 1982–1996, on the other hand, productivity growth helped accelerate overall growth to nearly 4% per year. Accelerated TFP growth in the 1980s occurred at a time of substantially increased investment in agricultural research. But investments in irrigation, quality improvements in the rural labor force (Appendix 2), agricultural price policies, government-led food crop intensification programs, and trade and investment liberalization (Appendix 5) also contributed to this growth. In 1997–2000, the Asian crisis and El Niño caused production to contract by 0.8% per year. Based on a slightly different time scale, Fuglie (2004) reports that in 1961–2000 agricultural crop and livestock production in Indonesia grew by an average of 3.5% yearly, of which half was due to increases in land, labor, and other conventional inputs, and half was due to TFP improvements. Increases in TFP were most pronounced in 1986–1993. Growth in agricultural output since 1993, at 1.1% per year, was wholly due to increases in conventional agricultural inputs, particularly land and labor.

The case of rice is an example of changes in the relative contribution of input and TFP growth. After a period of sustained rapid growth from the late 1960s to the early 1990s, rice production growth is showing unmistakable signs of deceleration (Figure 1.10). In particular, rice yields appear to have reached a plateau by the early 1990s. What are the contributing factors to declining rice production growth in Indonesia? The historical pattern of rice output reflects both short-term fluctuations in climate and other environmental factors, and the long-term influences of public policy, particularly investments in irrigation infrastructure and in agricultural R&D leading to improved varieties of rice; and the subsidy of important inputs such as fertilizer.

Rice-harvested area grew at a fairly steady rate of between 1% and 2% annually over the entire period of record (Figure 1.10). Recent growth has been more dramatic outside Java, reflecting the settlement density on Java, government efforts to shift population to other islands (transmigrasi), and resource transfers, although rice-cultivated area continues to increase in Java as well, albeit at lower rates. By contrast, production expanded most rapidly during two periods: the mid- to late 1960s and again during the late 1970s to early 1980s (Figure 1.10).
The first expansion reflects the initial introduction of Green Revolution improved varieties and, of far greater significance, increased fertilizer availability and rural institutional reform. The second expansion is a direct consequence of the Government’s program to achieve self-sufficiency in rice. The rice program consisted of reinvesting petrodollars in the rural economy through heavy subsidies on fertilizers and agrochemicals, investment in irrigation infrastructure, widespread dissemination of high-yielding varieties, subsidized rural credit, and strategies to improve and stabilize rice producer prices (Hill 2000). It is evident (Table 1.3, Figure 1.10) that growth in yields was the primary engine driving growth in productivity during these periods of rapid expansion, with yield growth averaging over 5% during 1966-1985.

During the first postwar decade (1951–1961), all-Indonesia rice productivity increases were attributable to increases both in harvested area and in yield, in roughly equal shares. Javanese productivity during this period was driven largely by yield growth (81%), whereas outside Java, the pattern was essentially reversed, with 94% of growth due to area expansion and only 6% attributable to growth in yield. For the following 3 decades (1961–1990), growth in yield was clearly the main engine of rice productivity, responsible for between two thirds and three quarters of overall growth in rice output, both on- and off-Java. However, over 90% of output growth post-1990 has been due to area expansion, which has continued apace and increasingly occurs off-Java. However, overall growth during this period was roughly half of growth during the 1970s and 1980s.

Given that area expansion will have to come at the expense of diversion from other uses or by utilizing less productive areas, any strategy for sustained rice output growth in Indonesia needs to focus on yield growth. As yield improvement has been the primary mechanism of output enhancement during periods of high, sustained output growth, and as land suitable for irrigated rice cultivation is ultimately limited by geography, soils, climate, and water resources, an understanding of the factors contributing to growth, both in yield and in harvested area, is essential (Rodgers 2003).

**Growth and Poverty Reduction**

Poverty in Indonesia is still largely a rural phenomenon. Many of the poor depend directly or indirectly on the farm sector for their income. Thus, growth that raises agricultural productivity and the returns to farm labor is particularly important in reducing poverty. In Indonesia, poverty declined by 41% between 1970 and 1987, and the real agricultural value added increased by 2.6% yearly per rural dweller (Rosegrant and Hazell 2000).

A study by Sumarto and Suryahadi (2004) shows that agricultural GDP growth is beneficial in reducing poverty—both the urban poverty headcount but particularly the rural poverty headcount. Agricultural growth of 1%
reduces total poverty by 1.9 percentage points, urban poverty by 1.1 percentage points, and rural poverty by 2.9 percentage points, while growth in industry reduces only urban poverty, with an elasticity of 0.06.

Fane and Warr (2002) estimate that the poor do much better if a given amount of GDP growth is produced by technical progress in services or manufacturing rather than by technical progress in agriculture. In their analysis, unskilled labor is the single most important income source for the four poorest household groups (out of 10 groups), accounting for 76% of total poverty. For the nonpoor, on the other hand, skilled labor is the main income source.

There is, however, a belief—and a fear—that poor people, for lack of alternative income-generating activities, will turn to making a living by exploiting, and destroying, the natural environment. This could be very dangerous, because it threatens not only natural sustainability but also livelihood sustainability (Clay and Reardon 1998, Marcoux 1998, Scoones 1998, Scherr 1999). The presence of a protection system—an “institutional regulating mechanism,” according to Manig (1999)—that rules the behavior of rural people, and protects the social system against actions leading to natural destruction, could enhance environmental sustainability.

Conclusions

Indonesia’s vast agricultural resources, if properly used, can generate substantial power to propel the economy to the future. However, this requires pro-poor and environmentally sustainable growth policies.

Nearly all of Indonesian agricultural TFP growth occurred between 1968 and 1992. By the mid-1990s, agricultural growth once more relied almost entirely on increases in conventional factors as productivity stagnated. Therefore, compared with the PRC and India, Indonesia relied much more on resource expansion, particularly bringing new cropland into production, while TFP stagnated. When productivity gains were exhausted, private and public investments in agriculture were not enough to promote productivity growth.

Continuing low levels of TFP will further erode the profitability of agriculture and divert resources to other sectors. The potential contribution of agricultural development to reducing poverty and generating broad-based economic growth would also be undermined. Moreover, growth in agricultural land area and in forestry and fishery production has come at a high cost to the environment, including land degradation, loss of forest habitat, and declining water quality, none of which have so far been incorporated into agricultural productivity measurements for Indonesia.

Expenditures on critical productivity-enhancing investments, including education, health, agricultural research, and transportation infrastructure, in Indonesia have also been declining over time and/or are at much lower levels than in neighboring countries. Investments in these sectors, in addition to investments in extension and irrigation infrastructure, have been crucial for Indonesia’s agricultural performance in the past, and additional efforts will be needed to get Indonesia back on the path of renewed agricultural production growth and rural development.
II. Strategic Challenges and the Vision

This publication is an outcome of a study funded by ADB technical assistance in 2003-2004 to formulate and disseminate a medium-term (2004-2020) agriculture and rural development (ARD) strategy in support of the development by the Government of Indonesia of policies, investment plans, and institutional reforms to promote pro-poor and environmentally sustainable ARD. The study was timed well to provide analytical background for the Government’s Medium-Term Development Plan. The study team, in close consultation with the Government and other key stakeholders in Indonesia, developed a shared Vision for Rural Indonesia in 2020, from which emerged strategic challenges for ARD. Out of that review came strategic priorities for the sector. The final chapter of this publication outlines the responsibilities of the various stakeholders in implementing the ARD strategy. Appendixes discuss elements of the strategy and the forces that impact it in more detail: poverty reduction (Appendix 2); diversification (3); research (4); trade, macroeconomic, and exchange rate policies (5); vertical integration (6); the rural nonfarm economy (7); and environmental concerns (8).

Vision for Rural Indonesia in 2020

Rapid agricultural growth was a major contributor to the drastic reduction in poverty that occurred in Indonesia in the 1980s and 1990s. In 2002, agricultural wages and farming incomes contributed 43% of rural household income and two thirds of rural employment. During the financial and economic crisis of the late 1990s, agriculture provided additional employment and income for individuals who were laid off from urban employment. Indonesian rural development over the past three decades shows that agriculture will continue to drive the rural economy in the next 20 years.

A Shared Vision

The ARD strategy presented in this publication stems from the shared Vision for Rural Indonesia in 2020 (see Box 2.1).

By 2020, based on this Vision, Indonesia’s village population would still be heavily dependent on agriculture for income and employment, but productivity would have increased as farms apply productivity-enhancing and environment-friendly technologies. Farming would become diversified and commercialized and would be less vulnerable to agronomic and market risks. The number of nonfarm enterprises would grow, though most would remain small. Most enterprises would be in trading and services, but small-scale manufacturing would increase, mostly in food
and beverage processing, garment subcontracting, and crafts. Moreover, villagers would be economically active, politically involved, and socially conscious.

Box 2.1: Vision for Rural Indonesia in 2020

**National and Regional: Macroeconomic Development Goals**
- Doubling of real per capita income
- Doubling of real agricultural GDP
- 50% fewer people below the poverty line
- 50% fewer malnourished preschool children
- 90% of the population with access to clean water
- 80% of households with access to better sanitation facilities
- 100% enrollment in primary education
- 75% enrollment in secondary education, including girls
- 90% employment
- Zero deforestation

**Rural Village**

**Economic Life**
- Full-time employment for most; not more than 10% open unemployment
- Full- or part-time involvement in microenterprises or small businesses for some
- $2,000 average annual per capita income, 15% of which is saved
- Less than 5% of the village population below the poverty line

**Political Life**
- Awareness of citizenship rights and responsibilities
- Awareness and consciousness raised through newspapers, radio, and television
- Aspirations made known to local government bodies, and basic service delivery by government actively monitored through community organizations
- Transparency, honesty, and accountability demanded from local and national government officials
- Vigilance against corruption, collusion, and nepotism
- Social consciousness
- Relatively high social consciousness and low tolerance for inequality or discrimination, whatever the basis (ethnicity, religion, gender, economic status, or political position)
- Vigilance against damage to the environment; mass actions waged to express indignation

**Farming Practices**
- Relatively high and constantly rising productivity through productivity-enhancing but environment-friendly technology
- Diversified crop or livestock enterprises, making farmers less vulnerable to weather and price risks
- Commercialized attitudes and practices; farmers produce high-value crops or base production decisions on what the market needs or wants, not just what they themselves need
- Production decisions based on comparative advantage
- Simple but loss-reducing postharvest handling techniques such as drying and sorting, thereby increasing value added at the farm gate
**Box 2.1: Vision for Rural... (continuation)**

**Farm Households**
- No homeless people; houses simple but secure from elements and wild animals
- Most houses with radio and television
- Most school-age children in school
- Most villagers in good health
- Some wives working part-time sewing garments or making handicrafts

**Rural Nonfarm Sector**
- Though the rural village will still depend heavily on agriculture, nonfarm enterprises will have grown in quantity and variety. Most of these, however, will still be micro- and small enterprises in trading and services.

**Infrastructure**
- Paved roads linking farmers and nonfarm village enterprises to the town market
- Communication facilities linking rural people to centers of authority and market information in the towns and capital city of the province
- Households with access to clean water
- Adequate transportation facilities for the daily flow of goods and people between the village and the town

**Other Institutions and Community Organizations in the Village**
- Relatively good elementary school in the village or nearby
- Health clinic, with adequate staff and medicines for primary health care, in the village or nearby
- At least one organization in the village as its capacity builder, advocate, or service provider

**Policies and Investments**

The International Model for Policy Analysis of Agricultural Commodities and Trade (IMPACT) developed by the International Food Policy Research Institute (IFPRI) was used to assess these key Vision policies and investments, to be phased in during 2005–2010, using the following parameters:

- Per capita income growth of 4.5% per year through a 7.5% yearly increase in nonagricultural GDP;
- Increased investment levels in health and access to water to reach 95% of Indonesia’s population;
- Increased investment levels in education to reach secondary enrollment of 75% of Indonesian girls;
- Increased investment levels in irrigation, achieving 25% larger areas compared with the baseline;
- Reduction in the rate of population growth, relative to the baseline population growth rate, to the 2002 United Nations “low” population growth scenario (UN 2002) as a result of rapid income increase and high social investment levels;
- Broad-based increase of crop productivity due to large expansion of investments in agricultural research, irrigation infrastructure, enhanced property rights to land and water, improved coordination among agencies, and more transparent and accountable use of funds, expressed in terms of increased annual yield growth by 50% (cereals, roots and tubers, soybean, vegetables, subtropical fruits, and sugarcane); and
- Broad-based growth in production of meat and livestock products, assumed to be generated by more rapid expansion in animal numbers, with a 50% increase in annual growth.
The Vision scenario addresses the key strategic challenges to the ARD sector presented later in this chapter. It is contrasted, first, with the baseline scenario, which assumes that the trends of 2003-2004 would continue until 2020, with no major shifts; and second, with an equally plausible “worst-case” agriculture and rural policy and technology failure scenario, which assumes a decline in research, extension, and policy reform in the sector; broad degradation of irrigation infrastructure; and rapid rural-to-urban transfers of irrigation water so that less water is available for agriculture. This worst-case scenario assumes changes of the same magnitude as in the Vision scenario, but in the opposite direction.

**Results**

The IMPACT simulations show that the Vision can be achieved if the Government and all sectors of society make ARD a priority for sustainable, pro-poor development. The combined effect of the parameter changes is an increase in projected cereal yield growth from 0.99% yearly in the baseline to 1.32% per year in the Vision scenario, while the worst-case scenario would result in a slowdown to 0.66% yearly.

The projected per capita food consumption for selected food items in the Vision and for the worst-case scenario is shown in Figure 2.1. Compared with the baseline scenario, per capita food availability improves for all food types in the Vision scenario. Increases are largest for meat products (58%, or 8 kg/capita), followed by vegetables (24%, or 7 kg/capita).

**Figure 2.1:** Annual Per Capita Food Availability, Indonesia, 1997 and 2020 Under Alternative Scenarios

![Figure 2.1](image)

Source: IFPRI IMPACT simulation.

**Table 2.1:** Selected Results of Baseline and Alternative Scenarios for Indonesia, 2020

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Baseline</th>
<th>Vision</th>
<th>Worst-Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereal Production</td>
<td>'000 tons</td>
<td>58,187</td>
<td>63,265</td>
<td>53,577</td>
</tr>
<tr>
<td>Cereal Demand</td>
<td>'000 tons</td>
<td>64,547</td>
<td>65,213</td>
<td>64,846</td>
</tr>
<tr>
<td>Meat Production</td>
<td>'000 tons</td>
<td>2,993</td>
<td>3,447</td>
<td>2,602</td>
</tr>
<tr>
<td>Meat Demand</td>
<td>'000 tons</td>
<td>3,484</td>
<td>5,202</td>
<td>3,073</td>
</tr>
<tr>
<td>International Price of Rice</td>
<td>$/ton</td>
<td>250</td>
<td>247</td>
<td>254</td>
</tr>
<tr>
<td>Calorie Availability</td>
<td>Kcal/capita/day</td>
<td>3,227</td>
<td>3,767</td>
<td>3,062</td>
</tr>
</tbody>
</table>

Source: IFPRI IMPACT simulation.
Overall, food production is considerably higher in the Vision scenario than in the baseline scenario. In 2020, cereal production under the Vision scenario would be 5 million tons higher, and meat production would increase even faster, by almost 0.5 million tons—a 15% increase over baseline outcomes (see Table 2.1).

The results of the Vision scenario for food imports are shown in Figure 2.2. The rapid increase in per capita demand for higher value commodities like meat products cannot be entirely met from local production. Therefore, in addition to the production increase of just under 0.5 million tons by 2020, Indonesia is projected to increase net meat imports by 1.3 million tons. On the other hand, cereal production gains, mostly from large productivity increases, are expected to be more than enough to meet domestic demand of the smaller population under the 2020 Vision scenario than under the baseline case. As a result, net cereal imports are projected to decline by 4.4 million tons to 1.9 million tons by 2020 compared with the baseline scenario.

**Figure 2.2: Projected Net Trade in Cereals and Livestock Products, Indonesia, 2020 Under Alternative Scenarios**

![Graph showing projected net trade in cereals and livestock products, Indonesia, 2020 under alternative scenarios.](image)

Note: Negative figures denote net imports.
Source: IFPRI IMPACT simulation.

**Child Malnutrition**

The Vision scenario will have profound effects on the well-being and food security of Indonesians as measured by malnutrition levels among children. Increased per capita income and lower food prices; strong growth in public investment in the social sectors, including education, water, and sanitation; and slower population growth over the projection period—all will contribute to a reduction in the number of malnourished children. By 2020, the number of malnourished preschool children is projected to decline from 5.2 million in the baseline scenario to 2.5 million in the Vision scenario, or 11.3% of all preschool children, down from 34.0% in 1997 (Figure 2.3).

But if income growth is less than the baseline assumption (3.5% annual growth versus 4.5%), if agricultural area degradation and a deceleration in yield and livestock growth outstrip improvements from additional investments, if population growth is high (a total population of 274 million people by 2020, according to the UN “high” variant), and if investments in social sectors and rural areas stagnate, then the outcomes would be disastrous. Relatively lower per capita income and higher food prices would depress per capita food demand and lessen caloric intake. This, combined with lack of growth in public investments in the social sector and increased fertility rates, translates into a higher proportion of malnourished children. Under this scenario, the number of malnourished children would increase by 3.6 million, to 8.7 million in 2020 (Figure 2.3). This is an increase of 1.1 million over the 1997 base year.
Financing the Vision for Rural Indonesia in 2020

The shared Vision for Rural Indonesia in 2020 can be achieved if the Government and all sectors of society make ARD a priority. Large increases in investment are needed in key drivers of ARD. The most important investment drivers in the IMPACT are irrigation, rural roads, education, clean water, and agricultural research. An investment calculation based on the Vision scenario for these drivers places the total requirement at $23 billion, compared with $17 billion in the baseline scenario for 1997–2020. Of the total, $9.6 billion would go to irrigation, $2.3 billion to rural roads, $5.5 billion to clean water provision, $2.2 billion to agricultural research, and $3.6 billion to education. Education expenditures would have the largest proportional change compared with baseline outcomes.

An additional $6 billion over the baseline scenario appears to be a feasible and high-payoff investment, given the substantial benefits of the Vision scenario. A significant part of these costs could be met by reducing wasteful public expenditures, particularly on subsidies for credit, fertilizers, and water. These subsidies may have played an important role in launching the Green Revolution, but today they are rarely needed and can be counterproductive because they create incentives for the overuse of water and farm chemicals, leading to environmental degradation.

There is also considerable scope for getting more with less by improving the efficiency of the public institutions that implement public investments. In 2001, Indonesia’s overall tax burden was relatively low, at 12% of GDP. This low tax rate was due partly to reliance on oil and gas revenues and also to poor enforcement, especially in the collection of corporate and individual income tax. The ratio of actual to potential revenue varies from 50% to 85% across various taxes. Thus, an increase in collection efficiency would also provide significant additional funds to support the suggested measures. As both stated and implied throughout this publication, a key element in the success of the strategy is improved governance, including increased transparency and accountability of key stakeholders and greater roles for the private sector, user groups, and civil society organizations (CSOs).

Finally, to ensure that adequate resources are available for major public goods expenditures and for the delivery of agricultural services and public goods by districts, as envisioned, central government ministries must have the fiscal instruments to earmark a greater share of intergovernmental transfers to regions and districts for ARD investments and programs.
Strategic Challenges for Agriculture and Rural Development

This publication proposes a new ARD strategy to ensure that the agriculture sector remains a vibrant source of growth and poverty reduction. The strategy addresses the changing structure of the rural economy and the many challenges it faces in the domestic and international markets. The key strategic challenges are

- low productivity and quality of agricultural products,
- low access of farmers to productive resources and to the results of scientific and technological progress, and low capacity to absorb the implications of such results;
- diversification, to keep up with rapidly changing food consumption patterns and urbanization;
- land conversion to nonrice farming and nonagricultural uses;
- universal access to productive assets and employment, to accelerate growth with poverty reduction;
- destructive utilization of natural resources and decline in availability of water, especially in Java;
- political change, including the democratization and decentralization of development policy; and
- globalization and economic liberalization.

A cross-cutting theme through all of these challenges is the pivotal role of governance in the implementation and delivery of services and in the achievement of targets.
Agricultural Productivity Growth and Technological Innovation

Rapid advances in agricultural technology have largely been limited to irrigated rice, maize for irrigated and relatively wet agroclimatic zones, oil palm, and hybrid chickens. Moreover, productivity growth, even in rice and other favored commodities, has stalled since the early 1990s. The challenge now is to reinvigorate productivity growth and to broaden invention and technology breakthroughs for farmers in less favorable and more remote environments and for appropriate aquaculture development. New technology involving molecular biology and information and communication technology (ICT) systems—if appropriately applied—can help poverty reduction and food security efforts. Hence, the success of Indonesia’s agricultural development depends on how well it can develop the technological, infrastructure, and human resource capital that farmers need to exploit emerging technologies. The capacities of all stakeholders—farmers, communities, and all levels of government—need to be upgraded.

Diversification

Income growth and urbanization have shifted consumption toward higher value agricultural products such as livestock and fishery products, fresh fruits and vegetables, and prepared foods. The share of spending on staple foods (mainly rice) has declined and is now lower than spending on animal protein, while the share of spending on prepared foods tripled between 1981 and 2002. These changes have induced rapid growth in supermarkets and have influenced the structure of agricultural production, processing, handling, and marketing (Appendix 6). Urbanization is also associated with an aging agricultural labor force, women as heads of farm households, and lower costs of capital goods relative to wages. All of these have generated changes in the structure of agriculture. These phenomena can have positive or negative effects on pro-poor economic development. A viable rural nonfarm economy should include agribusiness and rural industry clusters.

Land Conversion

The total harvested area of food crops and annual estate crops (sugarcane and tobacco) on Java declined by 0.42% yearly over the past 10 years as land was converted to residential, industrial estate, and infrastructure development uses. The conversion continues. Fruits, vegetables, and flowers—high-value products in increasing demand—are now grown on what used to be rice land. Sumatra and Kalimantan have contributed an increasing proportion of food crops over the past two decades, and could be significant sources of food growth if appropriate strategies are followed.

Universal Access to Productive Assets and Employment

To ensure pro-poor ARD, the Government must give potentially marginalized groups with relatively high poverty and low welfare, like poor farmers, landless laborers, and women, better access to productive employment, productive assets (such as land and capital), and sources of finance. It must increase their bargaining position and also solve the problem of geographic isolation from lack of economic infrastructure. No ARD strategy can succeed if its policies and institutions are not founded on the interests of the poor.
Natural Resource Deterioration

The continuous application of modern agricultural technology, combined with policies favoring monoculture and excessive use of water and fertilizers, has led to a decline in the quality of land and water resources over the past three decades (Pingali and Rosegrant 1998). This decline, coupled with the downward trend in real commodity prices, has slowed growth in farm incomes. Environmental deterioration has also resulted from inappropriate land, water, and forestry policies. There is high pressure on forest, water, coastal, and marine resources and a lack of adequate user participation in their management. To achieve sustainable ARD, these negative environmental trends must be reversed. Critical infrastructure like irrigation systems must be maintained, and fish stocks must be better utilized.

Political Change

Rapid political change has increased the responsibilities of regional and local governments while relegating the national Government to a facilitating and servicing role. Regional governments, private enterprises, nongovernment organizations (NGOs), rural society, and farmers must take the lead in deciding the future direction of agricultural development. Political change has also allowed disparate groups to give voice to social conflict, which could adversely affect development. Such conflict—whether of economic, ethnic, religious, or group origin—must be managed wisely.

Globalization and Economic Liberalization

Globalization and economic liberalization present opportunities to develop broadly diversified agriculture and to reduce poverty, and can thus contribute in a significant way to rural development. Globalization, as reflected in increased links between countries and amplified trade, financial, and information flows, provides new technologies and markets and new sources of finance. But there are inherent risks as well—a point driven home by the financial and economic crisis. The benefits of globalization can be reaped only if appropriate policies and institutions are in place. To fully rectify problems revealed by the crisis, Indonesia must manage globalization by developing its domestic institutions and policies.
III. Strategic Priorities for Agriculture and Rural Development

Pro-poor growth and rural development, and the Vision for Rural Indonesia in 2020 described in the previous chapter, will require concerted efforts across a wide range of areas. To increase effective incomes and food demand and availability, agricultural productivity and economic growth must be broad based and rapid, and investments must be made in physical infrastructure like roads and irrigation, and in agricultural research and extension. Governance and civil society, human resources and entrepreneurship, and education and health must all improve. Environmental and natural resource policies must be strengthened and enforced for the results to be sustained over the long term.

The ARD strategy proposed here combines improvements in agricultural productivity and investment in social services, on the one hand, and in linkages among rural areas, industrial clusters (discussed below), and growth centers, on the other. Policies must reach out directly to poor people in their homes, villages, and communities. Some will be reached more slowly than others, leaving them vulnerable to adversity, so they will need to be helped through short-term stresses or disasters with income transfers and safety nets.

To achieve the Vision for Rural Indonesia in 2020, the Ministry of Agriculture (MOA), with support from the central Government, regional and local authorities, the private sector, and CSOs, will have to implement an ARD strategy that focuses on six priority areas:

- human resource development and entrepreneurship,
- social capital,
- agricultural productivity,
- agribusiness and farming systems and rural industrial clusters,
- growth and productivity in the rural nonfarm economy, and
- natural resource management.

A sound macroeconomic framework is crucial for the implementation of the strategy (see Figure 3.1).

**Human Resource Development and Entrepreneurship**

Education makes farmers better able to adopt more advanced technologies and crop management techniques, and thus to achieve higher rates of return from their land. New and emerging technologies such as those involving integrated pest management and improved nutrient balance
are highly complex and location specific. They are more demanding for both the farmer and the extension agent, and they require significant information and skill for successful adoption.

Education also has significant indirect effects on rural poverty. Educated mothers are more likely to ensure that their children are educated and live healthy lives. Women’s education affects virtually every dimension of development, from lowering fertility rates to raising productivity to improving environmental management.

Figure 3.1: The Agriculture and Rural Development Strategy for Indonesia to 2020

It follows that poverty is usually reduced by increasing the proportion of educational resources going to primary and vocational education and to the poorest groups or regions. Investments in health and nutrition, including the development of safe drinking water, improved sewage disposal, immunization, and public health services, also contribute to enhanced human resource development in rural areas. Furthermore, the benefits of health and nutrition investments are most pronounced for activities in which most of the poor are engaged.
Expand Vocational Schools and Public-Private Partnerships to Educate Future Entrepreneurs

In addition to increasing the level of investment in education and improving access for all, the composition of educational facilities is important. An increase in the number of vocational schools will be crucial for rural development, provided their curricula can be adjusted to meet the needs of prospective employers and to support the development of both rural industrial clusters and the nonfarm sector in general. Vocational education for agriculture should also be pursued aggressively.

Public-private partnerships often lead to more timely and effective implementation of programs and services. In the case of vocational schools, for example, such partnerships can narrow the gap between theory and practice; assist the schools in keeping their curricula relevant and up-to-date; provide internships for students in rural industries and the exchange of practical facilities and instructors; and, most importantly, increase the chances that graduates will find work.

Empower Rural Women

Specific policies are needed to level the playing field for rural women. Quisumbing, Meinzen-Dick, and Smith (2004) give a comprehensive overview of such policies, which apply directly to Indonesia:

- To empower women as rural entrepreneurs, there must be no gender discrimination in the ownership of and access to economically productive assets. Women must be allowed under the law to inherit land, join credit and savings clubs and water user groups, have access to extension advice, set up small enterprises, and be self-sufficient as household heads if the family unit breaks down.
- Women and girls bear the greatest burden when adequate, clean domestic water supplies and sanitation are unavailable because they supply household water needs and care for family members who become ill from lack of water and sanitation. Relevant water policies include securing use rights and investing in safe water supplies and sanitation.
- Livestock are more easily accumulated than land and are therefore an important resource for women. Maintaining and expanding the benefits of a growing livestock sector to resource-poor women will require policies and practices to protect women’s ownership and use rights; increase their access to credit and information; and train them in livestock production, processing, and marketing.
- Policies that have shown the most promise in closing gender gaps in education include reducing education costs (especially for girls); increasing physical access to services, particularly health and education; improving the design of service delivery to take the special needs of children and women into account (for example, evening classes or long-distance schooling); and investing in time-saving infrastructure (including transport infrastructure and ICT).
- Women’s networks, such as microfinance and livestock development programs, can be effective advocacy groups for women’s rights while strengthening the social capital of women and supporting them in new activities (see Box 3.1). The Government must ensure that the ongoing decentralization does not thwart women’s effective participation, which is likely to require targeted outreach and training.
- Nutrition and health programs should be targeted at women, who with their children, are significantly—and disproportionately—affected by micronutrient deficiencies.
Box 3.1: A Success Story: Microfinance for Rural Women in South Sumatra, 1998–2000

The Agency for Agricultural Research and Development (AARD), under a project to improve farming systems in the swampy areas of South Sumatra, implemented a research study on microfinance to promote self-reliance among rural women. Women elected through women’s village networks were provided with a total of Rp50.0 million in seed capital, which they were expected to manage. Activities undertaken included the provision of savings facilities and non-collateralized loans, for which interest accrued at 1.5%–2.5% per month, as decided by the management group. At the end of the 2 years, the group’s operational capital had doubled (to Rp100.0 million); management and field staff were drawing salaries; and loans were supporting small traders, domestic food-processing industries, and the purchase of farm inputs. The number of bad loans was less than 1%. Key to the success of the study was the supervision and training of management and field staff by AARD project personnel.


Build Capacity for Agricultural Research

A significant part of agricultural research funding and training is sourced from international loans and aid agency contributions. Future growth will depend on increased researcher funding combined with significant capacity building. The share of scientists with masteral and doctorate degrees needs to increase, as do the number, quality, and frequency of international staff exchanges (both into and out of Indonesia) for training and capacity building. The national agricultural research system should capture and adapt new technologies from research centers and laboratories in the developed world. Through global scientific linkages, core research staff must be trained to take advantage of advances in biotechnology and ICT.

Social Capital

Social capital refers to features of society that facilitate coordinated action, such as trust, norms, values, and networks. Indonesia is rich in indigenous local social organizations such as subak (traditional water user associations [WUAs] in Bali), gotong royong (collective action), musyawarah dan mufakat (collective decision making), and tanah adat/marga (communal natural resource management). Research indicates a positive correlation between social capital and household welfare: Households with high social capital have higher expenditures per capita, more assets, higher savings, and better access to credit. Social capital makes poverty less likely, and returns to household investments in social capital are higher for the poor than for the population at large (see, for example, Grootaert and van Bastelaer 2002).

The Government must invest in social capital to promote a favorable environment in which local associations can develop and prosper.

Support Civil Society Organizations

Effective CSOs can contribute to good governance by (i) encouraging government ministries to adopt successful approaches developed within the voluntary sector, (ii) educating and sensitizing the public about their rights and entitlements under public programs, (iii) acting as a conduit to the Government for public opinion and local experience, (iv) collaborating
and negotiating with official bodies, (v) influencing local policy decisions of national and international institutions, and (vi) helping the Government and aid agencies design more effective development strategies.

Relevant policies in support of CSOs include:

- establishing specific formal and informal channels of communication and dialogue among CSOs, government institutions, and policy makers;
- facilitating the establishment of CSOs by streamlining the legal processes involved at the national, provincial, district, and community levels;
- establishing regional support centers to facilitate the formation of new CSOs, networking and knowledge sharing among CSOs, fund raising, and dialogue with policy makers;
- encouraging CSOs to participate actively in legislative deliberations; and
- establishing a secure environment in which CSOs can actively monitor the performance of their local governments and combat corruption, collusion, and nepotism with no fear of reprisal.

**Provide Social Safety Nets**

The Government, with the help of international financial institutions like ADB and the World Bank, has implemented various poverty reduction programs, particularly since the financial and economic crisis of the late 1990s. These programs, widely known as *Jaring Pengaman Sosial*, or social safety net programs, have (i) made food available to poor people at affordable prices, (ii) created employment, and (iii) given poor people access to critical social services like health and education. However, analysts report that, in many cases, relevant groups were only loosely targeted and thus were largely missed. Moreover, many program activities overlapped.

Public works projects can bridge income and food security gaps for poor households. Program targeting can be improved via (i) self-targeting through type of work, wage level, and form of payment; (ii) gender targeting through women’s piecework rates and work locations, or through day-care provision; and (iii) geographic targeting of adversely affected regions. Program wages must be kept close to the prevailing unskilled labor market levels to minimize labor market distortions.

Collaboration with NGOs is a key to the better targeting of poverty reduction programs, especially in selecting locations and identifying eligible beneficiaries. The ongoing decentralization will be both an opportunity and a challenge to improve the effectiveness of social safety nets. Local authorities will have less experience in targeting and distribution, but they will be better informed about appropriate beneficiaries.

**Strengthen Decentralization Through Legal Reforms and Appropriate Training**

Strengthening the ongoing decentralization will be fundamental to empowering rural communities. Decentralization can promote local activities, but some outcomes can distort the local trade and business environment and create disincentives to local investment. Increased marketing and transportation costs on account of regional taxes are a harmful result of decentralization.

An effective way of strengthening decentralization and promoting good governance is to assist community-based NGOs and CSOs in participating actively in the deliberations of their local legislatures (especially in discussions on the budget and new business regulations) and in monitoring the performance of the executing agencies that implement programs and regulations passed by the legislature. Social capital in rural communities can also be built through the support of public-private partnerships for both input and output markets.
Other policies include:

- strengthening regional administrative and legislative capabilities through intensive nationwide training and socialization, and the establishment of financial controls and information systems;
- identifying and implementing an equitable formula for allocating national government funds (dana alokasi umum, or DAU) among districts;
- clearly defining authorities and responsibilities among national, provincial, and district governments to establish accountability for expenditures and impact on rural communities;
- amending local regulations that distort trade or deter local investors and entrepreneurs; and
- improving the technical and administrative capacities of local government officials to carry out their new powers and responsibilities.

**Promote Public-Private Partnerships**

With public funds increasingly scarce, public-private partnerships are an important means of enhancing investments in rural areas. Partnerships include publicly provided training for small- and medium-sized enterprises (SMEs), collaboration in education and agricultural research, provision of ICT, expansion of roads and other rural infrastructure, and development of rural industrial clusters.

**Support Community Assistance Facilitation Centers**

The community assistance facilitation center (CAFC) is a user-friendly, one-stop village facility through which small farmers and the rural poor can get information and assistance. CAFCs can facilitate:

- capacity building and learning among the rural poor through public and private extension services;
- community access to rural finance by bringing staff from urban financial institutions to the villages to explain their services and negotiate agreements to deliver financial services to the community;
- linkages with external sources of grants, training, information, infrastructure, technology, and other support for the community and businesses;
- partnership arrangements (such as contracts between small farmers and agroprocessors) and the formation of rural industrial clusters; and
- regular community consultation and dialogue wherein villagers can express their needs and grievances to the Government and relevant institutions.

**Agricultural Productivity**

**Invest More in Agricultural Research**

Despite its continued profitability, public investment in agricultural research has declined over the past 3 decades, contributing to a decline in productivity growth after 1993. Moreover, the Indonesian agricultural research system is highly fragmented in its R&D effort and has limited involvement with universities, weak links with international research institutes, and weak enforcement of intellectual property rights for agricultural technologies. The Government should significantly increase funding for agricultural research from the current 0.24% of agricultural GDP.

Besides increasing the pool of research resources, Indonesia must prioritize public research, focusing on high-payoff, pro-poor activities. If agricultural research investments can be increased, the continued application of conventional breeding techniques and recent developments in
nonconventional breeding offer considerable potential for improving crop and livestock yield growth in all agroecosystems. The tools of biotechnology, such as marker-assisted selection and cell and tissue culture techniques, should be expanded and intensified. To tap the benefits of transgenic breeding responsibly, Indonesia should also develop the capacity to evaluate the risks of transgenic crops, adapt breeding and crop management strategies to minimize risk, and implement and rigorously enforce appropriate regulatory systems.

Through collaborative research, joint ventures, alliances, and networks with the private sector, public research institutions can access advanced scientific information and technologies held by the private sector; mechanisms for developing, processing, marketing, and distributing final products to farmers and consumers; and financial resources, which are increasingly difficult to obtain. Private firms, on the other hand, can access untapped or emerging markets, opportunities to participate in formulating regulatory systems, and prospects to improve corporate profiles. Collectively, partnerships can improve the capacity of researchers to address complex problems that cannot be solved single-handedly or that require complex navigation through a new and changing technological, socioeconomic, or regulatory landscape.

**Invest in Processing Technologies and Postharvest Facilities**

With changing consumer demand and rapid growth in the number of supermarkets with specific requirements for grades and standards, farm technology and quality assurance and, hence, processing technologies and postharvest activities must improve. Most of the investment in this area should come from the private sector because processing and postharvest activities are profitable ventures. The Government could encourage the private sector to invest by providing risk-sharing and tax-relief incentives. It should limit its direct involvement to public-private partnerships in applied research on well-defined, urgently needed areas that the private sector would not address on its own, and in the provision of rural infrastructure.

**Reform and Strengthen the Extension System**

Indonesia’s experience in decentralizing its extension system has been mixed. Drastic cuts in funding and the removal of centralized guidance have adversely affected extension. But there have also been successes in management experimentation, participatory approaches, dissemination of market and upstream information and technology, decentralized services, and some privatized extension. Relevant avenues for developing extension services include:

- expanding the coverage of the planned Farmer’s Empowerment through Agricultural Technology and Information Project and similar endeavors to cover the entire country, which the national Government funds, and are targeted to improve district-level extension services;
- training field extension personnel in a broader range of subjects not limited to technology and providing them with the resources they need to advise farmers on how they can obtain credit, add value to their agricultural products, find markets for their products, and other marketing information;
- implementing field schools for farmers with a simple curriculum, short training duration, and high-quality trainers to develop analytical skills, critical thinking, creativity, and decision making; prospects for collective action to improve outcomes are greater when larger groups of farmers in a village are trained; and
- privatizing extension through contracting, for example, with seed companies; success is more likely when extension is linked to the delivery of a specific technology and to larger, more homogeneous groups of farmers; if private extension services cannot be self-supporting, the Government must continue providing assistance and training.
Take Regional Diversification and Comparative Advantage into Account

The Government should respond to the demands and unique needs of the regions and districts, considering their agroecological systems, state of economic development, poverty incidence, local synergies, and economies of scale. The MOA should enhance the productivity of agricultural commodities through various means, including agroecological approaches. Ongoing decentralization is likely to support regional-level policies and implementation (Box 3.2).

**Box 3.2: Regional Comparative Advantage and Potential High-Value Commodities (Focus on Beef)**

Northern and Central Sumatra, and East, Central, and West Kalimantan have a comparative advantage in oil palm, rubber, and food crops. Northern and Central Sumatra also have a comparative advantage in horticultural production for the domestic and export markets, and for the poultry, beef cattle, and dairy cattle industries. Southern Sumatra and South Kalimantan have a comparative advantage in rice and food crops, rubber and coffee production, and beef cattle; Southern Sumatra also has a comparative advantage in sugarcane production, beef cattle, and poultry. Given the relatively high rainfall and water supply, Sumatra and Kalimantan can be developed into rice and food crop centers, together with their related cluster industries.

Because of its high population density, Java will gradually shift from being the major rice production center to being a high-value agricultural production and processing center with related cluster industries. Bali, Nusa Tenggara, and Sulawesi have a comparative advantage in livestock, cacao, coffee, cashew, and horticulture. To revitalize Nusa Tenggara and Sulawesi as suppliers of beef cattle, improved genetic resources and management as well as modern technology should be promoted. Rural and agricultural development in Maluku and Papua requires support for cluster industries of marine fisheries and estate crops. Basic food security strengthening will also be important for these islands.

The comparative advantage of high-value commodities must also be explored. For example, improved livestock policies could have significant benefits. With domestic prices of cattle below cost-insurance-and-freight prices, beef can be a competitive business that can contribute substantially to farmer incomes at all levels—even for landless farmers. Beef cattle can be a particularly important asset for women. In the last 2 decades, the population of beef cattle increased only in Sumatra and Kalimantan, mainly because of their available grazing areas and sufficient rainfall. More than 10 million ha of upland areas in Sumatra and Kalimantan could be developed for livestock farming or integrated livestock–estate crop farming. Reliance on imports of feeder cattle tends to make domestic cattle breeding less profitable. Government agencies and publicly funded research institutions should start improving local breeds such as Bali and Madura cattle. Over the longer term, Indonesia should develop cattle-breeding farms in Sulawesi, Bali, and Nusa Tenggara, and develop feeder cattle operations in Java (intensively) and in Kalimantan and Sumatra by improving grazing.
Invest in New Irrigation Technology and Reform Water Resource Policy

Under the pressure of increasing water scarcity and the high costs of new irrigation construction, the Government is challenged to (i) maintain enough irrigated area on Java, given the rapidly increasing nonagricultural water demand and accelerating conversion of irrigated areas into nonagricultural uses; and (ii) cost-effectively and sustainably increase irrigation development in the outer islands. Other challenges relate to O&M. Cash-poor provincial governments choose periodic rehabilitation over routine maintenance on the assumption that the central Government and externally funded rehabilitation projects will step in. As a result, at least a third of the 3 million ha of government-designed irrigation schemes have had to be rehabilitated twice in the past 25 years.

The Government can meet these challenges by (i) increasing water supply for farmers, households, and industries through infrastructure investment; (ii) conserving water and increasing the efficiency of existing systems through better water management and improvements in technology and infrastructure; and (iii) increasing crop productivity per unit of water and land by improving water management and by focusing research and policy efforts on rain-fed agriculture.

More efficient use of irrigation water is possible through drip irrigation and precision agriculture, management changes like demand-based irrigation, and institutional improvements like the creation of WUAs. Industrial water can be recycled to save water. Domestic water use can be made more efficient simply by repairing leaks. The Government should raise water prices to induce efficiencies in water use, and should give subsidies to poor households.

Finally, policies are needed to improve the effectiveness of WUAs, which have been hindered in the past by the absence of irrigator water use rights, free choice in the cultivation of crops perceived to be profitable, and authority commensurate with their responsibilities as service managers and not just water users. The irrigation schemes should be turned over to WUAs, and the rehabilitation needs, along with the WUAs’ equity contribution, reviewed with them. Investment decisions would thus be more transparent, and participation would give the beneficiaries greater ownership.

Agribusiness, Farming Systems, and Rural Industrial Clusters

Policies must promote agricultural diversification (Appendix 3), commercialization, and vertical integration and coordination (Appendix 6). Priorities are (i) effective legal, regulatory, and institutional environments for trade, commerce, and manufacturing; (ii) rural financial reforms; and (iii) infrastructure investments to reduce marketing margins and transport costs. Contractual and regulatory frameworks must give smallholders access to high-value commodity production and equitable contractual arrangements with agroprocessing companies. CAFCs at the village level, accompanied by support for viable rural industrial clusters, would strengthen farmers’ bargaining position in relation to both the input sector and output markets.

Phasing out government involvement in SOEs, by transferring farm management to local farmer institutions and then selling government shares to local individuals and institutions, would improve the dynamics of the rural economy and the equitable distribution of productive assets.

1 For example, securing property rights and enforcing contracts.
Facilitate Smallholder Involvement in High-Value Commodity Production and Supply Chain Management

The NES scheme for estate crops could be adapted to other crops. The nucleus enterprise formally associates with and extends support and production inputs to smallholders to get a larger and more reliable supply of higher quality raw materials or semifinished products for its markets. Priority policies that would promote smallholder involvement in high-value production and supply chain management include:

- investing more in rural infrastructure to reduce transport costs and increase the number of traders in the market, and thus reduce the gap between farm gate and retail prices;
- training traders and investing in market and information systems to link consumers and farmers;
- empowering farmer groups to promote vertical integration;
- drafting regulations to support contract farming;
- expanding extension activities beyond production to include market accessibility; and
- facilitating broad-based agribusiness development emphasizing
  - public-private partnerships in diversified and commercialized agriculture in selected production centers (like East Java, East Kalimantan, North Sumatra, Riau, and South Sulawesi);
  - central government assistance to local governments in prioritizing and coordinating the planning of agribusiness infrastructure;
  - corporate farming programs (between farmers and private companies) to integrate small farmers into the agribusiness system; and
  - expansion of the NES scheme to include other agricultural commodities and establishment of farmer-owned NES schemes to broaden vertical integration and the agribusiness environment in rural areas.

The shrimp trading system described in Box 3.3 shows how investments and technical or financial assistance can sustain the incomes of small-scale farmers.

Provide Effective Laws and Institutions

Standards and quality control must be effectively regulated to ensure the competitiveness of Indonesian farmers in both emerging national supermarkets and the demanding international markets.

Reform the Rural Financial Sector

The Bank Rakyat Indonesia (BRI) unit desa system—the largest and most successful microfinance operation in the developing world, with almost 3 million borrowers and nearly 28 million small savers—has shown that a large national commercial bank can provide microfinance services to low-income and poor households under full commercial terms by combining maximum outreach and sustainability. Among the key factors in BRI’s success are:

- user-friendly products and services priced for institutional viability;
- close and regular relationships with customers;
- convenient bank locations, simple loan procedures, quick processing, and flexible terms;
- secure and confidential service, liquidity, and investment returns;
- simple management information systems and transparent accounting and reporting systems; and
- close loan monitoring and incentives for repayment.
Despite these successes, however, most villagers still have no access to financial services. The banking network can be further expanded in the rural areas through linkages between commercial apex banks and viable community-based microfinance institutions. The loan programs for microenterprises should emphasize simple procedures, easy access, and institutional sustainability, not interest rate subsidies to borrowers. The following elements are required for this approach:

- a macropolicy environment conducive to microfinance needs, including appropriate legal and regulatory frameworks, information systems, and training facilities, plus proper enforcement of regulations;
- support for pro-poor innovations through viable microscale agribusiness and rural enterprises such as backyard aquaculture, fish-product processing, fishnet making and repair, and boat making and repair;

**Box 3.3: Shrimp Trading Systems: Indokom and Lampung Province**

Shrimp, being highly perishable, must reach processing companies in a specific storage environment (–5°C) within 2 days after harvesting. As shrimp companies are often supply constrained, they try to reach the various shrimp farmers through different channels. Shrimp trading at Indokom takes the following alternative routes:

- **Bypass the Company.** Traders buy the shrimp and transfer it to Jakarta. They pay in cash 3–7 days after the purchase, when they get the money from Jakarta. The Jakarta trader sells to Jakarta only if there is sufficient shrimp to supply Jakarta, as transportation costs are very high.
- **Trader Credit.** Traders buy the shrimp from the farmers with cash and sell it to Indokom. Farmers can thus meet with several traders to bargain, and sell their product only at the highest price.
- **Input Credit.** With Rp10 million in seasonal credit from Indokom, traders buy inputs for the shrimp farmers, and the farmers in turn sell their shrimp to the traders at a price discounted by Rp3,000/kg.
- **Farmer-Group Credit.** Traders pass on their Rp25 million in seasonal credit from Indokom to the head of a farmer group. The farmer group buys the shrimp production inputs and pays back the trader at zero interest. The trader buys the shrimp at a price discounted by Rp1,000/kg.
- **Trader Credit–Input/Land Rent.** Traders pay for all the inputs and the land. Farmers sell the output to the trader, and from their sales pay the trader for the inputs and the rent for the land. The shrimp price is reduced by Rp2,000–3,000/kg (implicit interest on the credit).
- **Nucleus-Plasma System.** About four out of five farmers in Lampung produce shrimp under the nucleus-plasma system, mainly to control shrimp disease and to maintain supply continuity for the processing company. The companies buy large areas of land, build houses and sophisticated aquaculture ponds, and enter into a contractual relationship with farmers. The farmers get all inputs (fertilizer, stock, medicine, etc.) from the company and sell the shrimp to the company at the government-determined export price. After they pay back all the company loans, plasma farmers take ownership of the land.

*Source: Case study for this report.*
- downward revision of the BRI pricing policy (without interest rate subsidies);
- increased social and enterprise mediation through CAFCs to lower the transaction costs of financial services in rural communities; and
- better village loan and savings institutions, with links to modern financial institutions in urban and metropolitan areas and overseas.

Poor people are typically barred from access to microfinance by low awareness of services offered; lack of education and literacy; small deposit and borrowing requirements; and limitations imposed by local customs, social organization (family, kinship groups, tribal or ethnic affiliations), and formal and customary laws. The Government should facilitate access of the poor and other vulnerable groups such as women, youth, and older people to microfinance services.

Support Viable Rural Industrial Clusters

A rural industrial cluster is an interrelated and interdependent group of enterprises that provide inputs, raw materials, services, primary agriculture production or farming systems, processing, handling, packaging, storage, distribution, transportation, and marketing. A successful example is the livestock and poultry industry cluster in the Kediri and Blitar districts in East Java. The farms grow food crops (rice, maize, soybean, and cassava), estate crops (sugarcane), beef and dairy cattle, and broilers and layer hens. The upstream industries produce farm machinery such as hand tractors; threshers; small, mobile rice mills (hullers); and small feed-mill machinery. Downstream industries are small feed mills, small rice mills, and slaughterhouses.

Rural industrial clusters can be focal points of rural off-farm and nonfarm economic transformation, provided they have good infrastructure, transport, and communications links within their own boundaries; with outside urban areas; and, perhaps most critically, with the surrounding hinterland. Without village access to rural towns and marketplaces, effective demand linkages within rural regions cannot be established, nor can the benefits of nonfarm economic growth be spread (Appendix 7). Other essential ingredients are effective local government and legal and financial institutions. Rural people must be adequately trained to diversify into nonfarm activities, especially those that depend more on skilled labor than on equipment and infrastructure. Government policies—such as the ones already discussed in detail above—can facilitate efficient clustering.

Invest in Rural Roads

Farmers often lack roads, storage, electricity, and communication links to markets and are thus more vulnerable to intermediaries who overcharge for inputs or to monopoly buyers who squeeze their incomes.

Improved and expanded rural infrastructure is key to agricultural diversification and the development of rural SMEs. Economic liberalization, growing trade, and increasing product specialization call for reduced transaction costs to compete in markets with more efficiently produced outputs. Moreover, high-value agricultural commodities like shrimp or vegetables are perishable and require swift turnover to the market and to processors.

Phase Out Government Involvement in State-Owned Enterprises

Most SOEs in Indonesia yield low returns on capital investments. If the 155 companies in the Ministry of State-Owned Enterprises portfolio in 2001 were more efficient, and if their assets were returning the cost of capital, these SOEs would have earned Rp34 trillion in profits instead of only Rp16 trillion. The difference represents the opportunity cost of the capital invested in SOEs.
In sugarcane and other estate crops like palm oil, SOEs appear not to be doing much worse than private enterprises. But they enjoy substantial unrecovered government subsidies and do not fully cost their operations. Structurally, SOEs have considerable disadvantages in achieving longer-term efficiency and should be privatized faster and in a more transparent manner than in the past. The Government could phase out its involvement by disengaging from farm management, transferring management to local and rural farmer institutions, and selling its interests to local people and institutions.

**Growth and Productivity in the Rural Nonfarm Economy**

Inadequate physical infrastructure, low access to institutional credit, local market distortions and trade restrictions, low management and business skills among the rural villagers, weak institutions and regulation, and the small size of local markets generally constrain rural nonfarm growth. The rural nonfarm sector could grow faster if these constraints were loosened or removed (Appendix 7). Rural nonfarm activities must be treated as an integral part of village and community development. Specific policy instruments, in addition to those described previously in this report, include:

- improving human resource development and basic infrastructure,
- building capacity in the nonfarm sector, and
- expanding ICT in the rural areas.

Since the Government cannot build or pay for all rural physical infrastructure, the private sector and rural communities must be closely involved.

The Government should support microenterprises and SMEs with training, technology, and market information. New rural platforms must be established to link the rural economy with rural industrial clusters and to establish rural-urban linkages that would equitably integrate the rural population into the economy. The Government and the private sector can collaborate in establishing technology parks and industrial estate sites that are centrally located in rural areas.

Industrialization policies should foster the development of all kinds of rural nonfarm enterprises, not just manufacturing, which currently accounts for only a small percentage of rural nonfarm employment and income in Indonesia. The playing field should be leveled by revamping rural industrialization policies to include small enterprises, and by removing all unnecessary subsidies and protective policies that prevent rural firms from becoming competitive in the marketplace.

Good public and corporate governance should be promoted in rural areas through consistent enforcement of laws and incentives for good governance. CSOs should also be encouraged to exercise social control over their local officials and the local private sector to promote transparency and accountability in public governance.

An important instrument for expanding the rural nonfarm economy is investing in and promoting the use of ICT in rural areas (see Box 3.4).

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2 Defined to include agricultural processing and informal household manufacturing in addition to formal manufacturing.
### Box 3.4: The Value of Information and Communication Technology

Enhanced information and communication technology (ICT), including radio, television, telephone, personal computer, and the Internet, lowers barriers to the flow of information. It can contribute significantly to income, education, and welfare in rural areas by expanding opportunities and bridging distances. Indirectly, ICT promotes economic growth by increasing the market for exports (especially in services), the number of participants in the market, and the speed and efficiency of the market (including the provision and quality of government services). Through the Internet, for example, small enterprises can market and distribute their goods worldwide at greatly reduced cost. Radio can be used to educate, and is still the major electronic medium in distance learning programs in developing countries, although Internet-based teaching devices have started to take hold. ICT also allows global competition for many service industries. Finally, ICT can expand access to financial services, not only through information but also through low-cost, automatic teller machine-based accounts. Evidence indicates that poor people are willing to spend significant financial resources on telecommunications. The impact of improved ICT on poverty, however, depends on the status of other infrastructure (such as roads and electricity) and services (like education and health), given the complementary and catalyzing role of ICT and its strong linkages with other sectors.

ICT is vital in building rural-urban linkages. However, the communications strategy must ensure that communication mechanisms are two-way. Policy actions in this area include (i) developing a rural-based ICT strategy for agriculture and rural development; (ii) providing information to rural banks and microfinance institutions to increase and sustain participation in rural microfinance; (iii) involving rural households in information gathering, particularly on market opportunities, and business monitoring; (iv) sharing social, economic, and institutional analyses and information on community needs with a broader group of village development stakeholders and local commercial partners; and (v) facilitating access to public information and communication facilities.

Government ICT programs include implementing an integrated e-government concept in local areas with private sector support to manage regional resources in support of regional autonomy. Such programs aside, an effective broad-based framework for developing ICT must be developed and implemented. ICT policies should encourage private sector investment, promote infrastructure conducive to the free flow of information, and make ICT more widely affordable.

### Natural Resource Management

#### Protect Property Rights to Land and Water

To stop or even reverse the degradation of land and water resources (Appendix 8), important legislation must be passed and then consistently implemented and enforced. Legislation on agrarian reform and natural resource management, which protects indigenous land ownership, farmers’ rights, and conservation, among others, is an important framework. Another is Law 7/2004 on Water Resources, which defines a uniform system of water use rights, distinguishing between water used for basic needs and noncommercial purposes including domestic uses and subsistence agriculture, and water for commercial uses including industrial, municipal, hydropower, and commercial agriculture.
Adopt Agroecological Approaches to Farming

Case studies indicate promising results from agroecological approaches to farming that seek to manage landscapes for both agricultural production and ecosystem services. Productivity can be improved by increasing the efficiency of input use, substituting natural capital for financial capital, efficiently organizing space on the farm, and promoting economies of scale through farmer collaboration. These approaches can also reduce agricultural pollution with new methods of nutrient and pest management; create biodiversity reserves; and enhance habitat quality through modified management of soil, water, and natural vegetation. Important issues that still need to be resolved include scaling up agroecological approaches; pursuing research and pilot programs to mobilize private investment; developing payment mechanisms for ecosystem services; and investing in participatory and multidisciplinary research, system development, and knowledge sharing.

Agroforestry practices on about 3 million ha in Indonesia offer food and nutritional security to poor farmers and biodiversity benefits to the environment, besides protecting vulnerable upland areas. However, more dialogue on location-specific technologies is needed. These production systems have not yet made a large contribution to reversing the rapid rate of land degradation. IPM, which has been highly successful in rice culture, needs to be extended to other crops, particularly horticultural crops, and to all of Indonesia.

Reward Farmers for Conservation

Valuable environmental services provided by natural ecosystems are often lost through mismanagement and the lack of incentives to preserve them. An alternative would be to reward the farmers who typically implement the services, on the principle that those who provide environmental services should be compensated, and that those who receive the services should pay for them.

For example, the 1 million ha of rubber agroforest managed by Indonesian smallholders significantly helps conserve forest species, while providing economic advantages to small farmers such as low development costs and minimal risks. But if there are no incentives for environmental conservation, small farmers have no reason to forgo more profitable land uses such as oil palm production. One incentive would be to ecolabel the products of small farmers who conserve agroforests or engage in other beneficial land use practices, thus giving them a higher average return on their products and increasing the overall economic returns of agroforests. Preliminary studies have shown that this approach could work over the long term in Indonesia. Still, it will take time and resources to identify the right markets, develop linkages, and form the right institutional arrangements to handle certification.

Payments for environmental services such as upstream watershed protection to secure downstream water availability appear to be highly successful in critical watersheds like the Segara in West Nusa Tenggara (see Box 3.5) and have been developing informally elsewhere in Indonesia. The Government, the private sector, and CSOs should work together in promoting such approaches.

Rationalize Forestry and Land Use Regulation and Management

Soil and forest conservation policies and programs in the past have shown that the problems of land degradation cannot be solved by physical or technical approaches alone. The political and economic implications of land-use practices (such as land ownership and distribution, cropping patterns, and wage rates), as well as possible government influences, must also be taken into account.
Until 1997, the Segara watershed was managed under the customary (adat) system. In 1997, a private timber company, PT Angkawiajaya, started to clear-fell the area under a forest extraction permit. Although the base camp of the company was burned after the Suharto era and the logging operation was closed in 2000, the permit has not been withdrawn. Communities blamed upstream logging, as well as the long drought period and increased cultivation of cash crops in upstream areas, for the decline of water flows in the dry season, landslides, downstream sedimentation, and poor water quality in the Segara since 1997. No formal government programs link upstream land managers with downstream users. But several financial arrangements for water and related environmental services have evolved in the Segara Basin. Important downstream buyers of watershed protection services are the regional drinking water company (PDAM) and Lombok Inter Rafting, a tourism company. Upstream communities use the water service payments of PDAM—Rp2 million in 2001 and Rp5 million in 2002—for salaries of forest guards and for local work to revive and codify traditional rules on environmental protection. Ad hoc payments by Lombok Inter Rafting fund the communities’ tree planting and other social and environmental activities.


Environmental management regulations therefore must:

- recognize preexisting local rights from customary (adat) laws, on which social and administrative organization in rural areas of the outer islands is based;
- apply forest sector regulations with accountability and transparency;
- implement land reform laws to address the growing number of land conflicts;
- raise the status of environmental concerns in public legislation;
- devolve natural resource management to local users, particularly local communities with strong de facto property rights based on customary community laws;
- include provincial and district authorities and local stakeholders in consultation with the central Government on environmental regulations; and
- set clear responsibilities for environmental damage, such as forest fires.
Supportive Macroeconomic Environment

Implementing the foregoing ARD strategy, or significant parts of it, would make the ARD sector much more efficient and competitive. Sustained economic liberalization in line with past reforms and, where possible, agricultural trade liberalization would be consistent with that goal.

However, with few effective instruments to compensate those losing out in the short run as a result of economic liberalization, for example, through the removal of tariffs, the social costs could rise disproportionately and disrupt the stability of the economic system. Farmers surveyed in the Brantas River Basin (ADB/IFPRI 2003) derive roughly 25% of their household income from rice cultivation on average, so a 30% drop in rice producer prices without a major change in cropping strategy would reduce household income by roughly 12%. Thus, when policies that lead to the overvaluation of producer prices of water-consumptive crops like rice and sugarcane are dismantled, farmers should be helped with programs, policies, and incentives in making the transition to less water-consumptive but equally profitable cropping rotations.

A smooth transition to trade liberalization in agriculture requires better rural institutions, as described here. As these steps are taken and agricultural and rural efficiency is restored, trade restrictions and tariffs on rice and sugar should be phased out. More immediately, fertilizer subsidies should be removed and the fiscal savings transferred into investments in research, extension, and irrigation.
The quality of implementation of the ARD strategy will be determined by the institutional capacity and competence of the key stakeholders—government, the private sector, and civil society—and the performance of their roles; by the level of collaboration and coordination among them; and by the adequacy of budgets and other resources.

The key stakeholders will act under the following principles:

- Indonesia will maintain a relatively open and market-based economy.
- Indonesia will continue to democratize and decentralize its political system.
- The role of each stakeholder will be based on its distinct legal mandate, core competence, and comparative advantage. For example, only government can issue regulations and public policies, and the private sector is the most competent to invest in and run businesses in a market-based economy.

Key Stakeholders

In the market-based economy of Indonesia, the private sector—comprising farmers, microenterprises, SMEs, SOEs, cooperatives, and private corporations—is the dominant producer and distributor of goods and services for the public. These prime movers of the economy invest capital, take risks, borrow funds, apply managerial and technical skills, craft and execute competitive strategies—all in pursuit of economic gain. Government sets the boundaries within which the private sector may operate. Those boundaries are the laws, regulations, and policies that guide and discipline the private sector.

CSOs in Indonesia are the political parties; labor unions; professional associations and business societies; academic groups and think tanks; press and media associations; advocacy and rights groups; religious organizations; women’s associations; welfare-oriented groups; environment-oriented groups; and recreational, sports, and leisure associations. Civil society is the “social controller.” It should demand good public governance from the government, and good corporate governance from the private sector. Good public governance should mean not only the absence of corruption, collusion, and nepotism but more importantly—especially for the rural poor—the attainment of development targets and delivery of crucial public services. On the other hand, good corporate governance essentially means responsible corporate citizenship—fair pricing, protection of the environment, good-quality products, and fair treatment of employees, among others.
Each of these key stakeholders has its own strengths, resources, mandate, and competence. At present, national government institutions, especially the executive branch, still represent the strongest element, while local governments, especially the regional legislative bodies, are still relatively weak. This relative imbalance has started to change under Indonesia’s decentralization policy, with increased resources now being devoted to regional and local authorities. CSOs are mixed in capacity. Some service- and welfare-oriented and other nonpolitical CSOs have relatively high organizational capabilities from years of experience and external assistance. But the regional political parties, which are potentially the channel for bottom-up and grassroots-based development planning and programming, are still often preoccupied with raising revenues rather than thinking of poverty reduction or rural development.

**Collaboration and Partnerships**

National development in its broadest sense needs constructive collaboration among government, the private sector, and civil society. In the process of political maturation and democratic evolution, the more active collaborators would be government and CSOs, while the private sector would be less involved. In ARD, the private sector and government would be the more active partners in producing and distributing goods and services. Service and development-oriented NGOs in the rural communities, on the other hand, would be active collaborators in training, education, health care, and grassroots empowerment. A strong and coordinated effort is required, given the declining importance of agriculture in the economy while large numbers of poor and low-income earners continue to reside in rural areas.

The national Government and Parliament would enact the enabling macrolevel policies and laws to implement the ARD strategy, and the local governments would translate those strategies and policies into programs and projects with budgets, geographic locations, and clearly identified target beneficiaries. The rural private sector, particularly SMEs, is expected to exploit the emerging investment and business opportunities in the rural sector, particularly in the off-farm and nonfarm sectors. The eventual collaboration will depend on the institutional strengths and internal capacity of each party.

A potentially attractive area of partnership between the private sector and government is in building large rural infrastructure such as in transportation and communications. Government should attract the private sector and foreign investors to invest in build-operate-transfer (BOT) or build-operate-own arrangements by providing attractive incentives. The package of incentives should include, among others, flexibility in adjusting user charges (inflation indexed) and adequate protection against foreign exchange risks (since the user charges will be in rupiah). Another example where government, the private sector, and CSOs can work well together is extension.

**Implementation Responsibilities**

The envisioned responsibilities of the three key stakeholders in implementing the priorities of the ARD strategy are given below and in Table 4.1.

**Responsibilities of Government**

Government should do the following:

- Accelerate human resource development and entrepreneurship by investing more in health, nutrition, and education; expanding vocational schools in collaboration with the private sector; and promoting higher education in agricultural research.
Develop social capital, by adequately restructuring MOA (as discussed below), then by reforming the legal system to strengthen decentralization, building district-level capacity in collaboration with CSOs and the private sector, and supporting local CSOs. Explicit implementation of good governance principles across all levels of government is also important.

Revitalize agricultural productivity through diversification and research, by substantially increasing R&D expenditures, facilitating participatory and agroecologically focused research, encouraging innovations in marketing and processing, and strengthening rural extension centers. Government should also play a key role in investments in agricultural infrastructure, particularly for irrigation.

Facilitate research to support competitive and efficient agribusiness and farming systems and viable rural industrial clusters, and enable the growth and enhanced productivity of the rural nonfarm economy. The MOA, in particular, should create an effective regulatory system, including standards and quality controls, to enhance both intraregional and international trade and to channel investments into rural roads and ICT. The national Government should also guide the reform of the rural financial sector; plan and implement the phasing out of SOEs; and support rural industrial clusters, marketing information systems, and overall supply chain management. Local and regional governments should support CAFCs and innovative platforms to link the rural farm and nonfarm economy with rural industrial clusters.

Enhance natural resource management by securing land and water use rights for individuals; recognizing local and customary rights; and establishing and enforcing environmental regulations in innovative ways, including exacting payment for environmental damage and giving rewards for conservation.

Public-Private Partnerships

Public-private partnerships will be important in

- expanding vocational schools and training opportunities to build human resource and entrepreneurial capacity;
- building social capital through support for CAFCs; increased private sector R&D; research in marketing and processing; and BOT schemes for rural infrastructure investments, particularly roads and ICT; and through active participation in extension;
- strengthening natural resource management through the transparent application of environmental standards and payment for environmental damage; and
- providing direction and assistance for the strategic priorities of supporting competitive and efficient agribusiness and farming systems and viable rural industrial clusters, and enabling growth and increased productivity in the rural nonfarm economy.

Collaboration with Civil Society

A strong civil society, with CSOs in all areas of human and social activity demanding good governance from government and the corporate sector, will be an important partner in implementing the ARD strategy. Among the main functions of civil society in this regard are

- forum for social dialogue and policy debates;
- monitoring and watchdog function;
- legal advice and advocacy;
- research, education, and conflict mediation; and
- social welfare and health care.
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<th>Strategic Priority</th>
<th>Important Instruments</th>
<th>Central Govt</th>
<th>MOA</th>
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<td>Social Capital Through Decentralization, Collaborative Action, and Community Empowerment</td>
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To strengthen civil society for these functions, CSOs must do the following:

- Concentrate on performing their basic functions well according to their objectives, programs, and staff competencies.
- Improve their internal governance structures and processes, particularly transparency and accountability, with the help of independent auditors. They must also improve their financial sustainability by diversifying their funding sources so that they become less dependent on a single donor or on government funding. A code of conduct for CSOs could enhance their professionalism, credibility, and fund-raising ability.
- Cooperate with and consult one another more in staff training, transfer of management best practices, financing, and advocacy.

Preventing the MOA for ARD Strategy Implementation

The MOA should look ahead to 2020, anticipate the changing needs of agriculture and rural communities, and gear up for the implementation of the ARD strategy. With its present structure and staffing, MOA is ill prepared to implement the strategy.

Ongoing discussions and efforts within MOA to prepare for decentralization foresee a future where MOA will focus on high-level policy formulation; standard setting for extension and other agricultural services; technical assistance to local governments; and technical supervision, monitoring, and evaluation of policy and program outcomes. All field-level programming and implementation will be left to local governments. Thus, MOA might need to be significantly downsized.

Such changes, however, will not have significant benefits if MOA officials and staff do not change their orientation. Lack of collaboration now contributes to funding misallocation and functional overlap. The MOA should be organized not by commodity, as in the past, but by development component to optimize resource use and to generate synergies in rural economic growth. In the provinces, regional assessment institutes of agricultural technology development, already established, should play an important role in technology transfer besides giving feedback and synchronizing national development objectives with regional and local objectives.

Implementing the ARD strategy will also require close coordination and functional synergies among directorates general in four ministries—Trade and Industry, Home Affairs, and Regional Infrastructure, aside from the MOA—whose activities directly touch on aspects of the strategy. Just as the private sector reengineers business processes and abolishes divisional boundaries for seamless production and marketing of products and services to customers, the four ministries should apply that same principle to their tasks and do whatever it takes to reduce rural poverty. The rural poor are the main constituents of these ministries. But even if the poor do not pay for the services of the ministries, they should be treated like customers who must be satisfied.

Investment Requirements for the ARD Strategy

The Vision for Rural Indonesia in 2020 can be achieved if the Government and all sectors of society make ARD a priority for the sustainable, pro-poor development of the country. Based on the Vision scenario, which incorporates key Vision aspirations and policies, and which was simulated with the IMPACT model (see Chapter 2), by 2020, cereal production will be 5 million tons higher than in the baseline scenario, and meat production will have increased even faster, by almost 0.5 million tons, or 15% higher than baseline outcomes. Most importantly, by 2020, the number of malnourished preschool children is projected to decline to 2.5 million, as against 5.2 million in the baseline scenario, as a result of the greater availability of cheaper food, large increases in social sector investments, and slowing population growth over the projection period.
But for all these projected outcomes to be achieved there must be large increases in investment. The key investment drivers in IMPACT are irrigation, rural roads, education, clean water provision, and agricultural research. Total estimated expenditures for these key drivers of rural development in the Vision scenario during 1997–2020 amount to $23 billion, compared with $17 billion if current trends are maintained. Expenditures for irrigated area expansion would increase from $7.7 billion to $9.6 billion; rural road expenditures would increase from $1.8 billion to $2.3 billion; expenditures on clean water provision would need to increase by about 44% over baseline expenditures, to $5.5 billion; and expenditures on agricultural research would increase to $2.2 billion, compared with $1.9 billion in the baseline scenario. The biggest proportional change would be in education expenditures: at $3.6 billion, they would be almost double the baseline level (Figure 4.1).

Figure 4.1: Cost Estimates for Implementing the Baseline and Vision for Rural Indonesia Scenarios, Projected to 2020

An additional $6 billion over the baseline scenario appears to be a feasible and high-payoff investment, given the substantial benefits of the Vision scenario. A significant part of these costs could be met by reducing wasteful public expenditures, particularly on subsidies for credit, fertilizers, and water. These subsidies may have played an important role in launching the Green Revolution, but today they are rarely needed and can be counterproductive because they encourage the overuse of water and farm chemicals, leading to environmental degradation.

There is also considerable scope for getting more with less by improving the efficiency of the public institutions that implement public investments. In 2001, Indonesia’s overall tax burden was relatively low at 12% of GDP. This low tax rate is partly due to reliance on oil and gas revenues, and also to poor enforcement, especially in the collection of corporate and individual income taxes. The ratio of actual to potential revenue varies from 50% to 85% for various taxes. Thus, an increase in collection efficiency would also provide significant additional funds to support the suggested measures. A key element in the success of the strategy is improved governance, including increased transparency and accountability, and greater roles for the private sector, user groups, and CSOs.

Ensuring adequate resources for major public goods expenditures will also require fiscal instruments that allow central government ministries to earmark a greater share of the intergovernmental transfer of funds to regions and districts. The general allocation fund (DAU) does not allow earmarking. The special allocation grant (DAK) does not seem likely to prioritize ARD spending over the next several years, and the levels of funding required are too large for
current DAK allocations. To fill the funding gap, the MOA and other ministries have been using a portion of the central government budget (APBN) as a deconcentrated matching grant instrument—an arrangement that the Ministry of Finance has at least tacitly accepted. But such an informal arrangement is risky. A significant budget allocation should be established under the DAU, or substantial new funds should be formally allocated to the APBN for earmarking to generate matching funds from the regions and districts for significant public goods and national priorities. Formalizing a program for earmarking and matching funds would engender improved management and discipline, including stronger strategy foundations, identified outcome objectives, and monitoring accountability.

A potentially sustainable strategy of infrastructure financing is domestic borrowing of long-term funds, to be collateralized by future taxes. Local and regional governments can issue long-term, low-interest, 25- or 30-year bonds with a 5-year grace period. The central bank, institutional investors, corporations, and high-net-worth individuals can purchase these bonds. The bonds would be secured by future taxes, which are expected to grow as private sector business activities and employment grow.

**Support from the International Aid Community**

Important areas of the ARD strategy could benefit from the expertise and resources of international funding agencies, which are already actively supporting the rural communities of Indonesia in several of these areas.

The following areas are considered crucial for the achievement of the Vision for Rural Indonesia in 2020, and appear to be appropriate for participation by the international aid community and for discussion among the MOA, development partners, and the private sector:

- development of rural community organizations (CAFCs);
- capacity-building programs for district officers and extension agents;
- increased investment in agricultural research;
- participatory and agroecologically focused research;
- reform and expansion of the rural financial sector;
- improvement of rural infrastructure and marketing;
- regulatory reform in contractual systems, food quality, and food safety for high-value and export crops;
- investment in ICT;
- securing rights to land and water;
- payments for environmental damage and rewards for conservation; and
- increased investment in new irrigation technology.
### APPENDIX 1

**Agriculture Sector Statistics**

**Appendix Table A1.1: Composition of Agricultural GDP, Indonesia, 1970–2002**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Crops</td>
<td>61.3</td>
<td>60.7</td>
<td>60.6</td>
<td>52.8</td>
<td>52.3</td>
<td>50.6</td>
</tr>
<tr>
<td>Estate Crops</td>
<td>17.2</td>
<td>18.8</td>
<td>16.7</td>
<td>16.2</td>
<td>16.4</td>
<td>16.6</td>
</tr>
<tr>
<td>Livestock</td>
<td>5.8</td>
<td>6.1</td>
<td>10.4</td>
<td>11.2</td>
<td>10.0</td>
<td>11.0</td>
</tr>
<tr>
<td>Fishery</td>
<td>9.3</td>
<td>5.4</td>
<td>7.8</td>
<td>9.8</td>
<td>11.0</td>
<td>11.8</td>
</tr>
<tr>
<td>Forestry</td>
<td>6.4</td>
<td>9.0</td>
<td>4.5</td>
<td>10.0</td>
<td>9.6</td>
<td>9.8</td>
</tr>
<tr>
<td>Share of Agriculture in Total GDP</td>
<td>41.0</td>
<td>30.7</td>
<td>21.5</td>
<td>15.4</td>
<td>19.6</td>
<td>17.5</td>
</tr>
<tr>
<td>Employment in Agriculture as Share of Total Employment</td>
<td>66.4</td>
<td>54.8</td>
<td>53.9</td>
<td>44.0</td>
<td>43.2</td>
<td>44.3</td>
</tr>
</tbody>
</table>

Source: Pendapatan Nasional Indonesia, BPS (various years).

**Appendix Table A1.2: Composition of Agricultural GDP Growth, Indonesia 1980–2002**

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Crops</td>
<td>2.54</td>
<td>3.42</td>
<td>2.36</td>
<td>1.1</td>
<td>0.42</td>
</tr>
<tr>
<td>Estate Crops</td>
<td>3.70</td>
<td>5.26</td>
<td>4.47</td>
<td>1.10</td>
<td>1.91</td>
</tr>
<tr>
<td>Livestock</td>
<td>3.32</td>
<td>4.06</td>
<td>4.93</td>
<td>-1.41</td>
<td>3.30</td>
</tr>
<tr>
<td>Fishery</td>
<td>4.00</td>
<td>5.30</td>
<td>5.26</td>
<td>4.57</td>
<td>4.10</td>
</tr>
<tr>
<td>Forestry</td>
<td>6.18</td>
<td>0.12</td>
<td>0.61</td>
<td>-0.92</td>
<td>1.90</td>
</tr>
<tr>
<td>GDP Growth Rate</td>
<td>3.1</td>
<td>3.4</td>
<td>2.9</td>
<td>0.6</td>
<td>4.0</td>
</tr>
<tr>
<td>Rate of Growth of Employment in Agriculture</td>
<td>1.21</td>
<td>3.56</td>
<td>-2.29</td>
<td>0.58</td>
<td>1.92</td>
</tr>
</tbody>
</table>

Source: Pendapatan Nasional Indonesia, BPS (various years).
### Appendix Table A1.3: Development of Agricultural Land in Java and in Indonesia 1980–2000

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Settlement</td>
<td>1,578</td>
<td>1,765</td>
<td>4,700</td>
<td>5,261</td>
</tr>
<tr>
<td>Shifting Cultivation</td>
<td>271</td>
<td>256</td>
<td>2,519</td>
<td>3,520</td>
</tr>
<tr>
<td>Garden (tegal/kebun)</td>
<td>2,716</td>
<td>2,848</td>
<td>6,861</td>
<td>9,440</td>
</tr>
<tr>
<td>Grassland</td>
<td>78</td>
<td>40</td>
<td>2,834</td>
<td>2,230</td>
</tr>
<tr>
<td>Brackishwater Pond</td>
<td>105</td>
<td>132</td>
<td>197</td>
<td>468</td>
</tr>
<tr>
<td>Freshwater Pond</td>
<td>37</td>
<td>40</td>
<td>193</td>
<td>199</td>
</tr>
<tr>
<td>Estate Crops</td>
<td>603</td>
<td>610</td>
<td>7,953</td>
<td>17,727</td>
</tr>
<tr>
<td>Swamp/Nonrice Field</td>
<td>44</td>
<td>44</td>
<td>6,412</td>
<td>4,187</td>
</tr>
<tr>
<td>Rice Field (sawah)</td>
<td>3,496</td>
<td>2,981</td>
<td>7,002</td>
<td>7,780</td>
</tr>
<tr>
<td>Irrigated Area</td>
<td>2,512</td>
<td>2,205</td>
<td>4,029</td>
<td>4,540</td>
</tr>
<tr>
<td>Temporarily Fallow Land</td>
<td>94</td>
<td>69</td>
<td>6,462</td>
<td>9,990</td>
</tr>
<tr>
<td>Private Forestland</td>
<td>264</td>
<td>466</td>
<td>8,357</td>
<td>10,089</td>
</tr>
<tr>
<td>State Forest</td>
<td>2,114</td>
<td>2,019</td>
<td>93,526</td>
<td>75,861</td>
</tr>
<tr>
<td>Agricultural Land</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Excluded Settlement</td>
<td>9,823</td>
<td>9,333</td>
<td>142,316</td>
<td>141,493</td>
</tr>
<tr>
<td>- Total Agricultural Land</td>
<td>11,401</td>
<td>11,097</td>
<td>147,016</td>
<td>146,754</td>
</tr>
</tbody>
</table>

Notes:
1. Sawah area in Java 2000 was reduced by 372,292 ha, on the basis of Landsat data, by the Center for Soil and Agroclimate Research.
3. Data on state forests exclude protection forests, parks, and reservation forests.

### Appendix Table A1.4: Tractors per Thousand Agricultural Workers

#### Selected Southeast Asian Countries, 1980–2000

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1980-2000</td>
<td>% per year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>0.3</td>
<td>1.4</td>
<td>4.37</td>
<td>14.86</td>
<td>1.54</td>
</tr>
<tr>
<td>Malaysia</td>
<td>3.4</td>
<td>24.6</td>
<td>9.94</td>
<td>14.36</td>
<td>2.08</td>
</tr>
<tr>
<td>Philippines</td>
<td>1.1</td>
<td>0.9</td>
<td>-6.50</td>
<td>2.21</td>
<td>-1.06</td>
</tr>
<tr>
<td>Thailand</td>
<td>1.0</td>
<td>10.4</td>
<td>10.08</td>
<td>15.63</td>
<td>7.42</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>1.3</td>
<td>5.9</td>
<td>2.02</td>
<td>10.96</td>
<td>8.50</td>
</tr>
<tr>
<td>Developing Country Average</td>
<td>3.2</td>
<td>5.5</td>
<td>4.83</td>
<td>2.35</td>
<td>2.13</td>
</tr>
</tbody>
</table>

Note: Growth rates are 3-year centered moving averages.
Appendix Table A1.5: Total, Agriculture, and Irrigation Expenditures Both Development and Routine, Indonesia, 1994–2000

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Expenditures</th>
<th>Agriculture</th>
<th>Fertilizer Subsidy</th>
<th>Irrigation</th>
<th>Agricultural R&amp;D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Development Routine</td>
<td>Development Routine</td>
<td>Development Routine</td>
<td>Development Routine</td>
<td>Development Routine</td>
</tr>
<tr>
<td></td>
<td>Rp billion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1994/95</td>
<td>26,156</td>
<td>15,242</td>
<td>961</td>
<td>82</td>
<td>412</td>
</tr>
<tr>
<td>1995/96</td>
<td>24,463</td>
<td>15,001</td>
<td>735</td>
<td>86</td>
<td>144</td>
</tr>
<tr>
<td>1996/97</td>
<td>25,126</td>
<td>17,026</td>
<td>1,049</td>
<td>94</td>
<td>108</td>
</tr>
<tr>
<td>1997/98</td>
<td>23,540</td>
<td>54,993</td>
<td>1,127</td>
<td>107</td>
<td>434</td>
</tr>
<tr>
<td>1998/99</td>
<td>23,956</td>
<td>48,930</td>
<td>1,711</td>
<td>75</td>
<td>764</td>
</tr>
<tr>
<td>1999/2000</td>
<td>19,993</td>
<td>59,151</td>
<td>667</td>
<td>97</td>
<td>-</td>
</tr>
<tr>
<td>2000</td>
<td>13,221</td>
<td>56,884</td>
<td>857</td>
<td>91</td>
<td>-</td>
</tr>
<tr>
<td>2001</td>
<td>10,821</td>
<td>63,968</td>
<td>681</td>
<td>87</td>
<td>-</td>
</tr>
</tbody>
</table>

R&D = research and development

* Excluding forestry and fisheries.

b Excluding the water resources development subsector.

Note: Data for 2000 are for 9 months (April–December) and preliminary; year 2001 data are preliminary.

Sources: World Bank Jakarta site (for total, agriculture, and irrigation expenditures) based on Ministry of Finance data; Fuglie and Piggott (2003) (for fertilizer subsidy and agricultural R&D expenditures).

Appendix Table A1.6: Agricultural Expenditures as a Share of Government Expenditures, Selected Asian Countries, 1975–1998

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>China, PR</td>
<td>12.1</td>
<td>12.4</td>
<td>8.3</td>
<td>8.9</td>
<td>8.3</td>
<td>10.6</td>
</tr>
<tr>
<td>India</td>
<td>9.7</td>
<td>14.6</td>
<td>12.6</td>
<td>11.5</td>
<td>9.6</td>
<td>14.5</td>
</tr>
<tr>
<td>Indonesia</td>
<td>9.8</td>
<td>9.6</td>
<td>6.8</td>
<td>7.6</td>
<td>6.6</td>
<td>7.2</td>
</tr>
<tr>
<td>Philippines</td>
<td>9.0</td>
<td>5.3</td>
<td>5.7</td>
<td>6.0</td>
<td>7.3</td>
<td>6.0</td>
</tr>
<tr>
<td>Thailand</td>
<td>5.9</td>
<td>8.1</td>
<td>11.7</td>
<td>10.4</td>
<td>10.4</td>
<td>7.5</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>15.2</td>
<td>8.0</td>
<td>8.5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Barker et al. (2004).

Appendix Table A1.7: Agricultural Expenditures as a Share of Agricultural GAP, Expenditures, Selected Asian Countries, 1975–1998

<table>
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<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>China, PR</td>
<td>8.5</td>
<td>7.6</td>
<td>6.3</td>
<td>6.4</td>
<td>7.1</td>
</tr>
<tr>
<td>India</td>
<td>10.2</td>
<td>12.7</td>
<td>13.5</td>
<td>12.8</td>
<td>9.8</td>
</tr>
<tr>
<td>Indonesia</td>
<td>9.2</td>
<td>8.8</td>
<td>7.8</td>
<td>7.7</td>
<td>6.9</td>
</tr>
<tr>
<td>Philippines</td>
<td>5.2</td>
<td>3.3</td>
<td>4.5</td>
<td>6.5</td>
<td>7.0</td>
</tr>
<tr>
<td>Thailand</td>
<td>8.2</td>
<td>13.2</td>
<td>15.3</td>
<td>17.5</td>
<td>16.1</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>3.6</td>
<td></td>
<td>4.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Barker et al. (2004).
Poverty in the Rural Areas

Poverty in Indonesia remains an overwhelmingly rural problem. Two thirds of those living below the poverty line live in the rural areas. The incidence of poverty, reduced to almost 10% by economic growth in the 1980s and early 1990s, surged anew during the financial and economic crisis toward the end of the 1990s. In 2002, more than 38 million Indonesians were living below the poverty line, 65% of them in the rural areas.

The rural poor tend to have low education and are thus excluded from many types of formal employment. Many depend on subsistence agriculture, often in resource-poor areas, and must earn a living with low-skill labor. But rural poverty in Indonesia hides a more disturbing picture of stagnant rural development. Seventy-five percent of families in the rural areas are low-income families.

Trends in Poverty in Indonesia

Table A2.1 shows selected Human Development Index indicators for Indonesia and neighboring countries with similar characteristics. Indonesia is 112th of 175 countries listed. The low gross domestic product (GDP) index may be interpreted as a sign of either considerable underemployment or a large population, probably in the rural areas, engaged in livelihood activities with only marginal returns (UNDP 2003).

Direct comparisons of poverty before and after 1996 are impossible, because the definition of the poverty line was changed that year. But because the Central Statistics Agency (BPS) computed a 1996 value corresponding to both the old and the new definitions, the poverty results for 1996 can be compared with the results for later years. These alternative estimates are labeled “old series” and “new series” in Table A2.2. Clearly, from the 1970s to the 1990s, Indonesia accomplished much in reducing poverty, with the head-count index of people below the $1-per-day poverty line falling by four fifths between 1975 and 1995.

However, the economic crisis led to sharp short-term increases in poverty. According to the BPS new poverty series, by the end of 1998, there were 7 million more poor people in rural areas and 8 million more poor people in urban areas than there had been in February 1996. From 1998/99, however, poverty again started to decline. By 2002, according to the National Development Planning Agency (BAPPENAS 2003), the percentage of people below the poverty line had nearly gone back to the pre-crisis level of 17.7% (Table A2.2).

1 The poverty line has since been adjusted to $1.5 per day (PPP).
### Table A2.1: Human Development Indicators, Selected Asian Countries, 2000/2001

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Indonesia</th>
<th>Philippines</th>
<th>Thailand</th>
<th>Malaysia</th>
<th>Viet Nam</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(112&lt;sup&gt;a&lt;/sup&gt;)</td>
<td>(85&lt;sup&gt;a&lt;/sup&gt;)</td>
<td>(74&lt;sup&gt;a&lt;/sup&gt;)</td>
<td>(58&lt;sup&gt;a&lt;/sup&gt;)</td>
<td>(109&lt;sup&gt;a&lt;/sup&gt;)</td>
</tr>
<tr>
<td>Human Development Index</td>
<td>0.682</td>
<td>0.751</td>
<td>0.768</td>
<td>0.79</td>
<td>0.688</td>
</tr>
<tr>
<td>Life Expectancy at Birth (years)</td>
<td>66.2</td>
<td>69.5</td>
<td>68.9</td>
<td>72.8</td>
<td>68.6</td>
</tr>
<tr>
<td>Life Expectancy Index</td>
<td>0.69</td>
<td>0.74</td>
<td>0.73</td>
<td>0.8</td>
<td>0.73</td>
</tr>
<tr>
<td>GDP Index</td>
<td>0.56</td>
<td>0.61</td>
<td>0.69</td>
<td>0.75</td>
<td>0.51</td>
</tr>
<tr>
<td>GDP per Capita (PPP $)</td>
<td>2,940</td>
<td>3,840</td>
<td>6,400</td>
<td>8,750</td>
<td>2,070</td>
</tr>
<tr>
<td>Education Index</td>
<td>0.8</td>
<td>0.9</td>
<td>0.88</td>
<td>0.83</td>
<td>0.83</td>
</tr>
<tr>
<td>Combined Primary, Secondary, and Tertiary Gross Enrollment Ratio (%)</td>
<td>64</td>
<td>80</td>
<td>72</td>
<td>72</td>
<td>64</td>
</tr>
<tr>
<td>Adult Literacy Rate (% age 15 and Above)</td>
<td>87.3</td>
<td>95.1</td>
<td>95.7</td>
<td>87.9</td>
<td>92.7</td>
</tr>
</tbody>
</table>

PPP = purchasing price parity.
<sup>a</sup> Numbers in parentheses indicate HDI rank.


### Table A2.2: Urban and Rural Poverty Trends in Indonesia, 1976–2002

<table>
<thead>
<tr>
<th>Year</th>
<th>Poverty Line</th>
<th>Share of Population Below the Poverty Line</th>
<th>Population Below the Poverty Line</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Urban</td>
<td>Rural</td>
<td>Urban</td>
</tr>
<tr>
<td></td>
<td>Rupiah</td>
<td>%</td>
<td>Million</td>
</tr>
<tr>
<td>1976</td>
<td>4,522</td>
<td>2,849</td>
<td>38.8</td>
</tr>
<tr>
<td>1978</td>
<td>4,969</td>
<td>2,981</td>
<td>30.8</td>
</tr>
<tr>
<td>1980</td>
<td>6,831</td>
<td>4,449</td>
<td>29.0</td>
</tr>
<tr>
<td>1981</td>
<td>9,777</td>
<td>5,877</td>
<td>28.1</td>
</tr>
<tr>
<td>1984</td>
<td>13,731</td>
<td>7,746</td>
<td>23.1</td>
</tr>
<tr>
<td>1987</td>
<td>17,381</td>
<td>10,294</td>
<td>20.1</td>
</tr>
<tr>
<td>1990</td>
<td>20,614</td>
<td>13,295</td>
<td>16.8</td>
</tr>
<tr>
<td>1993</td>
<td>27,905</td>
<td>18,244</td>
<td>13.4</td>
</tr>
<tr>
<td>1996</td>
<td>38,246</td>
<td>27,413</td>
<td>9.7</td>
</tr>
<tr>
<td>1996&lt;sup&gt;a&lt;/sup&gt;</td>
<td>42,032</td>
<td>31,366</td>
<td>13.6</td>
</tr>
<tr>
<td>1998&lt;sup&gt;b&lt;/sup&gt;</td>
<td>96,959</td>
<td>72,780</td>
<td>21.9</td>
</tr>
<tr>
<td>1999&lt;sup&gt;b&lt;/sup&gt;</td>
<td>92,409</td>
<td>74,272</td>
<td>19.5</td>
</tr>
<tr>
<td>2000&lt;sup&gt;d&lt;/sup&gt;</td>
<td>91,632</td>
<td>73,648</td>
<td>14.6</td>
</tr>
<tr>
<td>2001&lt;sup&gt;e&lt;/sup&gt;</td>
<td>100,011</td>
<td>80,382</td>
<td>9.8</td>
</tr>
<tr>
<td>2002&lt;sup&gt;f&lt;/sup&gt;</td>
<td>130,499</td>
<td>96,512</td>
<td>14.5</td>
</tr>
</tbody>
</table>

<sup>a</sup> Based on the 1998 standard, adjusted to account for the shift in consumption pattern in the respective years.
<sup>b</sup> Based on the regular National Social and Economic Survey (SUSENAS) of February (without East Timor).
<sup>c</sup> Based on the SUSENAS of December 1998.
<sup>d</sup> Estimated result, based on the core SUSENAS (including Nangroe Aceh Darussalam [NAD] and Maluku) of 2000.
<sup>e</sup> Estimated result, based on the SUSENAS of February 2002 (including estimates for four provinces—NAD, Maluku, North Maluku, and Papua—and the SUSENAS Sample Consumption Module 2002).

Source: BPS. Various SUSENAS surveys.
The large increase in the relative price of staple foods, including rice—by 180% between February 1996 and February 1999—pushed up the poverty rate. And the sharp decline in food prices, especially rice, after February 1999, as well as increasing real wages, reversed the negative trend.

The fairly low Gini coefficient for Indonesia indicates a relatively equal income distribution. In the urban areas, the Gini coefficient barely changed from 1978 to 1999, varying only between 0.38 and 0.34. In the rural areas, it declined from 0.34 to 0.26. In 1999, the richest 20% of the population received 42% of the country’s total income, while the poorest 40% received 20%. In comparison, the Gini coefficients for Malaysia, the Philippines, and Thailand were in the range of 0.42–0.47.

Few Jobs Mean More Poverty

Growth in Indonesian agriculture was higher than population growth rates throughout the 1980s and 1990s. Along with population growth, the Indonesian labor force expanded rapidly between 1990 and 2000, from around 75.4 million to 95.6 million, at an average growth of 2.4% per year. In 2002, the labor force comprised 100.8 million, with around 58.6 million people living in rural areas (58.1% of the labor force and 27.6% of the population) (BPS 2002a).

Providing productive employment opportunities for the new workers entering the labor force presents a formidable challenge. In 1990, around 26 million people, or 37% of the labor force, were underemployed (working less than 35 hours a week) (BPS 2002a). By 2002, the number had gone up to 59 million, of which 36% had had only primary education (BPS 2002a). Meanwhile, unemployment has also been increasing, from 2.1% in 1985 to 7.2% in 1995 and 9.1% in 2002 (ADB 2003, BPS data for various years).

Economic growth creates employment opportunities, but not always in step with growth. In 1971–1980, GDP grew by 7.9% yearly, but labor absorption grew by only 3% per year (Tjiptoherijanto 1996). From the early 1990s up to 1996, annual GDP growth was 7–8%, while unemployment varied from 2.5% in 1990 to 7.2% in 1995 and 4.9% in 1996 (BPS, various years). The rural labor force must acquire skills and knowledge faster to ease its transition into manufacturing and services or more knowledge-intensive farming.

The informal sector, with its lower average incomes, is at higher risk of income loss and is more vulnerable to shocks than the formal sector. But it also represents a vital stepping-stone to the economic rebirth of the country. It provides the flexibility and low investment potential that can transform marginal and landless farmers into rural entrepreneurs adding value to primary agricultural products and taking advantage of local potentials. Microfinance services and applied rural research for new technologies and product development will encourage the growth of the informal sector.

Given the limited capability of the formal economic sectors to absorb surplus labor, the number of people working in the informal sector in Indonesia is substantial. Table A2.3 shows the composition of the labor force based on the formal and informal sectors in Indonesia in 1980, 1990, and 2002. The share of people employed in the informal sector decreased during 1980–1990 but increased up to 2002, most likely due to the Asian financial and economic crisis.

Poverty in Indonesia Is a Rural Phenomenon

In 2000, 58% of the population of 206 million lived in the rural areas. By 2015, the proportion is expected to be 45%. As can be seen in Table A2.2, in 1998–2002, two thirds of the poor people in Indonesia lived in the rural areas, a ratio that has been fairly constant since 1987.

Rural poverty takes many forms other than expenditure poverty, such as lack of access to basic education, medical services, infrastructure (safe water, adequate sanitation, transport and roads, electricity), or participation in community life. The World Bank (2001) concludes in
Table A2.3: Labor Force, Formal and Informal Sectors, in Indonesia

<table>
<thead>
<tr>
<th>Sector</th>
<th>1980</th>
<th></th>
<th>1990</th>
<th></th>
<th>2002</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>million people</td>
<td>%</td>
<td>million people</td>
<td>%</td>
<td>million people</td>
</tr>
<tr>
<td>Formal Sector</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employers with Permanent Workers</td>
<td>1.7</td>
<td>0.90</td>
<td>1.5</td>
<td>1.05</td>
<td>3.3</td>
<td>2.79</td>
</tr>
<tr>
<td>Employees</td>
<td>28.2</td>
<td>14.55</td>
<td>34.9</td>
<td>24.95</td>
<td>29.9</td>
<td>25.05</td>
</tr>
<tr>
<td>Total</td>
<td>30.1</td>
<td>15.45</td>
<td>36.4</td>
<td>26.00</td>
<td>33.2</td>
<td>27.84</td>
</tr>
<tr>
<td>Informal Sector</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-employed, without Assistance of Other Person(s)</td>
<td>25.5</td>
<td>13.16</td>
<td>19.3</td>
<td>13.81</td>
<td>21.1</td>
<td>17.63</td>
</tr>
<tr>
<td>Self-employed, Assisted by Family Members or Temporary Workers</td>
<td>26.1</td>
<td>13.46</td>
<td>24.2</td>
<td>17.34</td>
<td>26.3</td>
<td>22.02</td>
</tr>
<tr>
<td>Unpaid Workers (family workers)</td>
<td>17.8</td>
<td>9.20</td>
<td>19.9</td>
<td>14.24</td>
<td>19.3</td>
<td>16.10</td>
</tr>
<tr>
<td>Total</td>
<td>69.9</td>
<td>35.82</td>
<td>63.6</td>
<td>45.39</td>
<td>66.8</td>
<td>55.75</td>
</tr>
</tbody>
</table>


its country assistance strategy: "Once the multidimensional breadth and dynamics of poverty are acknowledged, poverty is a reality that, in one form or another, confronts more than half of all Indonesians."

Regional Poverty Disparities and Policy Implications

The number of poor people in each province or island shows the regional disparities in the incidence of poverty.

According to the Agricultural Census of 1983, the five provinces with the highest rural household income were Bali, Riau, Central Kalimantan, South Sumatra, and Central Sulawesi. Ten years later, East Kalimantan and Jambi had displaced South Sumatra and Central Sulawesi. By the SUSENAS 2002 survey, Jambi had been replaced as well, by Bangka Belitung.

On the other hand, in 1983 the provinces with the lowest rural household income were West Nusa Tenggara, Lampung, East Java, South Kalimantan, and Central Java. By 1993, South Kalimantan and Central Java had given way to East Nusa Tenggara and Bengkulu. East Nusa Tenggara itself dropped off the list in 2002 when, according to the SUSENAS survey that year, it was replaced by Gorontalo.

In 1996–2002 (new series), poverty levels were consistently reduced in 10 provinces, namely Jambi, Lampung, West Nusa Tenggara, East Nusa Tenggara, West Kalimantan, Central Kalimantan, North Sulawesi, Southeast Sulawesi, Maluku, and Papua. The provinces with improved poverty levels tend to have more diversified rural economies and income levels above the national average (Table A2.4).

In provinces with declining land resources (Bali and West Sumatra), the contribution of agriculture to rural incomes is relatively small compared with the share of wages/salaries and nonagricultural businesses. In Bali, high-value agricultural commodities, particularly livestock and estate crops, dominate the agriculture sector. In provinces where there is still land for expansion (Jambi; Central, South, and West Kalimantan; and North Sulawesi), the share of agriculture in the rural economy remains high; less income is generally derived from food crops, and relatively more from estate crops, nonagricultural wages, and nonagricultural businesses. In these regions, except for West Kalimantan, rural income growth is generally above the Indonesian average. In provinces where rural poverty worsened in 1996–2002, staple crops and traditionally low-productivity estate crops (rubber, coffee, coconut) dominate agriculture.

In East Kalimantan, where rural household income is the highest, poverty levels have not yet recovered to pre-crisis levels because of a skewed income distribution, the presence of large mining industries, and lack of development in the nonagricultural sector. Both West Nusa Tenggara
and Yogyakarta have a high share of transfer income remittances from wage earners working outside the province or country.

The major income sources of poor rural households in 2002 were farm labor and farming. Thus, most poor rural households are either landless or small farmers. But in West Java, which is near metropolitan Jakarta, the income structure of poor rural households in 2002 was balanced between wage income, farming, and nonfarming small businesses. In this province, urban linkages have contributed to a more dynamic and balanced distribution of income among the various sources.

Past agricultural development strategies in Indonesia have emphasized irrigated agriculture and “high-potential” rain-fed lands in an attempt to increase food production and stimulate agricultural and economic growth. This strategy was quite successful, but large areas of less-favored areas (LFAs) have been neglected and lag behind in economic development. Despite some out-migration, the population of many LFAs continues to grow, and this growth has not been matched by increases in productivity. The result is often worsening poverty and food insecurity, and widespread degradation of natural resources, as people seek to expand the crop area.

### Table A2.4: Poverty Incidence in Rural Areas by Province, Indonesia

<table>
<thead>
<tr>
<th>Country</th>
<th>Percentage of People Below Poverty Line (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Old Series*</td>
</tr>
<tr>
<td>Nangroe Aceh Darussalam</td>
<td>16.32</td>
</tr>
<tr>
<td>North Sumatra</td>
<td>13.03</td>
</tr>
<tr>
<td>Riau</td>
<td>15.96</td>
</tr>
<tr>
<td>Jambi</td>
<td></td>
</tr>
<tr>
<td>South Sumatra</td>
<td>14.02</td>
</tr>
<tr>
<td>Bengkulu*</td>
<td></td>
</tr>
<tr>
<td>Lampung</td>
<td>12.84</td>
</tr>
<tr>
<td>Bangka Belitung*</td>
<td></td>
</tr>
<tr>
<td>DKI Jakarta*</td>
<td>0.00</td>
</tr>
<tr>
<td>West Java</td>
<td>10.21</td>
</tr>
<tr>
<td>Central Java</td>
<td>15.83</td>
</tr>
<tr>
<td>Yogyakarta</td>
<td>12.55</td>
</tr>
<tr>
<td>East Java</td>
<td>12.10</td>
</tr>
<tr>
<td>Banten*</td>
<td></td>
</tr>
<tr>
<td>Bali</td>
<td>9.27</td>
</tr>
<tr>
<td>West Nusa Tenggara</td>
<td>21.30</td>
</tr>
<tr>
<td>East Nusa Tenggara</td>
<td>24.84</td>
</tr>
<tr>
<td>West Kalimantan</td>
<td>28.86</td>
</tr>
<tr>
<td>Central Kalimantan*</td>
<td>22.01</td>
</tr>
<tr>
<td>South Kalimantan</td>
<td>21.91</td>
</tr>
<tr>
<td>East Kalimantan*</td>
<td>16.55</td>
</tr>
<tr>
<td>North Sulawesi</td>
<td>16.02</td>
</tr>
<tr>
<td>Central Sulawesi*</td>
<td>11.18</td>
</tr>
<tr>
<td>South Sulawesi</td>
<td>8.71</td>
</tr>
<tr>
<td>South East Sulawesi*</td>
<td>11.37</td>
</tr>
<tr>
<td>Gorontalo*</td>
<td>35.52</td>
</tr>
<tr>
<td>Maluku*</td>
<td>28.51</td>
</tr>
<tr>
<td>North Maluku**</td>
<td>28.15</td>
</tr>
</tbody>
</table>

* See notes for Table A2.2.
* a For 1990, BPS combined these provinces into an estimated poverty of 18.42%.
* b New provinces
* c No rural area

Sources: BPS (various years).
These problems indicate that, on poverty and environmental grounds alone, more attention may have to be given to LFAs in public policy and investments. New and improved approaches, particularly to agricultural intensification, are likely to be required. Rosegrant and Hazell (2000) describe one appropriate development strategy. It calls for stronger partnerships than needed in high-potential areas between agricultural researchers and other agents of change, including local organizations, farmers, community leaders, nongovernment organizations (NGOs), national policy makers, and funding agencies. The public sector would build and maintain roads, and promote the expansion of competitively priced private transport, marketing, input supply, and financial services. Investments in electricity and telecommunications would also be needed for private sector growth. Investments in clean water and in education and health would not only increase productivity in agriculture, but allow the local people to diversify into nonfarm activities. Priority targeting should be adopted in these LFAs to reach the poor.

The SUSENAS (National Socioeconomic Survey) and PODES (Rural Potential) national development monitoring systems can be used to develop poverty reduction strategies and to ensure that pro-poor strategic investments and programs are really targeted at and reach the poor.

Growth and Poverty Reduction in Indonesia

The success of agricultural development in Indonesia in the 1970s and 1980s was primarily due to technological breakthroughs, supported by investment in irrigation and economic infrastructure and by favorable macro- and microeconomic policies.

The technological revolution in agriculture was aimed at moving small-scale subsistence farmers to commercial, profit-oriented enterprises. This shift was reinforced by rapid national economic growth, trade liberalization, and urbanization, fueling the development of specialized enterprises for livestock and aquaculture. The impact of agricultural technological change on poverty reduction has been mixed. As mentioned, the past emphasis on irrigated agriculture and “high-potential” rain-fed lands, while successful in increasing food production and stimulating economic growth, led to the neglect of LFAs.

There is no lack of promising pro-poor technologies for raising agricultural productivity while conserving the environment, including agroforestry, biological nitrogen fixing, a focus on water use efficiency, integrated pest management, organic farming, and integrated soil and water management (see also Appendix 8). But none of these have achieved breakthroughs in rural income growth similar to the Green Revolution technologies. As yield improvements in rice appear to have stagnated in most of Indonesia, and the relatively low price of rice does not provide enough returns to farmers, it becomes more important for farmers to improve farm management and acquire skills.

Role of the Rural Nonfarm Sector

Nonfarm enterprises present a viable alternative to farming for many marginal and landless farmers and rural families. These micro-scale agribusinesses and enterprises require no land resources and often little capital investment. All that is needed is a market, easily acquired business skills, and a willingness to work hard. Nonfarm enterprises can also provide employment and additional income for family members and dependents, and particularly women. The importance of nonfarm enterprises for the poor is described in more detail in Appendix 7.

Poverty Reduction Policies

Chris Dixon, in *Rural Development in the Third World* (1990), characterizes the rural poor as landless or having too little land, having too large families, malnourished, in poor health, uneducated, weighed down by high infant mortality and low life expectancy, earning too little or
irregularly, in a weak bargaining position, isolated through poor communication, preoccupied with survival, and indebted. Policies are needed to provide development opportunities for pro-poor agricultural and economic growth.

Broad-based economic policies to raise rural incomes are perhaps the most effective way to improve the quality of life for the largest number of people, but may not sufficiently improve the lot of the worst-off members of rural societies. Over and above efforts to raise incomes, there must be policies specifically for the poor (ADB 2001).

In Indonesia, in 2002, 69 poverty reduction programs with a budget allocation of Rp16,541 trillion were carried out by 17 government institutions (Nurmanaf et al. 2002). These programs focused on increased per capita income, access to public services, and social protection.

Most poverty eradication programs are managed at the national level. There is evidence that some of the distribution of food, inputs, finance, and welfare assistance has been subject to mismanagement and misuse, with only a limited percentage of poverty eradication funds reaching the poor.

While governments in other Asian countries have tried to increase expenditures on social services as a share of total expenditures, particularly during the Asian crisis, social expenditures in Indonesia have been declining (Figure A2.1).

Financial Pro-Poor Growth

Microfinance services have provided credit and savings opportunities at the local level through savings and lending groups, as well as sponsored microcredit programs. But moneylenders, whose rates are often not viable for microbusiness development, are still predominant in most rural areas. For pro-poor agricultural and rural development, a primary concern is how to link rural communities to the large liquidity in the formal banking sector through sustainable microfinance institutions (see also Appendix 7). Microfinance can have a large impact on poverty reduction. Moreover, without access to safe facilities for regular savings, poor families have few alternatives to saving cash. Microgrants and microcredit at commercial rates (3–4% per month) can cover the startup and working capital needs of low-income families diversifying into more profitable livelihoods.

For further details, consult www.adbi.org/Forum/microfinance/papera/Weiss and microfinancegateway.orgg/content/article
Information and Communication Technology (ICT)

The most important benefits of ICT are related to its ability to make critical information easily available and break down barriers to participation. ICT can also provide the management tools necessary for local governments to respond to demand-driven, location-specific requests for technical support services. For example, the Income-Generating Project for Marginal Farmers and the Landless (P4K) Small Farmer/Fisherman Income-Raising Program (funded by the United Nations Development Programme, the International Fund for Agricultural Development, and the Asian Development Bank [ADB]) has used ICT to link data on self-help groups directly to banking systems in more than 300 branches of Bank Rakyat Indonesia, a state-owned bank. This has reduced the transaction costs of lending to the poor and consequently increased outreach to poor families. The P4K program has reached almost one million families throughout Indonesia.

ICT has been effectively applied in many rural development contexts. The challenge is how to define clearly the role that ICT can be expected to play, where it could be most effectively applied, and what it can realistically be expected to achieve with respect to rural poverty.

In Indonesia, the removal of media controls has boosted the number of Internet subscribers and users—from 110,000 users and 31,000 subscribers in 1996, to about 8,000,000 users and 1,000,000 subscribers by 2002, and from 87 domains of Internet service providers in 1995 to 4,264 by 2000 (APJII 2000). However, there has been little Internet penetration in rural areas, in part because of low computer ownership and the high costs of connection in remote areas.

Other ICT tools in Indonesia are also underdeveloped and contribute to the low Internet penetration. The proportion of fixed phone lines, at only three lines per 100 persons, is low. On the other hand, the number of public payphones, teleshops (wartels), and Internet shops (warnets) has been increasing rapidly in recent years. However, Indonesia lags behind other Southeast Asian countries, especially Singapore and Malaysia, in diffusion rates of information infrastructure (Table A2.5).

Table A2.5: Diffusion Rates of Information Infrastructure, 1999

<table>
<thead>
<tr>
<th>Country</th>
<th>Fixed Phone Lines</th>
<th>Mobile Phones</th>
<th>Internet Users</th>
<th>Personal Computers</th>
<th>GDP/capita ($ 1998)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>2.91</td>
<td>1.06</td>
<td>0.19</td>
<td>0.91</td>
<td>605</td>
</tr>
<tr>
<td>Malaysia</td>
<td>20.3</td>
<td>13.7</td>
<td>6.87</td>
<td>6.87</td>
<td>3,333</td>
</tr>
<tr>
<td>Philippines</td>
<td>3.88</td>
<td>3.66</td>
<td>0.67</td>
<td>1.69</td>
<td>898</td>
</tr>
<tr>
<td>Singapore</td>
<td>48.2</td>
<td>41.88</td>
<td>29.45</td>
<td>52.72</td>
<td>21,413</td>
</tr>
<tr>
<td>Thailand</td>
<td>8.57</td>
<td>3.84</td>
<td>1.31</td>
<td>2.27</td>
<td>1,859</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>2.68</td>
<td>0.42</td>
<td>0.12</td>
<td>0.89</td>
<td>335</td>
</tr>
</tbody>
</table>

GDP = gross domestic product.
Source: ITU Telecommunication Indicators, www.itu.int/its/industryoverview/index.htm

In research funding for ICT, the Government also spends a very small amount compared with other countries in Southeast Asia (Depdiknas 2002). In 2000, ICT expenditures as a share of GDP were a low 0.6% for Indonesia, compared with 1.0% for India, 1.2% for Thailand, 1.5% for the Philippines, 2.4% for Malaysia, and 3.7% for Singapore (BAPPENAS 2003) (see also Figure A2.2 for per capita expenditures for the same time frame).

Ideally, ICT policies should encourage private sector investment, ICT infrastructure development, and the free flow of information, and make ICT affordable to the general public. Indonesian policy development is moving slowly in this direction. The telecommunication sector is gradually being privatized. In December 2002, the Government sold a further 41.9% interest in
PT Indosat for around $627 million. Related laws to provide a legal foundation for the ICT sector are in progress. Efforts have been made to provide connectivity in underserved areas.

Health and Nutrition Policies

Poor health is both a cause and consequence of poverty. Poor nutrition diminishes personal capacity, lowers productivity, and reduces earnings.

The mortality rate of Indonesian children under 5 years is below the global average for both boys and girls. But in 1995–2000, 9% of infants had a low birth weight, and 26% of children were below average weight (UNDP 2003). Malnutrition slows down the physical and mental growth of children, and, if widespread, can affect the intellectual potential of a country for generations. Malnutrition has become prevalent among Indonesian children in rural and urban areas following the Asian crisis. According to the SUSENAS survey of 2002, a third of the 24 million Indonesian children under 5 years are malnourished. Moreover, in access to safe drinking water, Indonesia’s coverage of 65% in 2000 was lower than Malaysia’s 90% and the Philippines’ 80% (BPS 2002b and ARIC/ADB 2003).

Figure A2.3 presents the evolution of the share of public government expenditures on health in total government expenditures for selected Asian countries. Public expenditures on health in Indonesia are comparatively low and declined in real terms during the Asian crisis. Total public sector health spending fell by 8% in 1997/98 and by a further 12% in 1998/99.

According to WHO (2003), out-of-pocket expenditures on health as a share of total expenditures on health in Indonesia were 76.3% in 2000, much higher than in neighboring countries such as Thailand, while general government expenditure on health accounted for the remaining 23.7%. Total expenditures on health as a share of GDP were 2.7%, or $19 per capita, compared with Thailand’s $71 per capita (at 2000 prices).

Government spending on health in Indonesia tends to favor the rich, mostly because a disproportionate share goes to curative care and hospitals, which are more often used by the rich, rather than to clinics and other service facilities on which the poor rely (World Bank 2001b). Community health insurance schemes are a promising tool to improve health and nutrition in the country, but most communities need government support to set them up. An example is the dana sehat system, which covered 13% of Indonesia’s villages in 1994 (Hsiao and Liu 2001). Health services must balance the opportunities for revenue with the desires of service users, especially the poor.
Education Policies

Education has strong direct and direct links to poverty reduction (Rosegrant and Hazell 2000). Individuals of school age usually obtain knowledge and skills through formal education, while nonformal education is more effective for adults. Poverty reduction therefore starts with proper formal education, particularly to provide basic knowledge to young people 6–14 years of age, and professional knowledge and skills up to the age of 24. Only a few can participate in professional educational programs. According to BPS (2003), 49.3% of 15- to 19-year-olds, and 89.4% of 20- to 24-year-olds are not attending school in Indonesia.

The vast majority of the poor in Indonesia have very little formal education: 93% have only elementary schooling. The illiterate are also often poor. Their employment opportunities are very limited. They often use their physical skills as farm laborers in rural areas, and as road and market cleaners and other manual laborers in urban areas.

Table A2.6 shows that in 2002, about 4% of the 15–24 age group in the rural areas was illiterate, compared with just over 1% in the urban areas. Illiteracy is much higher among older groups; almost 40% of those aged 50 and above in the rural areas and 22% in the urban areas are illiterate. Illiteracy levels have, however, been declining.

Table A2.6: Share of Illiterate Population Aged 10 Years and Above in Indonesia

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Urban Areas</th>
<th>Rural Areas</th>
<th>Total (Urban + Rural)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 – 14</td>
<td>0.69</td>
<td>0.64</td>
<td>2.14</td>
</tr>
<tr>
<td>15 – 24</td>
<td>1.47</td>
<td>1.23</td>
<td>5.37</td>
</tr>
<tr>
<td>25 – 44</td>
<td>13.43</td>
<td>10.60</td>
<td>39.66</td>
</tr>
<tr>
<td>45 – 49</td>
<td>7.24</td>
<td>6.03</td>
<td>19.12</td>
</tr>
<tr>
<td>50 and over</td>
<td>24.30</td>
<td>22.02</td>
<td>43.60</td>
</tr>
</tbody>
</table>


More than half of the urban unemployed attended junior high school and general senior high school. In the rural areas, more than 60% of the unemployed have only a primary or junior high school education. Moreover, in 1997–2002, the share of unemployed increased for those with less education, in both rural and urban areas. On average, unemployment was less among Indonesians with a senior high school or higher education. Thus, education does pay in terms of employment opportunities, even in rural areas. In addition, the share of unemployed with professional education, such as vocational training, is lower than the share of people with a general education.

Education is usually a household priority after food. Innovative education and skill development opportunities must be developed for the poor. Ongoing nonformal education programs for urban and rural industries and the informal sector should also be expanded. The absolute poor could find a niche for their skills and limited resources in the gaps between the core agriculture subsectors (food crops, livestock, estates, horticulture) and the nonfarm, microenterprise sector. Direct community grants for self-help learning and short-term apprenticeships have succeeded in some areas.¹

In the education sector, public expenditures fell by 41% between 1996/1997 and 1997/1998, but in 1998/1999 were back up, to 72% of precrisis levels. Total realized public spending on education declined both as a share of total government expenditures (from 9.2% in 1996 to 7.1% in 1998) and as a share of GDP (1.4% in 1996 to 1.3% in 1998) (ARIC/ADB, 2003). Compared

¹ ADB. Participatory Approaches to Sustainable Income Generation (PASIG) TA 3313/4 (2001); and Microaid.net.
with other countries in Southeast Asia, Indonesian public expenditures on education are very low and declining (Figure A2.4).

In 2004, the Government allocated Rp15.3 trillion for education, or 3.49% of the state budget of Rp439.8 trillion, slightly more than the Rp12.8 trillion allocated in 2003. But the Education Law of 2003 requires the Government to set aside at least 20% of the state and regional budget for education.

The formal education system provides basic knowledge but does not teach skills required on the job. Recently, the Government increased the number of vocational schools. Their curriculum has been adjusted to suit the needs and demands of the industries that will absorb their graduates. So far, however, graduates outnumber job offerings in the industrial and manufacturing sectors. Universities also offer diploma programs to produce professionals rather than scientists, and often enter into partnerships with the private sector. The most common activities of these partnerships are industry internships, usually for one semester, to provide students with practical work experience and skills. The partnership programs benefit all concerned. Students, besides practicing their knowledge, have a better chance to land a job after their course. Universities get practical facilities and instructors for practical works, allowing them to narrow the gap between theory and practice. Industries get relatively cheaper personnel while gaining access to the latest research and innovations.

In other types of partnership programs, industries provide visiting lecturers to universities, university lecturers (and later students) advise industries, and industries lend facilities to universities for practical teaching.

The internship programs offered by small- and medium-sized enterprises (SMEs) are another opportunity for those seeking work to acquire skills and possibly find employment with the SMEs or start their own business.

Population Growth

UNDP reports show that, since 1970, developing countries with lower fertility and slower population growth have had higher productivity, more savings, and more productive investment, leading to faster economic growth. In Indonesia, the fertility rate declined from 1990 to 2002 except in 1996–1997, while GDP increased rapidly up to 1995, but then declined during the Asian crisis. The success in reducing fertility in Indonesia was due to the family planning campaign, which changed the way of thinking at the community level. But family planning has taken a back seat since the phaseout of the Board for Family Planning several years ago.

The downturn in fertility translates within a generation into a large group of working-age people supporting relatively fewer older and younger dependents. Table A2.7 provides selected population indicators for Indonesia compared with indicators for Southeast Asia and the world.
Focus on Rural Women

Data from BPS (BPS 1996 and 1998) show that women’s participation in the labor force was 58.03% in 1994 (versus 72.01% for men) and 58.97% in 1998 (72.65% for men). Studies done in West Java Batik Industries, which has a mixed workforce, concluded that the work shifts and wage system discriminated against women. Men tended to be employed in “modern” forms of employment, such as drying and painting activities, and received higher wages than women, who tended to work in the more traditional activities, such as wax painting. In tobacco factories, where men are responsible for the mechanical process of producing tobacco, mechanization in effect decreased the role of women.

The trade and services sector provides good employment opportunities for women who have been displaced from the rural sector and have not been absorbed into the industry sector. But the sector typically requires skills, capital, or suitable equipment. Rural women tend to be unskilled, poorly educated, burdened with household responsibilities, and without access to working capital. To have a chance to succeed, rural women need targeted training programs and guidance.

Many women’s programs and projects are based on the belief that women are housewives and have spare time. Very few programs consider the fact that many women, especially among the poor, must work to make a living and have very little free time. Women are involved in planting, weeding, and harvesting in the fields. In many irrigation areas, women manage the water because their husbands have gone to the city to find other jobs. Women also have to take care of other activities around the house, like gardening and chicken breeding.

Investments in Rural Infrastructure

Investments in rural physical infrastructure are important for pro-poor growth, particularly in remote areas. Appendix 7 gives details on the role of rural infrastructure in economic development.

Safety-Net Programs

These programs either transfer income directly or attempt to generate income, to protect a person or household against chronic incapacity to work and earn (chronic poverty) or against a temporary setback, such as a poor harvest or cuts in public spending, limiting the capacity to work and earn (transient poverty). Safety net programs include food subsidies, public works programs, and credit for the poor.

Untargeted food and other transfer programs require large subsidies and have proven to be fiscally unsustainable, as they create explicit tradeoffs against investments for growth. Targeted

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5 Ibid.
approaches to food subsidies are more cost effective but politically infeasible and administratively difficult to run in countries where poverty is prevalent and households in need are difficult to separate from those that are not or are less so. Moreover, targeted systems often create disincentives to work and cause other kinds of consumption distortions. Approaches that impose an obligation on the recipient (such as a labor or time requirement) are best in screening out the non-needy. But such obligations should not be so onerous that they significantly increase transaction costs. In general, support for the poor should have minimal distortions, involve local communities, and take a demand-driven approach. Food transfers to women and children, along with other services (such as immunization), are promising but administration intensive.

Unlike cash and in-kind transfers like food subsidies, income generation programs oblige the recipient to exchange labor time for income. Two such programs have been used widely: labor-intensive public works and credit-based self-employment (livelihood) programs. Public works programs provide mainly current benefits and in most countries offer only temporary employment during the off-season. But they can also have long-run benefits if they build assets (savings, physical capital, skills, health, or infrastructure) owned by, or providing future employment income to, the poor.

The Government of Indonesia, with help from many international financial institutions, including ADB and the World Bank, has implemented poverty reduction programs, particularly after the Asian crisis. These social safety net programs (jaring pengaman sosial) are intended to ensure the availability of food at affordable prices for the poor, create employment, and give the poor access to critical social services such as health and education.

Besides the national programs, there are also regional poverty reduction programs like the Integrated Swamp Development Project in Riau and the Animal Husbandry System Development in East Nusa Tenggara.

Overall, the safety net programs have had mixed results. Many target groups have been largely missed by the programs (SMERU 1999). The food security program of 1998, for example, was created to maintain sufficient national food stocks and provide cheap basic necessities to the poor through a special market operation. But in most districts, the coverage of the poor was less than 50% (SMERU 1999).

A social safety net program in the health sector in 1998–2002 had the objective of improving the health and nutrition of poor families, and ensuring that the poor had access to the medicines they needed. As reported by SMERU (1999), the coverage of the free medical services program for the poor was quite low.

Emergency short-term employment programs have been designed as part of the Government’s social safety net strategy for those sections of society that were worst affected by the economic crisis. These labor-intensive (padat karya) programs typically target urban areas, as well as some rural areas that have experienced harvest failures. The community fund program, District Empowerment in Alleviating the Impact of the Economic Crisis, is an ambitious program that attempts to deliver large amounts of assistance to nearly every region of the country in a very short time.

In 2003, as a reflection of the priority accorded by the Government to poverty reduction, the President proposed that the state budget for health and education be used more efficiently to eradicate poverty. The banking sector has also been asked to gear lending to micro-, small, and medium enterprises. To this end, Rp20 trillion in loans will be distributed through 14 banks in Indonesia.

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6 Funded by ADB-Loan 1623 and 1676 INO.
Community Poverty Reduction Programs

Many poverty reduction programs are managed by the communities themselves, with or without government assistance. The *Karya Usaha Mandiri Wanita Tani* (KUM-WT) in South Sumatra, established in November 1998, is targeted at women farmers. Credit for productive activities is given to members without collateral. Each member must save about Rp200–250 weekly and put the savings into the group saving fund (*dana tabungan kelompok*, DTK). A borrowing member must save about 5% of the amount of the loan and put it into the DTK. The interest, or administrative fee, is 1.00–1.25% per month, or 12–15% a year. The DTK, the voluntary saving fund, and administrative fees compose the capital of the KUM-WT. After about 2 years of existence, membership and savings had significantly grown, while unpaid loans remained few, indicating the increased trust of the community in KUM-WT.

Role of Community Development in Poverty Reduction

Village-initiated projects in Indonesia have been more successful than government-sponsored projects, particularly in maintaining facilities and generating community satisfaction. Rural communities have the potential to implement projects that meet their needs. The two main types of community organizations are those that obtain their legitimacy primarily from government, and indigenous (*adat*) organizations and religious institutions, which get their legitimacy from community practices and community support. Both types of institutions are involved in planning and implementing development activities, the former with government funds (often with obligatory community contributions) and the latter with community funds. In West Sumatra, most institutions (both government and nongovernment) gained legitimacy in the community by being managed by *adat* leaders.

Consistent with the new climate of reform (*reformasi*) and decentralization (*desentralisasi*), ADB and the Directorate General of Rural Community Development in 1999 arrived at a working definition of community development that sees the village, subdistrict, district, provincial, and national governments as more of facilitators, providing services rather than instructions, guidance, and supervision.

On average, each Indonesian village has 30 local institutions, 14 of them government initiated and 16 community initiated (Figure A2.5). Differences in social history dictate group preferences. In traditional societies like the Jangkat Subdistrict in Jambi, customary institutions are most important. In societies that are still traditional but with more outside influence, like other parts of Jambi, religious groups are often the most important community institutions. In regions like Central Java, where interaction with outsiders is extensive, savings groups represent binding patterns of interaction. Also important in Central Java and, to some extent, in East Nusa Tenggara are neighborhood groups, the locus of much collective action.

A study of development projects carried out by the affected communities themselves found that villagers participated in only 12% of government projects before 1998, and only 37% declared themselves satisfied with the projects. After 1998, participation increased to 22%, and satisfaction with the projects went up to 50% (Wetterberg 2002, cited in Atlatas et al. 2002).

![Figure A2.5: Village Institutions in Indonesia](source: World Bank/BAPPENAS (1998)).
Community Funding

More than three fourths of community projects are funded through public collections (World Bank/BAPPENAS 1998). A study of 833 villages by the Ford Foundation in 1999 found that 38% of the projects implemented were initiated, funded, and managed by village communities without outside help. Furthermore, contrary to popular belief, these projects were mostly nonreligious and involved the construction of public facilities, infrastructure, and credit.

About 21% of community projects receive full or partial support from the village government funds (bandes), but only a small part of these funds reaches the communities. Communities in villages with strong organizing capacity or efficient village governments have better access to the funds (see Table A2.8).

<table>
<thead>
<tr>
<th>Funding/Project Source</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Source of Funds</strong></td>
<td></td>
</tr>
<tr>
<td>Public Collection</td>
<td>75</td>
</tr>
<tr>
<td>Village Government Funds</td>
<td>11</td>
</tr>
<tr>
<td>Combination of the Above</td>
<td>10</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
</tr>
<tr>
<td><strong>Source of Projects</strong></td>
<td></td>
</tr>
<tr>
<td>Government</td>
<td>53</td>
</tr>
<tr>
<td>Village/Community</td>
<td>38</td>
</tr>
<tr>
<td>Nongovernment Body</td>
<td>7</td>
</tr>
<tr>
<td>Private Sector</td>
<td>2</td>
</tr>
</tbody>
</table>


Remaining Problems for Community Development

The main threat to community development and village autonomy comes from outside the communities, from the state, and from district elites (Antlov 2003). Concepts like “local wisdom,” “village autonomy,” and “customary values” are often used naively. In fact, such concepts could mask highly patrimonial and authoritarian government structures (Benda-Beckmann et al. 2001).

The effectiveness of village governments is often weakened by lack of real autonomy. Villages have little control over financial resources from outside the village. The use of bandes and targeted credit from the public sector (bantuan langsung masyarakat) is determined by central, provincial, and district regulations and villages do not receive the full amount. Villages are in a weak position when it comes to the implementation of government-initiated projects in the village. Regulations and local government policies still favor outside contractors over implementation by locals (swakelola).

Lessons Learned and Recommendations

Poverty reduction is a difficult challenge, as it is interlinked with social, economic, and environmental systems. Breaking the cycle of poverty requires a deep understanding of its root causes. To speed up agricultural and rural development, Indonesia must first find out the root causes of slow development.

Infrastructure Investment in Remote Areas

When rural infrastructure is run down or nonexistent, the cost of marketing farm produce can be prohibitive for poor farmers. Poor rural infrastructure also limits the ability of traders to travel to and communicate with remote farming areas, thus restricting the market access of
these areas and reducing competition for their produce. Rural roads almost inevitably lead to higher agricultural production and productivity by bringing new land into cultivation and/or by intensifying existing land use. Besides facilitating agricultural commercialization and diversification, rural infrastructure, particularly roads, consolidates the links between agricultural and nonagricultural activities in rural areas and between rural and urban areas and integrates the rural poor into the broader economy.

**Importance of Microfinance**

Evidence has shown that the poor typically repay their debts. P4K, which has lent more than $50 million to poor families throughout Indonesia, has repayment rates above 95%. But for microcredit to help eradicate poverty, it must go to profitable enterprises. Aid to the poor must be monitored and must be community based. Grant money without guidance and local family decision making is mostly wasted. The primary concern of the poor is to have an opportunity to work that fits their skills and resources.

Microfinance programs that have succeeded in reducing poverty provide pilot testing grants and microcredit through a bank at low interest rates for initial business activities of the poor in rural areas; take a group approach to lending, to promote participation in the program; use group dynamics to motivate borrowers to make their businesses succeed and repay their loans, and have recourse to the group in case individual borrowers fail to pay back their loans; rely on the target groups to select their business activities; and encourage thrift on the principle that compulsory saving, provided it is affordable to the poor, is the best way for them to build group capital for group activities.

**Better-Targeted Poverty Reduction Programs**

During the New Order regime, implemented by President Soeharto beginning in 1968, poverty eradication programs were aimed at improving crop productivity, particularly of rice, in the expectation that it would raise the incomes of rural people and reduce poverty. This strategy was successful in reducing poverty from 40.1% in 1976 to 11.3% in 1996.

Targeting poor areas remains a challenge: Better off or politically favored subdistricts tend to be favored. Inefficient management of program targeting to poor families results in considerable leakage to nontargeted families, high administrative overhead, and waste of institutional resources. Participatory planning by local communities can best achieve collaboration between stakeholders in poverty eradication. Poverty eradication policies and programs must be thoroughly monitored and evaluated, and both successes and failures shared through local ICT networks.

Providing community funds alone, without enough preparation, guidelines, phasing, and monitoring, is ineffective. Programs with strategic alliances between complementary institutions that provide win-win local synergies (like the P4K Rural Income Generation Project) can be sustainable over a long period. In remote, underdeveloped areas, infrastructure investments, particularly rural roads, appear to be the most effective intervention. Microfinance services should promote savings first as a proof of the viability of the microenterprises and as insurance against emergency high-cost borrowing. Local communities demand programs that give employment opportunities to less skilled and unskilled workers (like the Food for Work Program).

Poverty reduction policies are part of the plans of all ministries. Annual budget allocations are large, but they are generally uncoordinated and not well targeted to poor households. There are as yet no signs that centrally designed and funded poverty reduction programs have become more effective as a result of decentralization and regional autonomy. The central Government is making renewed efforts to eradicate poverty, but it does not have the enthusiastic support of local governments. The coordination ministry has no way of controlling or monitoring the poverty
reduction interventions of the line ministries. Fragmented, inefficient, and inadequately targeted programs, if allowed to continue, do so at a huge cost to society.

The P4K method is considered highly appropriate for empowering poor villagers. But even this program must be tightly monitored and managed during implementation, so that the agreed upon stages of guidance are all carried out in the field.

In addition, the beneficiaries of poverty programs must be involved from the planning stage. A balance must be struck between sector and region, with more decentralization.

Better Communication and Information in Rural Areas and Linkages with the Nonfarm Sector

Marketing services and access to information are vital for Indonesian rural development. Access to information can be provided through ICT policies, improved rural infrastructure, and the distribution of electronic and printed media.

ICT can be a powerful tool for economic and social development, as it tends to diminish constraints of time and distance. With ICT, many activities can be located outside traditional production centers, and a wide range of public services can be efficiently delivered to sparsely populated or remote areas. But successful deployment requires infrastructure, human resources, and relevant content. Those prerequisites are not well met in Indonesia, and to overcome such suboptimal conditions, well-designed policies to encourage the use of ICT for human development become important.

The e-government initiative, while commendable, is still far from being feasible in Indonesia. It needs substantial financing, technology, and public acceptance. Infrastructure and human resources for ICT development are currently limited, and the Internet penetration is low. Besides, ICT investment, unclear in its goals, involves high capital costs to the Government.

Continuing to deploy ICT infrastructure and services preferentially in areas with the most important and receptive customer bases would exclude many rural citizens and businesses from the Information Society and the New Economy for a long time, and probably worsen the economic difficulties. Proactive, specific policies are needed to surmount the obstacles to achieve large-scale rural ICT diffusion.

Investment in Agricultural Productivity

The Government and farmers should invest in agricultural productivity and cash-crop diversification for export. Developing location-specific seeds and soil nutrient strategies to generate high yields under local conditions will stimulate local investment. See also Chapter 1 for details.

Need to Refocus on Community Development and Management

Village-initiated projects in Indonesia have been more successful than government-sponsored projects, particularly in maintaining facilities and generating community satisfaction. Therefore, in line with decentralization, local communities themselves must take part in identifying community needs and in planning, implementing, monitoring, and evaluating poverty eradication programs to ensure useful and sustainable programs. Because many communities are inexperienced in planning and implementing such programs, capacity building, particularly in bottom-up planning, leadership, and program/project management, should be intensified.
Increased Acknowledgement of the Importance of Rural Women

Women participate less in groups involving assistance from government agencies, because access to external resources to a large extent happens through government-initiatives whose members are usually household heads. A gender analysis framework should be used to plan women’s activities and programs more effectively and to integrate women into the mainstream of rural development. The importance of nonfarm enterprises for poor women is discussed further in Appendix 7.

Increased Investments in Education and Health

The Government should spend much more on education and health. Adult literacy programs are important because of their indirect effects on poverty reduction. To make the learning group programs more attractive, they should be tied to economically beneficial activities such as enterprise learning groups for the target audiences.

Partnerships between educational institutions and industries are promising, both for reducing the number of the unemployed, and thus reducing poverty, and for building a reliable, skilled local labor force. These partnerships need to be intensified.

Community Assistance Facilitation Centers

Community assistance facilitation centers (CAFCs) are village facilities where communities, particularly small farmers and the poor, can have access to services or assistance not otherwise available to them. CAFCs can facilitate capacity building and learning among the rural poor, facilitate access to rural finance, identify and provide links to sources of financial and other support for communities and enterprises, promote partnerships between small farmers and agroprocessors and the formation of rural industrial clusters, and provide a forum for consultation and dialogue between communities and the Government and other institutions.

Rural Employment Safety Net

Communities should create a rural employment safety net in their area. Funds for such programs should go directly to the poorest subdistricts. Community-based organizations should register and monitor employment levels among low-income families. Targeted areas should be supervised and their results reported to local parliamentary bodies by local government, the private sector, and NGOs.
APPENDIX 3
Diversification of Agriculture

The Indonesian economy has experienced major changes in the last three decades, transforming from a predominantly agricultural economy into one that relies more heavily on its nonagriculture sectors (Martin and Peter 1993). In the agriculture sector, high-value products (HVPs) like estate crops, livestock, fisheries, and fresh fruits and vegetables (FFVs) have increased their contribution more rapidly than staple crops, making the sector as a whole more diversified. On the demand side, where Indonesians used to eat mostly rice, cassava, and maize, they now consume much more fruits, fish, meat, dairy products, and processed foods (BPS 2006b). The shift in consumption has been driven by rapid income growth and urbanization, and concomitant changes in lifestyle. By 1999, 40% of Indonesians lived in cities, and by 2020, more than half of the population is expected to be urban (Edwards et al. 1995).

Structural Changes and Diversification in Indonesian Agriculture

Trends and structural changes in food supply and demand in Indonesia are described in Chapter 1. This appendix focuses on the recent diversification to HVPs, particularly estate crops, livestock, fisheries, FFVs, and floriculture products.

Diversification to High-Value Products

Estate Crops

In 2002, the major estate crops in Indonesia, in production volume, were oil palm, coconut, rubber, cocoa, sugarcane, coffee, cashew, and pepper. Among the top five estate crops, the fastest-growing in 1990–2002 were oil palm (11% annual growth) and cacao (10% annual growth) because of market demand combined with smallholder access to new technologies. A favorable exchange rate helped through the crisis period. Pepper and sugarcane, on the other hand, had very low growth.

Estate crop productivity has varied substantially by type of holding and crop. For oil palm, productivity increased continuously in state-owned companies in 1971–2002, but fluctuated in private estates and then declined from the late 1980s. In smallholder estates, productivity was low at the start but has since surpassed the productivity attained in privately owned large estates.
With few exceptions, like oil palm and sugarcane, smallholders have dominated estate crop production. The average share of smallholders in total oil palm area was 0.12% in 1971–1980 but increased to 13.8% in 1981–1990 and to 30.1% in 1991–1996. Similarly, in cacao production, the share of smallholders was 33.6% in 1971–1980, 51.5% in 1981–1990, and 70.0% in 1991–1996 (CBS, various years). For some crops like coconut, coffee, cashew, and pepper, smallholders have traditionally accounted for 90% or more of total area.

Livestock

In 1985–2001, significant changes took place in the Indonesian meat industry. Meat production doubled between 1985 and 1995, driven by broiler production, followed by beef. Broilers increased their share in total meat production from 16% in 1985 to more than 40% in 1995. The contribution of water buffalo decreased, both in absolute terms and in relative importance, to less than 3% of production by 2001. Despite the commercialization of poultry production, native chickens remain an important source of meat in Indonesia, contributing more than 18% to total meat production. Swine contributed less than 6% to total production in 2001.

The financial and economic crisis of 1997/98 significantly hurt the livestock sector. Except for Bali and Nusa Tenggara, total meat production in all the other islands had not reached the precrisis level in 2001.

Fisheries

The fisheries sector in Indonesia is highly dynamic. In 1970, total production was 1.2 million tons, or 10 kilograms/capita. From 1970 to 1995, production increased by 5.1% yearly to 4.3 million tons, or 22 kg/capita, more than double per capita availability in 1970. During the Asian crisis, growth in fish production slowed to 2.6% per year (1996–1999).

The contribution of marine fisheries increased over time, from 66% of total fish production in 1970 to 80% in 1999.

In the inland fisheries subsector, growth was mostly in aquaculture, which expanded by 6.6% annually in 1970–1995, while the share of inland open water fisheries declined from more than 23% in 1970 to 7% in 1999. In 1995, fish production contributed 1.7% to gross domestic product (GDP) and involved about 2 million households. By 2000, the sectoral contribution had improved slightly to 2.3% and 2.02 million households, or 4% of all Indonesian households. Moreover, the value of fish exports accounted for half of total agricultural exports and 3% of the total value of exports in the late 1990s (Figure A3.1).

Fresh Fruits and Vegetables

FFVs are part of the food subsector. Their contribution to overall agricultural production has been increasing rapidly over time. Fruits (mango, orange, papaya, pineapple, and others) and vegetables (cabbage, chili pepper, potato, tomato, and others) all grew by more than 5% annually over the last 15 years.

Between horizontal expansion, through an increase in area planted to HVPs, and vertical expansion, through an increase in yield, vertical expansion seems to have contributed more to increased FFV production. While the correlation coefficient between growth in area and growth in production for the period 1970-2000 is 0.315, the correlation coefficient between growth in yield and the growth in production for the same period is 0.797. However, despite rapid increases in yield, productivity was lower than in other countries. In 2000, the average tomato yield was 12.1 tons per hectare (ha) in Indonesia, 22.6 tons/ha in Thailand, and 69.2 tons/ha in the United
States (FAO, various years). Therefore, there is scope in this subsector for vertical expansion without competing with other products for horizontal expansion.

Cut Flowers

Information on floriculture production is relatively scant. According to ASBINDO, the association of floriculturists, there were about 100 growers in 2003, 35% of whom were “large” growers and the rest “small” growers (with farm sizes ranging from 0.1 ha to 0.4 ha). Small growers usually build traditional greenhouses with an investment of only $1,000/ha, while large growers build modern greenhouses with an investment of about $100,000/ha. Floriculture production in Indonesia is concentrated on the mountainsides of East and West Java, Bali, and Sumatra.

Employment turnover in floriculture is around 10 times that in rice production. The wage rate is lower in floriculture, but employment is year-round. Unlike the generally male-dominated crop agriculture, where the ratio of male to female employees in 1999 was 60:40, the ratio for floriculture that year was roughly 50:50. But floriculture is much more capital-intensive than rice, and large-scale production requires investment in modern greenhouses.

Domestic demand for cut flowers in Indonesia has been growing by 15–20% yearly. World demand for floriculture consists of flowers (55%), followed by decorative leaves (40%) and orchids (5%). Domestic demand in Indonesia consists of decorative leaves (60%), followed by orchids (25%) and flowers (15%). Flowers in Indonesia are used mostly in wedding parties, and also in hotels and restaurants.

Trade in High-Value Products

Figure A3.2 presents total HVP trade in 1984–2002. In the 1980s and 1990s, estate crops dominated trade in HVPs. Trade in fisheries products picked up in the late 1980s and continued to grow, and, because of a stable international price, did not fluctuate from year to year, unlike trade in estate crops. Similarly, FFV trade increased from the late 1980s. Noticeably, despite a production boom, trade in livestock was insignificant in the last two decades. Similarly, trade in floriculture remained flat; but this sector was smaller than the other HVP sectors.

From 1984 to 2002, net trade in HVPs was highly correlated with total trade for the two most important categories, estate crops and fisheries. However, unlike estate crops and fisheries, net trade in FFVs changed from deficit in the mid-1980s to surplus in the early 1990s, and back to deficit in the late 1990s. For livestock products, net trade was again highly correlated with total trade, but, unlike estate crops and fisheries, it was always in deficit. In contrast, floriculture maintained a trade surplus, although very small.

Net imports of livestock products were increasing in the early 1990s, but then declined in 1998 during the economic crisis. With economic recovery, net imports of these products are once

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1 Most of the information in this section came from ASBINDO, an association of floriculturists who produce and sell flowers and ornamental plants. A meeting with ASBINDO officials on 8 September 2003 in Jakarta was part of a rapid reconnaissance survey done for this study.

again increasing. If domestic animal production does not improve, the increase in imports is likely to be rapid.

There has been a change in the relative contribution of the various subsectors to total agricultural production. All five subsectors examined here—estate crops, livestock, fisheries, FFVs, and floriculture—grew faster than cereals in the 1980s and 1990s and contributed to increased diversification in food production, particularly before the economic crisis. However, agricultural diversification overall was slow, in both products and regional concentration, and within each subsector, growth was driven by a few products. For instance, oil palm drove the growth in production and export earnings in the estate crop subsector, and growth in broilers largely drove the growth in livestock production.

Similarly, Java contributed more than 60% of major food crops, livestock, and floriculture production.

There is major scope for increased productivity in estate crop production, both by smallholders and by large holders, since productivity in publicly owned enterprises is higher than in the private sector.

Although the currency crisis was devastating in many respects, it also opened up opportunities for agricultural exporters, and export earnings increased for several commodities. However, for FFVs and fisheries, exports did not pick up immediately after the crisis. One reason, according to an exporter interviewed, is the high freight costs for Indonesian FFV exporters compared with the costs for exporters from neighboring countries like Thailand.

The potential for fish exports remains high because of high external demand. The reasons behind the stagnation in inland open water fisheries must be examined. Exports grew by double digits before the economic crisis and could expand further. A noticeable feature of Indonesian fish exports is that their volume and value grew at almost the same rate, implying that the international price has been stable.

Moreover, although the world floriculture market has reached maturity, there is scope for Indonesian producers to increase their market share. Large-scale enterprise development is an option. However, the small domestic market; high interprovincial taxes resulting from decentralization; and high import tax on seeds, plants, fertilizers, and pesticides for floriculture are constraints.

Both total trade and net trade are dominated by two subsectors, estate crops and fisheries. While trade in estate crops and fisheries is driven by external demand, trade in livestock is driven by domestic demand. Net imports of livestock products have been increasing since 1990. Trade in FFVs is driven by both internal and external demand.

**Diversification Factors and Constraints**

This section empirically examines important factors favoring diversification, particularly of FFVs. The selection of products was dictated largely by the availability of time series data at the province level. The transaction costs that constrain diversification will then be reviewed.

Several factors account for the relative decline of agriculture as economies develop. These factors include (i) the relatively low income elasticity of demand for food (Schultz 1953); (ii) slower technological progress in agriculture than in the nonagriculture sectors (Chenery et al.
1986); and (iii) the different rates of capital accumulation in agriculture and the nonagriculture sectors, such that capital-intensive nonagriculture sectors gain a greater share in total output, while the relatively labor-intensive agriculture sector gets a reduced share.

Similar factors apply in Indonesia. For example, the decline in future rice consumption is thought to be mainly the result of the negative response of per capita income to the quantity of rice consumed (Table A3.1). For vegetables, on the other hand, income elasticity has remained very high, declining only marginally (0.60 to 0.55 in urban areas, and 0.89 to 0.74 in rural areas), and in the case of fruits, it increased from 1.56 in 1981 to 1.82 in 1993 (Widjajanti 1996).

Martin and Peter (1993) note that in 1960–1987 technological change in Indonesia was biased toward the agriculture sector, and that factor accumulation was highly important. These two factors, high income elasticity of demand for food and agriculture-biased technological change, along with other factors, should have important consequences for the production of HVPs in Indonesia.

### Table A3.1: Price and Income Elasticity of Demand for Rice in Indonesia

<table>
<thead>
<tr>
<th>Variable</th>
<th>Elasticity</th>
<th>Change in Elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Short Term</td>
<td>Long Term</td>
</tr>
<tr>
<td>Own Price</td>
<td>-0.0132</td>
<td>-0.0257</td>
</tr>
<tr>
<td>Maize Price</td>
<td>0.0762</td>
<td>0.1478</td>
</tr>
<tr>
<td>Income</td>
<td>-0.1479</td>
<td>-0.2870</td>
</tr>
</tbody>
</table>


### Diversification Factors

At a given point, both demand-side and supply-side factors contribute to agricultural diversification to HVPs (Pingali and Rosegrant 1995, Joshi et al. 2003). Typical demand-side factors are lifestyle and dietary changes in the population at home and abroad due to changes in income and taste. On the supply side, important factors are the relative profitability of HVPs compared with traditional alternatives, factor endowments, and the rate of technological change. However, since the HVPs considered in the case of Indonesia are perishable, rural infrastructure and institutions can also play a significant role. As in earlier studies in a similar setting (Joshi et al. 2003), all these factors will be considered here.

#### Lifestyle and Dietary Changes

GDP per capita in Indonesia grew by more than 5% yearly for more than two and a half decades, from $298 in 1970 to $1,113 in 1996 (World Bank 2003). During this period, urbanization was also remarkably rapid at 5% yearly, and the share of the total population living in urban areas doubled from 20% in 1976 to 40% in 1999 (World Bank 2003). By 2020, more than half of the population will be urban (Edwards et al. 1995).

As income and urbanization have rapidly increased, food consumption patterns have changed. Indonesians used to eat primarily staple foods like cereals and cassava; now fruits, fish, meats, dairy products, and processed foods have a larger share in the diet. This shift can be attributed to higher incomes, greater urbanization, and concomitant changes in lifestyle.

Figure A3.3 shows the share of cereals, high-value foods, and prepared foods in the monthly food expenditures of urban and rural consumers from 1978 to 2002. As expected, Indonesians in both urban and rural areas have been spending less on staple foods and more on prepared foods. During the same period, average real expenditures for food increased from Rp4,313 to Rp11,470, or by 3.3% yearly, in rural areas; and from Rp13,530 to Rp28,950, or by
2.6% yearly, in urban areas. The changes in food demand are expected to have a positive effect on the production of HVPs. In addition, urban residents tend to spend more on all categories of food (other than staples) than rural residents, and the difference in expenditure is especially large in the case of meats, dairy, and prepared foods. Therefore, any increase in urbanization implies an increase in the aggregate demand for these HVPs.

**Relative Profitability**

However, an increase in urban demand for HVPs by itself will not lead to diversification toward them. Prices and profitability must also be considered. In fact, producer prices determine the type and volume of agricultural products. Whether or not a producer will diversify to HVPs depends on the present and expected prices of the products and their relative prices, among other things. From 1981 to 1995 there was a general increase in the prices of all FFVs.

Table A3.2 presents the prices of selected FFVs relative to the price of rice during the same period. Rice was chosen as the denominator because of its importance in Indonesian agriculture and diets. In contrast to the absolute price increase, which was 10% or more yearly, the relative prices of FFVs compared with rice did not dramatically increase. In fact, of the eight FFVs selected, four declined in relative price on an annual basis (last column of Table A3.2). Four products that increased in both relative and absolute price were chili pepper (green), mango, papaya, and orange.
Given profitability, the other important supply-side determinant of HVPs is the rate of technological change in agriculture and factor endowments. Since technological change influences a factor's productivity, the rate of technological change and the availability of factors are interlinked. If tractors per 100 ha of arable land were taken as a proxy for technological change in agriculture, it is evident from Figure A3.4 that, until the financial and economic crisis, agricultural mechanization was progressing rapidly, particularly in the late 1980s and early 1990s. The number of tractors per 100 ha of arable land was 0.05 in 1970, 0.14 in 1990, and 0.4 in 1996 before the crisis. Since arable land also increased during this period, there was definitely a move towards mechanization.

Though not shown in Figure A3.4, most of the growth in the tractor population was due to a rapid increase in the use of two-wheel tractors, which are used mostly by small farmers. The total number of two-wheel tractors increased from less than 1 million in 1985 to more than 6 million in 1996. And despite the crisis, which slowed down overall mechanization, the number of two-wheel tractors continued to grow and reached more than 9 million by 2000. Mechanization should free up labor for the production of labor-intensive HVPs.

Rural Infrastructure and Institutions

In HVP agriculture, rural infrastructure such as electricity, roads, and telecommunications has an important role (see also Appendix 7 for the role of infrastructure in rural nonfarm development). Since HVPs are perishable, they require expensive storage facilities, reliable communications, and speedy transfer. Rural infrastructure can facilitate all these. Other important factors are institutions like modern vendors and supermarkets. As Appendix 6 shows, a major change in the retailing industry in Indonesia is the emergence of modern supermarkets. However, data for supermarkets at the province level are not available. Therefore, they are not part of the empirical analysis that follows.

Empirical Evidence

Regression analysis was used to show the impact of demand-side and supply-side factors on the diversification of Indonesian agriculture to HVPs. Fixed-effects and random-effects models were estimated in a panel of cross-section time series where provinces represent the cross-section.

The provinces of Indonesia vary in factor endowments and hence specialize in different agricultural products. Therefore, it is assumed here that the differences between provinces can be captured in the constant term. The random-effects model, on the other hand, assumes that the differences between provinces are mere parametric shifts.

For the empirical analysis, data on all the provinces from 1980 to 2000 were gathered from the Central Bureau of Statistics. The availability of long-time series data on the variables...
required for the analysis determined the inclusion of any province. The data set contained information on supply-side indicators like relative profitability (relative price), agricultural mechanization (land-tractor ratio), and state of rural infrastructure (land-rural road ratio). For demand-side indicators, urban food expenditures were used.

For the dependent variable, the yearly province-level production area (in hectares) for orange, pineapple, and shallot was chosen. The production area for individual products was expressed as a ratio of total area planted to major and other agricultural products. Though a proper diversification measure would include a well-constructed index, the production of individual products was chosen, because production data could not be obtained on a sufficient number of products measured with a common denominator. It was assumed that the production data on HVPs were a good proxy of the diversification to HVPs.

The first explanatory variable was the relative profitability measured as a ratio between the price of a particular product (e.g., price of oranges per kg) and the price of unhusked rice. All the prices were farmgate prices collected at the province level. The price of unhusked rice was chosen on the assumption that farmers decide to diversify to HVPs if these are more profitable than rice. Besides, data on the price of unhusked rice was readily available.

The other explanatory variables in the analysis were urban food expenditures, agricultural mechanization, and rural infrastructure. For urban food expenditures, yearly urban consumption at the province level, in constant rupiah, was chosen. For agricultural mechanization, the chosen proxy was the number of tractors over the total area in hectares planted to major and other agricultural products. Since the HVPs considered here are perishable, the length of rural roads was included as a proxy for the development of rural infrastructure. Other studies have found that rural roads are highly correlated with other rural infrastructure like electricity and telephones (Chowdhury 2004).

To take the shock of the Asian crisis into account, the data were divided into two periods: before the economic crisis (from 1980 to 1996), and after the economic crisis (from 1997 to 2002). Table A3.3 gives the values of the estimated coefficients along with their respective standard errors.

Before the results are described, two important caveats must be mentioned. First, for lack of data, institutional factors like changes in the retailing sector and vertical integration (see Appendix 6) in agriculture could not be taken into account. Second, the results should be taken with caution because of the limited number of observations and the use of less than perfect proxies.

Regarding the impact of price response on the increased supply of FFVs, in all three cases and in both models, the relative price is not statistically significant. That means, in the case of the FFVs examined here, relative profitability did not play a role. Therefore, the supply of FFVs is not due to a price response.

The factor that seems most important in the analysis is urban food expenditures. According to the findings, for every 1% increase in urban food consumption, FFV production increased by 0.8% to 5.1%. However, the magnitude of the coefficients should be taken with caution because of the small base values of some of the products.

Unlike relative profitability, agricultural mechanization has had a positive effect on the production of FFVs. Though its impact is statistically significant for only one product (oranges), the coefficient remains positive in all cases and in both models. One possible reason is that, since FFV production is more labor intensive than traditional agricultural production, including the growing of cereals, agricultural mechanization in general, as discussed above, has freed labor and contributed positively to the production of FFVs.

In contrast to mechanization, rural infrastructure, with rural roads as the proxy, has not had a positive effect on the diversification to FFV production. This is surprising; since HVPs are perishable and there is a lack of modern storage facilities, particularly in rural areas, rural roads are needed for the speedy transfer of products from rural production centers to urban consumption centers. However, as already seen, the ratio of paved roads to total roads did not
change in the 1990s. Though the ratio improved in the early 1990s, it fell before the crisis and did not recover after that. During that period, the total road network increased only marginally. Therefore, given the stagnation, it is not surprising that roads have not been significant in the FFV supply response.

The last factor of interest is the financial and economic crisis, which is captured in a dichotomous variable that takes the value 1 if the economy is in crisis, and 0 otherwise. It is obvious from the estimated coefficients that the crisis had a negative impact on FFV production, particularly in the case of oranges.

The findings on FFVs suggest that the observed diversification of Indonesian agriculture to FFVs in the 1980s and 1990s was largely a demand-pull diversification. Though agricultural mechanization had a positive role, diversification was driven primarily by urban demand for FFVs.

However, some important contributory factors, such as changes in retailing and institutions, were not taken into account.

The finding that relative profitability compared with rice has not had any significant role in agricultural diversification for the last two decades has important implications for Indonesia. Over that period, except in 1988–1991 and the peak years of the Asian crisis, 1997 and 1998, the domestic price of rice was always higher than the world price by 13–70%. Therefore, farmers always had an incentive to produce more rice. If other government incentives for rice production, such as the fertilizer subsidy, irrigation, and credit, are considered, the overall incentives in favor of rice production become pervasive. Therefore, the finding that the present diversification is not due to a price response conforms to reality.

Though the crisis did not affect all products equally, it adversely affected diversification overall. Exports of some HVPs (e.g., oil palm) increased during the crisis, but diversification to HVPs slowed down.

Table A3.3: Determinants of FFV Production (Dependent Variable: Production at Province Level), 1980–2000

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Orange</th>
<th>Pineapple</th>
<th>Shallot</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fixed Effects</td>
<td>Random Effects</td>
<td>Fixed Effects</td>
</tr>
<tr>
<td>Relative Price</td>
<td>0.611  (0.628)</td>
<td>0.495  (0.447)</td>
<td>0.172  (0.343)</td>
</tr>
<tr>
<td>Urban Food Expenditures</td>
<td>4.989 ** (2.000)</td>
<td>4.731 ** (1.572)</td>
<td>5.131 ** (1.718)</td>
</tr>
<tr>
<td>Agricultural Mechanization</td>
<td>1.572 * (0.758)</td>
<td>0.860 ** (0.352)</td>
<td>0.504  (0.563)</td>
</tr>
<tr>
<td>Rural roads</td>
<td>-0.050 (0.191)</td>
<td>0.141 (0.167)</td>
<td>-0.248 (0.175)</td>
</tr>
<tr>
<td>Economic crisis</td>
<td>-0.893 ~ (0.470)</td>
<td>-0.571 * (0.332)</td>
<td>-0.630 (0.403)</td>
</tr>
<tr>
<td>Constant</td>
<td>-44.572 ~ (22.482)</td>
<td>-44.674 ** (15.952)</td>
<td>-51.882 ** (18.245)</td>
</tr>
</tbody>
</table>

Note: Standard errors are in parentheses.

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Significant at 10%, * significant at 5%, ** significant at 1%.
Transaction Costs: Diversification Constraints

The previous section showed that, despite the increased demand in urban areas, the relative profitability of HVPs compared with unhusked rice has not played an important role in diversification. This contradicts the notion that an upward shift in demand for HVPs under lagged supply response results in a higher equilibrium price, which should result in higher profitability. However, this can happen if there is a high transaction cost between HVP producers in rural areas and HVP consumers in urban areas. If transaction costs are high, a high consumer price may not translate into a high farmgate price.

For simplicity, transaction cost is defined here as the gap between the buying and the selling price (see Hirshleifer and Hirshleifer 1984, pp. 421–423). Transaction cost is widely used to explain observed market failures and noncommercialization in agriculture in developing countries. Transaction costs create a wedge between a household’s buying and selling price. They can reduce the market size; and in extreme cases, when transaction costs are very high, the market may fail.

To examine the extent of transaction costs, measured by the gap between buying and selling prices, two sets of prices—farm gate price and wholesale price—were chosen and compared within a province and between provinces. An ideal measure would take producer and consumer prices into account, but such prices were unavailable for the HVPs considered in the regression analysis; the second-best option was therefore chosen. Since the consumer prices in a given location would be higher than the wholesale prices in the same location, this approximation of transaction costs is biased downward.

Two sets of price ratios were computed. First, the average farm gate price of a particular product in a province was computed as a percentage of the wholesale price of the product in the province. Table A3.4 provides these price ratios, which vary from 52% to 98%. There seems to be an upward tendency, implying that farmers received a higher share of the wholesale price in the 1990s than in the 1980s. But the trend is not obvious; there are exceptions, and the few data points limit the analysis further.

The provinces that were considered in Table A3.4 are all on Java, the island with the best infrastructure and the largest consumer base in Indonesia. Since the farmers receive as little as 30% of the wholesale price on average, it is obvious that transaction costs in HVPs are still large; in fact, the gap between the wholesale price and the retail price could be as high as 50%. This means that farmers have only a 25–30% share in total gross value generated in the production and consumption of HVPs.

Table A3.4: Farm Gate Price as a Share of Wholesale Price in the Same Province, 1984–1999

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Potato</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Java</td>
<td>62%</td>
<td>64%</td>
<td>70%</td>
<td>60%</td>
<td>71%</td>
<td>65%</td>
</tr>
<tr>
<td>Central Java</td>
<td>80%</td>
<td>97%</td>
<td>98%</td>
<td>81%</td>
<td>57%</td>
<td>54%</td>
</tr>
<tr>
<td>Yogyakarta</td>
<td>97%</td>
<td>98%</td>
<td>63%</td>
<td>57%</td>
<td>71%</td>
<td>66%</td>
</tr>
<tr>
<td>East Java</td>
<td>97%</td>
<td>97%</td>
<td>63%</td>
<td>57%</td>
<td>71%</td>
<td>66%</td>
</tr>
<tr>
<td>Orange</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>West Java</td>
<td>61%</td>
<td>52%</td>
<td>66%</td>
<td>60%</td>
<td>71%</td>
<td>66%</td>
</tr>
<tr>
<td>Central Java</td>
<td>60%</td>
<td>77%</td>
<td>88%</td>
<td>91%</td>
<td>93%</td>
<td>93%</td>
</tr>
<tr>
<td>Yogyakarta</td>
<td>73%</td>
<td>77%</td>
<td>88%</td>
<td>91%</td>
<td>93%</td>
<td>93%</td>
</tr>
<tr>
<td>East Java</td>
<td>73%</td>
<td>77%</td>
<td>88%</td>
<td>91%</td>
<td>93%</td>
<td>93%</td>
</tr>
</tbody>
</table>

Source: Computed from BPS data.

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3 See Key et al. (2000) for a theoretical analysis and empirical evidence.
4 The overall mean is 71.8% and the standard deviation is 13.3%. For potato and oranges, the means are 70.5% and 71.8%, and the standard deviations are 12.4% and 15.0%, respectively.
For the second set of price ratios, the average farm gate price of a particular product in a province was computed as a percentage of the wholesale price of that product in Jakarta. The wholesale price in Jakarta was taken as a denominator, since Jakarta is the largest urban consumption center of HVPs in Indonesia. Table A3.5 presents the price ratios for 1984 to 1993.

Two observations can be made. First, farmers in production centers receive only a part of the wholesale prices achieved in Jakarta. Second, the farther a production center is from Jakarta, the lower the price ratio, as the figures for South Sulawesi and South Kalimantan show. Transportation and infrastructure are needed to reduce the price gap and increase the profitability of farmers who produce HVPs.

Thus, transaction costs that include marketing margins remain very high—up to 70% of the gross value in some areas. Therefore, to increase the price incentive and relative profitability of farmers who produce HVPs, transaction costs and marketing margins must be reduced. Such a reduction can induce further diversification to HVPs.

### Table A3.5: Farm Gate Prices in Different Provinces as a Share of Wholesale Prices in Jakarta

<table>
<thead>
<tr>
<th>Province</th>
<th>1984</th>
<th>1987</th>
<th>1990</th>
<th>1993</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Java</td>
<td>26%</td>
<td>15%</td>
<td>44%</td>
<td>43%</td>
</tr>
<tr>
<td>Central Java</td>
<td>29%</td>
<td>15%</td>
<td>47%</td>
<td>53%</td>
</tr>
<tr>
<td>Yogyakarta</td>
<td>23%</td>
<td>15%</td>
<td>47%</td>
<td>58%</td>
</tr>
<tr>
<td>East Java</td>
<td>3%</td>
<td>14%</td>
<td>43%</td>
<td>49%</td>
</tr>
<tr>
<td>South Sulawesi</td>
<td>4%</td>
<td>21%</td>
<td>28%</td>
<td></td>
</tr>
<tr>
<td>West Java</td>
<td>99%</td>
<td>83%</td>
<td>90%</td>
<td>88%</td>
</tr>
<tr>
<td>Central Java</td>
<td>72%</td>
<td>68%</td>
<td>76%</td>
<td>73%</td>
</tr>
<tr>
<td>Yogyakarta</td>
<td>80%</td>
<td>91%</td>
<td>82%</td>
<td>59%</td>
</tr>
<tr>
<td>East Java</td>
<td>93%</td>
<td>67%</td>
<td>72%</td>
<td>69%</td>
</tr>
<tr>
<td>West Java</td>
<td>61%</td>
<td>62%</td>
<td>61%</td>
<td>60%</td>
</tr>
<tr>
<td>Central Java</td>
<td>76%</td>
<td>73%</td>
<td>81%</td>
<td>74%</td>
</tr>
<tr>
<td>Yogyakarta</td>
<td>81%</td>
<td>70%</td>
<td>78%</td>
<td>71%</td>
</tr>
<tr>
<td>East Java</td>
<td>67%</td>
<td>71%</td>
<td>49%</td>
<td>42%</td>
</tr>
<tr>
<td>South Kalimantan</td>
<td>67%</td>
<td>31%</td>
<td>32%</td>
<td>24%</td>
</tr>
</tbody>
</table>

Source: Computed from BPS data.

### Conclusions

This appendix looked at the extent of structural changes and the state of diversification in Indonesian agriculture, and the driving forces behind diversification. The linked issue of vertical integration is examined in Appendix 6.

Evidence presented here shows that, in the last three decades, Indonesian agriculture has undergone a significant structural change in the composition of its subsectors. The production of HVPs—estate crops, livestock, fisheries, FFVs, and floriculture—has grown faster than the production of cereals. However, diversification is still limited to only a few regions and a few products within each subsector. Production in some subsectors, like inland fisheries, has been stagnant. Productivity in some estate crops has actually been eroding, and for FFVs has been lagging behind productivity in other developing countries.

The factors that have contributed most to diversification are rapid growth in income, changes in urban consumption patterns in favor of HVPs, rural infrastructure development (roads), agricultural mechanization, and labor endowments. The relative profitability (prices) of HVPs compared with rice is either negative or insignificant and does not seem to have played any role in diversification. In addition, the transaction costs and marketing margin for HVPs have remained substantial and have kept farmers from diversifying to HVPs.
The financial and economic crisis of the late 1990s resulted in a sharp depreciation of the rupiah against foreign currencies, particularly the dollar, and, combined with political turmoil, has had a lasting impact on agriculture. It affected the performance of the sector by changing production costs through a change in the (relative) prices of traded and nontraded inputs, output prices, and agribusiness profits, among others. However, the impact of the crisis varied by subsector and by product within each subsector, and was either positive or negative, depending on the changed incentive structure.

Among the supply-side factors that were examined here, rural infrastructure was surprisingly found to have an insignificant role in HVP production, largely because of the low investment in rural infrastructure in the 1990s. Therefore, the development of rural infrastructure such as rural roads should be a priority area for future investment by the Government, not least because such development is generally pro-poor and pro-smallholders, as well as pro-diversification (see also Appendix 7).
Research and Development: Structure and Challenges

The State Ministry for Research and Technology coordinates research and development (R&D) policy (Fuglie and Piggott 2003). Government research institutions like the assessment institutes for agricultural technologies in 27 provinces, the Indonesian Institute of Sciences, and the Central Statistics Agency (BPS) are allocated budgets directly or through ministries. The largest government research agency in Indonesia, with more than 3,000 scientists in 2003, is the Indonesian Agency for Agricultural Research and Development (IAARD) of the Ministry of Agriculture (MOA) (AARDa 2003).

Agricultural research projects developed by individual scientists move up the AARD hierarchy to the National Development Planning Agency (BAPPENAS), which approves projects that are important to Indonesia’s agriculture, food security, and poverty goals, and to its geographic focus. The AARD Strategic Plan for 1994–2004 (cited in Fuglie and Piggott 2003) named the following challenges to agricultural research in Indonesia: (i) limited employment opportunities in the rural areas; (ii) threats to rice self-sufficiency from a variable climate, pest infestation and disease, shrinking land area, stagnating productivity, and the need to diversify; (iii) need to adapt research to smallholders’ needs; (iv) underperforming rural financial institutions; (v) adaptation of agriculture to agroecological zones; (vi) lack of farm management skills for commercial agriculture; (vii) need for greater environmental awareness; and (viii) water scarcity.

Agricultural Research Expenditures

Agricultural research expenditures grew steadily in real terms (at 1993 constant prices) from roughly Rp70 billion in the mid-1970s to Rp135 billion by the mid-1980s, then fell to Rp84 billion in 1989/90 before recovering to Rp187 billion in 1997/98 at the start of the Asian financial and economic crisis and then dropping once more in 2000 to Rp123 billion (Table A4.1). Real expenditures on food crop research peaked at Rp18 billion in 1993/94, but have been declining since. Moreover, food crop research, a major component of which is rice research, once made up one third of AARD expenditures (1988/89) but has since dropped to only 18%. Expenditures on rice research are deemed critical for raising the stagnating productivity of this vital crop.

The number of agricultural researchers grew by 12% yearly after the mid-1970s, to 1,251 by the mid-1990s; the share of scientists with doctorates increased from 3% to 7%. Growth in the number of agricultural researchers slowed somewhat to 7% per year toward the mid-1990s.
The share of PhDs increased to 9% but has since stayed at this level. As researchers increased in number, real research spending per agricultural scientist declined, from Rp137 million in the mid-1970s to Rp59 million in the mid-1990s and Rp37 million in 2000 (Figure A4.1).

As can be seen in Figure A4.2, the fertilizer subsidy (see also Appendix 5) took up a larger share of agricultural expenditures than research. In 1974–1979, 46% of development expenditures in agriculture and forestry, on average, went to the fertilizer subsidy and 7% to research. In the 1980s, the fertilizer subsidy took up 43% of development expenditures and research stayed at 7%. In the 1990s, fertilizer subsidy expenditures declined to 24%, while research increased to 13%, on average.

Table A4.1: Government Expenditures on Agricultural Research, Indonesia, 1984/85–2000

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Center for Soil and Agroclimate Research</th>
<th>Center for Food Crops Research and Development</th>
<th>Center for Horticultural Research and Development</th>
<th>Total AARD</th>
<th>Total Agricultural Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount (Rp billion)</td>
<td>% of AARD</td>
<td>Amount (Rp billion)</td>
<td>% of AARD</td>
<td>Amount (Rp billion)</td>
<td>% of AARD</td>
</tr>
<tr>
<td>1984/85</td>
<td>3.0</td>
<td>4.9</td>
<td>14.1</td>
<td>23.2</td>
<td>3.5</td>
</tr>
<tr>
<td>1989/90</td>
<td>2.2</td>
<td>6.8</td>
<td>8.9</td>
<td>27.6</td>
<td>3.1</td>
</tr>
<tr>
<td>1994/95</td>
<td>7.1</td>
<td>8.1</td>
<td>16.4</td>
<td>18.6</td>
<td>6.0</td>
</tr>
<tr>
<td>1995/96</td>
<td>6.8</td>
<td>7.4</td>
<td>15.7</td>
<td>17.1</td>
<td>6.3</td>
</tr>
<tr>
<td>1996/97</td>
<td>4.9</td>
<td>4.9</td>
<td>16.0</td>
<td>15.7</td>
<td>6.9</td>
</tr>
<tr>
<td>1997/98</td>
<td>2.6</td>
<td>5.6</td>
<td>7.5</td>
<td>16.3</td>
<td>2.9</td>
</tr>
<tr>
<td>1998/99</td>
<td>3.3</td>
<td>6.2</td>
<td>9.5</td>
<td>18.0</td>
<td>4.0</td>
</tr>
<tr>
<td>1999/00</td>
<td>2.7</td>
<td>6.6</td>
<td>7.5</td>
<td>18.4</td>
<td>2.9</td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

AARD = Agency for Agricultural Research and Development.
Note: Total agricultural research expenditures include research expenditures for food, estate, and industrial crops; livestock; and fisheries. Amounts in constant 1993 rupiah.
Sources: Center for Agro-Socioeconomic Research (CASER) for information on Total AARD and three individual centers; Fuglie and Piggott (2003) for total agricultural research.

Figure A4.1: Number of Agricultural Scientists and Research Expenditures per Scientist, 1974–2000

Source: Adapted from Fuglie and Piggott (2003).
The agricultural expenditures of MOA also declined significantly in real terms, from Rp813 billion in 1993/94 to Rp300 billion by 1998/99. Although MOA also reduced its spending on agricultural research during this period, from Rp85 billion to Rp45 billion, the share of agricultural research in overall expenditures increased from 11% to 15%.

**Figure A4.2: Fertilizer Subsidy versus Agricultural Research Expenditures, Indonesia, 1975–1999**

![Graph showing the comparison of fertilizer subsidy and agricultural R&D expenditures in Indonesia from 1975 to 1999.](image)

R&D = research and development

Note: Data are 3-year centered moving averages.


**Agricultural Research Expenditures in the Region**

Most developing countries greatly underinvest in agricultural research and extension despite rates of return that are often more than 50% and have remained high over time (Alston et al. 2000). Public and private investment in R&D is only 0.6% of agricultural gross domestic product (GDP) in developing countries, compared with 5% for developed countries (Byerlee 1998). Indonesia ranks near the bottom among Asian countries in agricultural research spending relative to agricultural GDP and total government expenditures on agriculture (Table A4.2).

Supplemental funding comes from different sources, depending on the commodity. In Indonesia, government revenues, supplemented by foreign loans and grants, support research on crops and livestock. Funds for forestry research, on the other hand, are mostly sourced from a special assessment on forest concessions, while research on estate crops is financed largely by the

**Table A4.2: Share of Agricultural Research Expenditures in Total Government Expenditures on Agriculture, 1975–1993**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>China, PR</td>
<td>4.1</td>
<td>4.5</td>
<td>7.0</td>
<td>5.4</td>
<td>6.5</td>
</tr>
<tr>
<td>India3.4</td>
<td>3.4</td>
<td>3.0</td>
<td>4.0</td>
<td>4.6</td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>2.3</td>
<td>1.8</td>
<td>3.4</td>
<td>3.4</td>
<td>3.0</td>
</tr>
<tr>
<td>Malaysia</td>
<td>13.3</td>
<td>7.9</td>
<td>8.0</td>
<td>8.0</td>
<td>10.2</td>
</tr>
<tr>
<td>Philippines</td>
<td>4.0</td>
<td>5.2</td>
<td>4.8</td>
<td>4.1</td>
<td>3.0</td>
</tr>
<tr>
<td>Thailand</td>
<td>17.3</td>
<td>8.5</td>
<td>6.8</td>
<td>9.9</td>
<td>10.7</td>
</tr>
</tbody>
</table>

Sources: Barker et al. (2004); agricultural research expenditure figures from Pardey et al. (1998).
plantation sector itself from product sales and member fees of the Indonesian Planters Association for Research and Development (IPARD). In 1996, research expenditures per scientist at IPARD were four times the average AARD level, but were geared principally to large estates, and not smallholders. Table A4.3 shows some agricultural commodities produced in Indonesia chiefly for the export market, and the economies that fund research on those products with a levy on producers.

Table A4.3: Commodities with Industry- or Producer-Funded Research

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Bangladesh</th>
<th>India</th>
<th>Indonesia</th>
<th>Malaysia</th>
<th>Pakistan</th>
<th>Philippines</th>
<th>Sri Lanka</th>
<th>Taipei, China</th>
<th>Thailand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cashew</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coconut</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Coffee</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Palm Oil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rubber</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Sugar</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Tea</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Timber</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Tobacco</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Source: Adapted from Pardey et al. (1998).

Reasons for Indonesia’s Poor Agriculture R&D

According to Dillon et al. (1999, cited in Fuglie and Piggott 2003), the agricultural research system in Indonesia has been doing poorly for the following reasons: (i) highly fragmented effort; (ii) limited involvement of universities; (iii) weak linkages with international R&D providers; (iv) internal reorganization of AARD in 1995, disrupting its research efforts; and (v) weak intellectual property rights. Low research expenditures, the low and stagnating share of PhDs in the research staff, and limited coordination with the private sector can also be named as reasons.

Public-Private Partnerships

Public-private partnerships—through collaborative research, joint ventures, alliances, and networks—can contribute significantly to agricultural and rural growth. Public research institutions gain access to advanced scientific knowledge and technologies; product development, processing, and marketing mechanisms; and financial resources. Private firms, on the other hand, can access untapped or emerging markets, take part in drawing up regulatory systems, and improve their corporate profile. Through partnerships, researchers are able to deal with complex problems that they cannot easily solve by themselves, or that require navigation through new and changing technologies, regulations, or socioeconomic contexts.

But successful public-private partnerships in agriculture are rare, partly because of inherent differences in research objectives: while public institutions do research according to their broad social mandate, private firms are more interested in maximizing profits. Further, they compete over the ownership and use of proprietary scientific knowledge and technologies, over scarce financial resources for research, and over markets, clients, and beneficiaries for their output. The competition engenders real and hidden costs and risks that make partnerships hard to create or sustain, and are heightened by misunderstanding and mistrust. For public-private partnerships to
succeed, both parties must find research areas where their objectives harmonize and must be willing to negotiate the often difficult details of project planning and implementation (Spielman and von Grebmer 2004). In Indonesia, a partnership between ICI Seeds (Zeneca) and the Central Research Institute for Food Crops collapsed when the parties could not agree on the transfer of genes and transformation technology because of insufficient intellectual property protection (Spielman and von Grebmer 2004, citing Lewis 2000).

There are nonetheless strong complementarities between public and private agricultural research in Asia. Publicly funded agricultural research has provided basic technologies for the Green Revolution, and has also been very important as a source of scientists for private research. Table A4.4 shows that private research intensity is generally higher in more liberalized economies. In the mid-1990s, Indonesia was in the middle field of private sector involvement in agricultural research, with the private sector providing about 12% of total R&D. The private sector has a more important role in the Philippines, Malaysia (where private R&D intensity is also highest among the countries shown in Table A4.4), and India. But private investment in agricultural research is not growing fast enough to meet the rapid growth in demand for agricultural products. Foreign firms made an important contribution to private research in all the Asian countries shown in Table A4.4, thanks to liberalized industrial policies that allowed private and foreign firms to operate and expand in agricultural input industries (Pray and Fuglie 2001).

In Indonesia, linkages among AARD, universities, and the private sector have been supported by loans from the Asian Development Bank (ADB, through the Participatory Development of Agricultural Technologies [PATP]) and the World Bank (through the Agricultural Research Management Project II). The ADB-funded PATP project sets aside special funds for collaborative research among AARD scientists and universities, international centers, and private companies. Foreign and local partners in the private sector must provide matching funds. The contributions have so far been in kind, but the private sector has increasingly shown willingness to contribute cash as well. Through this and other, similar, projects, AARD raised Rp684 million and IPARD Rp845 million in matching contributions from private companies in 2001.

Agricultural research at universities is funded mainly through government sources. In 1998/99, Bogor Agricultural University raised over Rp10 billion, 80% of this from government funds and 16% from the private sector. As the universities gain autonomy, the share of government funds will decline; at the same time, the universities will have greater flexibility and responsibility in sourcing funds.

Table A4.4: Private and Public Research Expenditure and Research Intensity, Selected Asian Countries, 1995

<table>
<thead>
<tr>
<th>Country</th>
<th>R&amp;D Expenditure (million)</th>
<th>Private R&amp;D as Share of Total R&amp;D (%)</th>
<th>R&amp;D Intensity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Private</td>
<td>Public</td>
<td>Total</td>
</tr>
<tr>
<td>China, PR</td>
<td>16.0</td>
<td>479.5</td>
<td>3</td>
</tr>
<tr>
<td>India</td>
<td>55.5</td>
<td>347.9</td>
<td>14</td>
</tr>
<tr>
<td>Indonesia</td>
<td>6.1</td>
<td>81.0</td>
<td>12</td>
</tr>
<tr>
<td>Malaysia</td>
<td>16.6</td>
<td>64.0</td>
<td>21</td>
</tr>
<tr>
<td>Pakistan</td>
<td>5.7</td>
<td>25.0</td>
<td>19</td>
</tr>
<tr>
<td>Philippines</td>
<td>10.5</td>
<td>37.5</td>
<td>22</td>
</tr>
<tr>
<td>Thailand</td>
<td>17.4</td>
<td>127.0</td>
<td>12</td>
</tr>
</tbody>
</table>

R&D = research and development
Note: R&D intensity represents R&D as a share of agricultural value added.
Private sector research is estimated to have almost tripled between 1985 and 1996 to reach $18.2 million (in constant 1999 international dollars), or 7% of total agricultural research (Table A4.4 shows a somewhat higher share—12%—for private research in 1995). Privately owned rubber and oil palm companies conduct in-house research outside the IPARD system, private seed companies do the same for hybrid maize and vegetables, while large poultry producers carry out research on animal production.

The spillover from international research into the Indonesian agricultural system has been significant. In 1991, a major variety of rice (IR36) developed at the International Rice Research Institute occupied about one third of the wetland rice-growing area in Indonesia (Fuglie and Piggott 2003). Technology transfer has also been important in the development of new clones of oil palm and rubber from Malaysia; vegetable, maize, and poultry hybrids; integrated poultry production systems; and shrimp farming based on technology developed in Taiwan, China and Thailand (cited in Fuglie and Piggott 2003).

Agricultural biotechnology research, which the Government has supported since the 1980s, is concentrated in the Center for Agricultural Biotechnology and Genetic Resources. Most of the research is foreign-funded. In 1997, AARD spent $6 million on this type of research, mostly for food crops (Falconi 1999, cited in Fuglie and Piggott 2003). The work involved cell and tissue culture for plant propagation, marker-selected breeding, use of monoclonal antibodies for disease diagnoses, and development of genetically modified crops (Moeljopawiro 1999, cited in Fuglie and Piggott 2003). In 2001, a Bt-cotton variety developed by Monsanto was grown in Indonesia, the first genetically modified organism approved for commercial use in the country.
APPENDIX 5

Impact of Trade, Macroeconomic, and Exchange Rate Policies on Agriculture

Trade and macroeconomic policies are important determinants of economic growth, which, in turn, will create domestic markets for agricultural commodities and generate capital for investment in the sector. Agriculture, supported by a positive macroeconomic framework, has contributed significantly to Indonesia’s economic growth since the 1970s (Anderson and Strutt 1999) and must sustain growth at a level that will halve poverty by 2020 and double per capita real income.

This appendix gives an overview of Indonesia’s trade, macroeconomic, and exchange rate policies and alternatives for the future, as well as their impact on Indonesian agriculture and rural development.

Indonesian Policies Affecting Agriculture

In 1985, with its revenues threatened by falling oil prices, Indonesia made trade liberalization the centerpiece of economic reforms (Feridhanusetyawan 2001). Before that, reforms were limited to nontrade areas like exchange rate liberalization; fiscal and monetary policy consolidation; and encouragement of private, including foreign, investment, together with a reduced role for the state. Agriculture was directly taxed through export taxes and periodic quotas or bans on major exports like copra, coconut oil, logs, and palm oil (Myint 1984; Glassburner 1985; Sundrum 1986, 1988).

Macro and Exchange Rate Policies

Among the exchange rate and fiscal policies adopted to support trade and other structural reforms (Saxena 2002), the fluctuation of exchange rate around wider bands was paramount (Joseph 1998). With the help of fiscal discipline, which kept inflation in check, this policy was relatively successful until the financial and economic crisis. From 1980 to 1998, Indonesia’s real effective exchange rate closely tracked equilibrium levels at below 1.5% overvaluation per year (Saxena 2002). This confirmed the findings of earlier studies that rupiah overvaluation was not a major tax on agriculture. According to one such study (Müller 1995), when overvaluation increased (16% in 1984 and 14% in 1987), the rupiah was devalued under the managed float to restore
balance. At the time, the slight overvaluation was balanced by heavy fertilizer subsidies that kept prices at about one half of world prices; moderate direct price protection for rice and other food crops; and heavy price protection for favored commercial crops like sugar, soybean, and milk and dairy products to promote crop diversification (Rosegrant and Hazell 2000).

Evidence also suggests that Indonesia’s trade openness in the 1990s largely reduced import barriers and promoted exports. This was associated with a depreciating rupiah exchange rate, which, in turn, was related to improved trade balances even during the crisis (Saxena 2002). The large currency depreciation, however, also raised domestic prices sharply, contributed to high inflation (over 50%), and temporarily reversed the successes achieved in reducing absolute poverty.

But then the rupiah appreciated by 45% in 1999, and by about 26% in 2002. Macrostability to further lower inflation was needed to reduce the rupiah’s real appreciation and improve economic performance and international competitiveness.

**Trade Protection Policies**

**Protection Before 1985**

When Indonesia began reforming trade in earnest in the mid-1980s, major segments of domestic production—both manufacturing and agriculture—were sheltered from import competition. Effective rates of protection were very high for many activities like dairy (effective rate of assistance of 211%) and fruits and vegetables (209%); other activities received low or negative effective assistance because the tariff-inflated prices on protected inputs exceeded the value of the output assistance.

The manufacturing sector by and large started with much higher protection than agriculture. The protective structure was therefore biased against agriculture overall, despite the high effective assistance to some agricultural activities. This was a reflection of Indonesia’s high-protection, import-substitution industrialization policies after World War II. Export controls on many important agricultural activities also kept domestic prices below world levels, penalizing the agriculture sector and providing an implicit subsidy to downstream processors.

The significant anti-agriculture bias in the prereform trade regime can be seen from Table A5.1. In 1987, manufacturing was assisted almost 30 times more than agriculture, while oil and gas and mining and quarrying were negatively assisted (penalized). By 1995, trade liberalization reforms had reduced manufacturing protection, largely removing the discrimination against agriculture.

![Table A5.1: Effective Rates of Protection by Main Sector, 1987 and 1995 (%)](https://example.com/table.png)

<table>
<thead>
<tr>
<th>Sector</th>
<th>1987 (%)</th>
<th>1995 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>4</td>
<td>–4</td>
</tr>
<tr>
<td>Oil and Gas</td>
<td>–11</td>
<td>–6</td>
</tr>
<tr>
<td>Mining and Quarrying</td>
<td>–27</td>
<td>–8</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>110</td>
<td>5</td>
</tr>
</tbody>
</table>

Source: García García (2000).

---

1 While non-oil export prices in US dollars fell 26% between the second quarters of 1997 and 1999, export volumes rose substantially, such that non-oil exports (especially manufacturing, followed by forestry, mining, and agriculture), measured at constant prices, grew by 24% and manufactured exports by 31% during this period (Rosner 2000). Thus, the decline in world prices significantly reduced the impact of the real rupiah on export returns, while the currency’s decline also helped cushion the impact of lower world prices on exports.
Such high assistance disparities between sectors and within sectors suggest large resource-use inefficiencies, and the possibility of substantial welfare improvements from a move to a lower and more uniform assistance structure, as in 1995.

The discrimination against agriculture in the trade regime can also be measured through the “net tax rate” on agriculture relative to manufacturing (Table A5.2) (Garcia Garcia 2000). By 1995, the trade reforms had substantially reduced the anti-agriculture bias. But major disparities still existed. Estate crops on average were still heavily taxed relative to farm food crops, which were slightly assisted, thereby pushing resources out of estate crops into food crops. Moreover, forestry remained heavily taxed in 1995, while fisheries had changed from being highly taxed to being moderately assisted.

Table A5.2: Net Rates of Taxation of Agricultural Activities Relative to Manufacturing, 1987 and 1995 (%)

<table>
<thead>
<tr>
<th>Sector</th>
<th>1987</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Tax on Agriculture</td>
<td>-50</td>
<td>-9</td>
</tr>
<tr>
<td>Farm Food Crops</td>
<td>-46</td>
<td>1</td>
</tr>
<tr>
<td>Estate Crops</td>
<td>-55</td>
<td>-12</td>
</tr>
<tr>
<td>Livestock</td>
<td>-44</td>
<td>2</td>
</tr>
<tr>
<td>Forestry</td>
<td>-67</td>
<td>-59</td>
</tr>
<tr>
<td>Fisheries</td>
<td>-50</td>
<td>13</td>
</tr>
</tbody>
</table>

Source: Garcia Garcia (2000).

The heavy bias in the trade regime for Java, where most manufacturing is done, was also reduced (Garcia Garcia 2000). That bias favored urban over rural people, who work mostly in food and estate crops, and may have aggravated poverty in rural communities and worsened regional income inequality. Reducing trade and price distortions to overcome the anti-agriculture bias in the trade regime helped promote both growth and poverty reduction objectives.

Indonesia’s trade regime also had an anti-export bias. Protection assists inefficient import-substitution activities in the domestic market while leaving efficient exporting activities to export at world (unassisted) prices. Export controls worsen this anti-export bias, which is defined as the effective rate of protection for import-competing activities relative to export-competing activities. The anti-export bias of Indonesia’s trade regime is estimated to have dropped from 53% in 1987 to a still substantial 28% in 1995.

Trade Reforms in the Mid-1980s

Indonesia’s experience with trade reforms highlights the fundamental point that assistance to one activity or sector by definition penalizes another activity or sector and economic efficiency in general. While specific agricultural policies tended to protect the sector, the much higher trade protection for manufacturing imposed a penalty on agriculture that offset these benefits (Garcia Garcia 2000). Improving Indonesia’s incentive structure for agriculture therefore hinged on reforming the protectionist trade regime for manufacturing.

Indonesia’s precrisis trade reforms, though relatively comprehensive, concentrated on reducing manufacturing protection while lowering agricultural protection gradually and selectively. Many nontariff barriers (NTBs) that protected domestic manufacturing were removed (Table A5.3). In 1995, NTB coverage in agriculture was four times that in manufacturing (based on value added).

Tariff reforms reduced the average (simple) tariffs marginally from 22% to 20% in 1995. At that time, tariff surcharges were intended to protect infant industries against allegedly “dumped” imports. Some tariffs on agricultural commodities were removed in the June 1994 package, but these were mainly redundant duties and had little effect on agricultural protection.
A unilateral program introduced in 1995 aimed at reducing most tariffs to no more than 10% by 2003 and achieving a simple average rate of 7%. Tariff packages in 1996 accelerated the tariff reductions and eliminated surcharges. But tariffs on many products, including agricultural commodities, were still high.

Agricultural trade reforms were needed to promote resource-use efficiency and to keep the trade bias against agriculture from being replaced by a bias against manufacturing. Relatively high protection in agriculture therefore also needed dismantling.

Postcrisis (1997) IMF-Sponsored Trade Reforms

Until 1997, reforms and trade liberalization in agriculture and forestry lagged behind the rest of the economy. The crisis exposed the need for these reforms.

Not surprisingly, agriculture was the initial focus of many trade and other structural reforms agreed to by the Government and the International Monetary Fund (IMF), especially in 1998. The policy reforms in agriculture involved the following (Erwidodo et al. 1999): eliminating Badan Usaha Logistik (BULOG) import monopolies on wheat, wheat flour, sugar, soybean, garlic, and rice; reducing tariff rates on all food items, including rice, to no more than 5%; removing trade and marketing restrictions on several commodities, including local content provisions for dairying; and deregulating provincial and regional trade in agricultural products like clove, orange, and livestock. Most of these commitments were implemented in the January 1998 package to deregulate agriculture. Unilateral agricultural liberalization under the IMF program went substantially beyond Indonesia’s World Trade Organization (WTO) commitments.

IMF’s Agricultural Sector Adjustment Loan included more specific agricultural reforms (Erwidodo et al. 1999): food security through reliance on the market to provide foodstuffs, well-targeted food subsidies to food-insecure households, and BULOG restructuring; more efficient factor input markets, especially for fertilizer and seeds, through less state involvement, stronger

<table>
<thead>
<tr>
<th>Sector/Activity</th>
<th>% NTB Coverage of Gross Output</th>
<th>% NTB Coverage of Value Added</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture (excluding Forestry, Fishing, and Hunting)</td>
<td>64 45</td>
<td>67 48</td>
</tr>
<tr>
<td>Food Crops</td>
<td>75 56</td>
<td>77 57</td>
</tr>
<tr>
<td>Estate and Other Crops</td>
<td>68 34</td>
<td>73 33</td>
</tr>
<tr>
<td>Fishing and Hunting</td>
<td>19 0</td>
<td>17 0</td>
</tr>
<tr>
<td>Livestock</td>
<td>26 3</td>
<td>25 3</td>
</tr>
<tr>
<td>Forestry</td>
<td>86 72</td>
<td>72 72</td>
</tr>
<tr>
<td>Mining and Quarrying</td>
<td>2 0</td>
<td>2 0</td>
</tr>
<tr>
<td>Excluding Oil and Gas</td>
<td>33 0</td>
<td>28 0</td>
</tr>
<tr>
<td>Manufacturing (nonoil)</td>
<td>80 24</td>
<td>77 17</td>
</tr>
<tr>
<td>Food, Beverages, and Tobacco</td>
<td>88 45</td>
<td>85 25</td>
</tr>
<tr>
<td>Textiles, Clothing, and Footwear</td>
<td>82 0</td>
<td>79 0</td>
</tr>
<tr>
<td>Wood Products</td>
<td>78 58</td>
<td>74 58</td>
</tr>
<tr>
<td>Paper Products</td>
<td>69 25</td>
<td>72 37</td>
</tr>
<tr>
<td>Chemicals</td>
<td>69 0</td>
<td>77 0</td>
</tr>
<tr>
<td>Oil Refining and Gas</td>
<td>0 0</td>
<td>0 0</td>
</tr>
<tr>
<td>Nonmetal Products</td>
<td>59 0</td>
<td>59 0</td>
</tr>
<tr>
<td>Basic Metals</td>
<td>53 0</td>
<td>59 0</td>
</tr>
<tr>
<td>Engineering</td>
<td>88 n.a.</td>
<td>87 0</td>
</tr>
<tr>
<td>Other Manufactures</td>
<td>33 0</td>
<td>34 0</td>
</tr>
<tr>
<td>All Tradable Sectors</td>
<td>52 23</td>
<td>44 23</td>
</tr>
</tbody>
</table>

n.a. = not available, NTB=nontariff barrier.
competition, and reforms in subsidy arrangements; and adequate research and development, technology, and an enabling environment for agricultural development.

Tariff packages in 1997 and 1998 substantially reduced average (simple) tariffs to 10% in 1998. Manufacturing tariffs fell to almost 10%, versus 9% for agricultural tariffs.

Average (simple) tariffs fell from 9.5% to 7.2% between 1998 and 2002. For the first time, average agricultural tariffs exceeded manufacturing duties (8.3% versus 7%) (WTO 2003). But rice and sugar had relatively high tariffs and were the only two commodities to benefit from specific duties, which domestic producers seeking protection usually prefer because they protect more against lower priced, low-quality imports and a decline in world prices.

**Recent Developments in the Agricultural Trade Regime**

Most of the IMF-sponsored agricultural reforms were implemented quickly and comprehensively at the start, and agriculture was deregulated quickly. Recently, however, tariffs have been increased for sensitive commodities like rice and sugar, reflecting food security concerns and a desire to maintain the competitiveness and income levels of farmers.

Trade protectionism and intervention, in agriculture and other sectors, have showed signs of resurgence (Ray 2003). Resistance to trade liberalization and requests for more protection have increased from local producers who cannot compete with the lower than normal international prices of certain commodities, especially sugar and cloves (Alisjahbana and Manning 2002, Athukorala 2002). These requests appear to be gaining stronger political support.

Proposed tariff increases from 0% to 27% for soybean could hurt not only the 2–3 million small-scale tahu and tempe (soybean curd and cake) producers who import soybean from the United States (US) for their better quality and taste, but also consumers, especially the poor. The Ministry of Trade and Industry (MTI) is also considering reintroducing NTBs, and allowing new cartel-like arrangements with regional producers to support exports, like the government-sanctioned agreement between the Indonesian and Vietnamese coffee producer associations in June 2003 to support world coffee prices.

Protectionist pressures were expected to intensify until the 2004 elections and to become a political pawn to attract rural voters. Resisting renewed protectionism requires an informed public debate among all stakeholders, including policy makers and politicians, to ensure that the efficiency costs to the Indonesian economy of renewed protectionism are well known and that trade policies are transparent.

Agricultural protection, if it is to be increased, should be based on national welfare considerations and not on narrow sectoral interests, to help limit it from spreading to other activities. The potential damage from renewed protectionism in sensitive areas must also be minimized. Protection levels must be kept as low as possible, and the measures chosen must be those that would distort efficiency the least. On efficiency grounds, tariffs, especially *ad valorem* duties, are always preferred over nontariff barriers, which are usually nontransparent and highly distorting.

Also uncertain is how the Government’s decision to exit the IMF program at the end of 2003 will affect its trade liberalization commitment. Deciding to adopt postprogram dialogue and monitoring by IMF would help maintain international confidence in Indonesia’s trade and other economic reforms.

Open trade policies require further unilateral commitment, irrespective of multilateral developments. The reform-minded must organize themselves into coalitions to counterbalance the powerful political forces and vested-interest groups opposed to liberalization. The public must be told that trade is good and that the message that “exports are good and imports are bad” should be rejected (Cass 2000).
Macroeconomic Policies for Rice: A Case Study

The rice industry in Indonesia has been at the heart of self-sufficiency policies, which are traditionally underpinned by import restrictions and other forms of government intervention. In the mid-1980s, a rapid increase in yield, thanks to Green Revolution technologies (see Chapter 1), led to temporary self-sufficiency. However, the self-sufficiency ratio has slipped (Table A5.4). Production has not kept pace with growing consumption, and imports have risen to about 10% of the market. Indonesia is now the world’s largest rice importer, as well as the third-largest producer and consumer of rice.

The loss of self-sufficiency has alarmed some policy makers and politicians, who view it as evidence that rice imports are undermining Indonesia’s food security. They also claim that subsidized rice imports will drive out domestic producers and place Indonesia at the mercy of foreign exporters. These claims fail to take into account market realities or the crucial role that the international rice trade can play in Indonesia’s food security. Self-sufficiency in rice (or any other product) is costly if achieved behind trade barriers that provide relatively high protection. The economy suffers from resource-use inefficiency, consumers pay higher prices, taxpayers shoulder any financial assistance from the Government, and the rural areas forgo agricultural and income diversification. Moreover, the growing water shortages in parts of Indonesia, particularly on Java, will make rice self-sufficiency difficult to maintain (ADB/IFPRI 2003).

Table A5.4: Development of Rice Self-Sufficiency, Indonesia 1995–2001

<table>
<thead>
<tr>
<th>Year</th>
<th>Production ('000 tons)</th>
<th>Import ('000 tons)</th>
<th>Export ('000 tons)</th>
<th>Self-Sufficiency Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>32,334</td>
<td>3,014</td>
<td>0</td>
<td>91.5</td>
</tr>
<tr>
<td>1996</td>
<td>32,216</td>
<td>1,090</td>
<td>0</td>
<td>96.8</td>
</tr>
<tr>
<td>1997</td>
<td>31,206</td>
<td>406</td>
<td>0</td>
<td>98.7</td>
</tr>
<tr>
<td>1998</td>
<td>31,118</td>
<td>6,077</td>
<td>0</td>
<td>83.7</td>
</tr>
<tr>
<td>1999</td>
<td>32,148</td>
<td>4,183</td>
<td>0</td>
<td>88.5</td>
</tr>
<tr>
<td>2000</td>
<td>32,040</td>
<td>1,512</td>
<td>0</td>
<td>95.5</td>
</tr>
<tr>
<td>2001</td>
<td>31,651</td>
<td>1,300</td>
<td>0</td>
<td>96.1</td>
</tr>
<tr>
<td>Average:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1995–1997</td>
<td>32,252</td>
<td>1,503</td>
<td>0</td>
<td>95.7</td>
</tr>
<tr>
<td>1998–2001</td>
<td>31,739</td>
<td>3,268</td>
<td>0</td>
<td>90.9</td>
</tr>
</tbody>
</table>


Indonesia can best guarantee its food security by producing rice (and other commodities) efficiently at world-competitive prices and establishing links and stable contractual arrangements with efficient world exporters to ensure a steady and reliable source of imported foodstuffs. If Indonesian demand for rice were to increase significantly, international prices would rise, thereby benefiting Indonesian producers and encouraging more production at home and elsewhere. Indonesia can rely on imported rice at lower longer term prices as a result of increased global competition. Moreover, since unstable domestic rice prices are more likely to come from domestic production disturbances than from international fluctuations, a more open Indonesian rice market is likely to reduce rather than raise price volatility (BAPPENAS et al. 2003).
Empirical Estimates of the Economic Costs of Higher Rice Tariffs

Modest increases in rice tariffs from Rp430 per kilogram (kg) to Rp550 per are estimated to have substantial “deadweight” efficiency losses and adverse effects on consumers, especially on the poorest households (Erwidodo and Hermanto 2002). According to one partial-equilibrium study, this tariff increase would raise retail rice prices by almost 6% and farm prices by just over 4%. The annual net welfare (deadweight) loss to the economy of the higher tariff was estimated to be Rp499.2 billion. Rice producers would receive an annual income transfer from consumers through higher prices of Rp4.7 trillion; farmers would capture 64.7% of this transfer (Rp3.1 trillion), and rice processors and traders the rest (Rp1.7 trillion). However, many rice farmers would still be worse off, since they consume more rice than they produce. The study therefore rejected higher rice tariffs as counterproductive, leading to significant economic (efficiency) costs and hurting particularly the low-income groups of consumers.

Effects on Farm Incomes

Most small rice farmers are net consumers of rice, so tariff protection, which benefits the largest, most efficient, and richest rice farmers the most, provides poorly targeted welfare. Field research by the Center for Agro-Economic Research indicated that the very small size of the average farm (below 0.5 hectare [ha]) and not rice prices was the root of the problem of low farm income, since Indonesian production was very profitable at world prices. Besides, for most rice farmers, rice income is only 28% of household income. Improving nonrice, especially off-farm, income opportunities will be the main means of reducing poverty (BAPPENAS et al. 2003).

Crop Diversification and Self-Sufficiency

Indonesia’s intensive self-sufficiency policies in a few selective commodities, especially rice and sugar, are contrary to its crop diversification objectives. Crop diversification is slow. In the mid-1980s, when Indonesia achieved rice self-sufficiency, 41% of all cropped farmland was in rice. Today the share is 38%. Artificially setting higher (and more stable) prices for rice and sugar has altered relative prices against other crops and land uses and has encouraged farmers to continue producing rice and sugar.

While some studies (including that by Timmer 1997) have suggested that BULOG’s price stabilization program hastened economic growth from 1970 to 1995, by the 1990s it was clear that the large public costs of its operations could have been better used to promote growth and reduce poverty. Moreover, stable prices do not necessarily mean stable farm incomes. Price fluctuations can often compensate for production variations, such as those due to drought. Stable commodity prices are also less relevant to farm income if off-farm sources are significant. Price fluctuations, between seasons and at other times, also provide important signals and incentives to allow efficient producer decisions; price-stabilizing arrangements that mask these signals can lead to poor decisions. A change to a more market-based price policy was clearly needed (BAPPENAS et al. 2002).

Macroeconomic Policies for Sugar: A Case Study

The sugar industry centers on private and state-owned milling operations. Small-scale family farmers account for about half of cane plantings. State-owned mills crush cane from these farmers and from their own plantations. Private mills manage their own plantations. The Government’s objective is to achieve self-sufficiency in sugar by 2007. But self-sufficiency has declined substantially (Table A5.5). The industry suffers from low returns, high input costs, and inefficiency.
Trade and Assistance Arrangements

Sugar is probably the most regulated food commodity in Indonesia. The government provides subsidized inputs to farmers, maintains informal production targets in sugar-growing areas, owns and operates most of the mills, regulates prices at the farm gate and throughout the marketing chain, and controls distribution channels (Magiera 2003).

BULOG’s sugar import monopoly was terminated in 1998. Between 1999 and 2002, several hundred importers were apparently involved in the sugar trade (Rosner 2003). An import tariff was, however, reintroduced in January 2000 at 25% for refined and 20% for raw sugar. These tariffs were changed to specific rates of Rp550 per kg for refined and Rp600 per kg for raw sugar in July 2002, and the tariff for refined sugar was increased to Rp700 per kg in November 2002. These specific rates correspond to ad valorem duties of about 35% for refined and 30% for raw sugar.

The industry is also assisted by domestic price support arrangements underpinned by tariffs and NTBs. In September 2002, MTI reestablished a restricted import licensing system with quotas to protect farmers. It granted only five permits to import sugar—to BULOG and four state plantation enterprises—but because of import difficulties, the state plantations designated BULOG as the actual importer. All importers of sugar and seven other commodities had to have a special identification number, effective May 2002. Sugar, along with rice and wheat flour, was also subjected to special “red-line customs procedures” from September 2002.

Effects of Sugar Protection

The domestic price of sugar has risen sharply since the new trade restrictions were imposed. The average retail price rose by 23% from September 2002 to January 2003, and by 75% from September 2002 to April 2003. The retail price has almost quadrupled since 1996, and in real terms sugar is now 40% more expensive to consumers than it was before the economic crisis (Rosner 2003). Domestic sugar prices rose suddenly from Rp3,800 to more than Rp5,000 per kg in April 2003 because of domestic shortages, even though world prices fell (McIntyre and Resosudarmo 2003). The gap between domestic and world prices has widened as protection has increased. In early 2003, domestic prices were more than double world levels.

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*This changed the licensing arrangements for sugar from general importers to only registered importers (NPIK) who either have “Angka Pengenal Importir Produsen (API-P)” or “Angka Penenal Importer Terbatas (API-T)” licenses.*

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### Table A5.5: Development of Sugar Self-Sufficiency, Indonesia, 1995–2000

<table>
<thead>
<tr>
<th>Year</th>
<th>Production ('000 tons)</th>
<th>Import ('000 tons)</th>
<th>Export ('000 tons)</th>
<th>Self-Sufficiency Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(1)/[(1)+(2)-(3)]</td>
</tr>
<tr>
<td>1995</td>
<td>2,092.0</td>
<td>688.8</td>
<td>0.0</td>
<td>75.2</td>
</tr>
<tr>
<td>1996</td>
<td>2,094.2</td>
<td>975.8</td>
<td>0.0</td>
<td>68.2</td>
</tr>
<tr>
<td>1997</td>
<td>2,190.0</td>
<td>1,364.6</td>
<td>6.0</td>
<td>31.7</td>
</tr>
<tr>
<td>1998</td>
<td>1,491.6</td>
<td>1,811.7</td>
<td>6.0</td>
<td>45.2</td>
</tr>
<tr>
<td>1999</td>
<td>1,498.8</td>
<td>1,998.0</td>
<td>7.0</td>
<td>43.1</td>
</tr>
<tr>
<td>2000</td>
<td>1,244.0</td>
<td>989.0</td>
<td>0.0</td>
<td>55.7</td>
</tr>
<tr>
<td>Average:</td>
<td>2,125.4</td>
<td>1,009.7</td>
<td>3.0</td>
<td>68.4</td>
</tr>
<tr>
<td>1998–2000</td>
<td>1,411.5</td>
<td>1,599.6</td>
<td>7.7</td>
<td>48.0</td>
</tr>
</tbody>
</table>

The industry remains inefficient as a result of repeated high protection and cannot compete with imports under reduced protection. Self-sufficiency policies in products like sugar, where Indonesia has no comparative advantage, will continue to require high levels of protection. The protection will be very costly to the economy, to consumers, and especially to food processors, which will have to pay higher prices on an important input for the food and beverage industry.

Moreover, much of the sugar land in Java can also be planted to rice, where Indonesia has a comparative advantage. The periodic need to compel Javanese farmers in the sugar belts to grow sugar instead of rice to ensure sufficient cane for the mills shows the relative inefficiency and nonprofitability of sugar compared with rice.

The deep-seated problems in the sugar industry have long been recognized. Nowhere in the system has there been any regard for sugar industry economics, productivity, and efficiency, nor any strong incentives to change the system (Mackie and O'Malley 1988, Gonarsyah et al. 1991).

**Possible Tariff Increases**

Despite recent changes, the sugar industry appears to be lobbying for even more protection, including higher tariffs of Rp1,200 per kg on imported refined sugar and temporary import bans in light of large domestic sugar stocks. Several policy options are being studied, including leaving the tariff unchanged and giving a price subsidy of Rp500 per kg to sugar producers, or introducing tariff quotas to be administered by BULOG.

If the sugar tariff were to be raised to Rp1,200 per kg (about 50% in *ad valorem* duties), net welfare (*“deadweight” losses*) would fall further by about Rp644 billion (about the same loss with the present tariff), and higher prices would cost consumers Rp1,476 billion more and give Rp710 billion more to producers. But a substantial part (probably well over half) of the tariff increase would most likely go to the sugar processors and eventually be dissipated in cost inefficiencies. Moreover, higher tariffs on sugar or any other product would also encourage smuggling and illegal trading.

Leaving the tariff unchanged and paying a subsidy of Rp500 per kg to sugar producers would reduce the additional welfare loss to Rp49 billion, because the subsidy would raise producer prices without increasing consumer prices. While this policy option is preferable to an increased tariff along standard static partial equilibrium lines, it would still worsen national welfare. A Rp500 per kg subsidy plus a Rp700 tariff would mean that some 60% of the price received by sugar processors would come from assistance, reflecting the industry’s inefficiency and noncompetitiveness. Moreover, the subsidy would cost the Government (and hence the taxpayer) some Rp844 billion yearly.

If a subsidy is to be provided, it should be part of a well-designed adjustment scheme to facilitate the industry’s adjustment, including contraction, which incorporates immediate delicensing of imports, phased tariff reductions, and sunset provisions of a given period. Any such program would need to be credible, and once fully announced, should be implemented without exception.

**Fertilizer Subsidies: A Case Study**

Input subsidies, primarily on fertilizer, are instrumental in achieving rice self-sufficiency, but at tremendously high financial cost. Providing cheaper fertilizer to farmers in the early years helped them to experiment with its use and to realize the benefits provided. Total domestic fertilizer consumption increased almost sixfold to 5.9 million tons between 1975 and 1998 (Table A5.6).

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3 Government tariff revenue would increase by Rp121 billion. The difference between the extra total amount paid by consumers from the tariff increase and the sum of what producers and the Government receive equals the “deadweight” efficiency or welfare loss to the economy.
However, because of its success in increasing fertilizer use, the budgetary cost of the subsidy escalated. The total financial cost of fertilizer subsidies in 1997/1998, according to the Ministry of Finance, was Rp2.257 billion ($282 million at $1 = Rp8,000).

The financial cost was not the only disadvantage of the subsidy. Since it was intended mainly to assist rice and sugar farmers, the subsidy applied only to nitrogenous (urea-based) fertilizers. The subsidy encouraged overuse of these fertilizers and heightened the nutrient imbalance in fertilizer application.

Increased assistance to farm activities from input subsidies can affect resource allocation and reduce efficiency, particularly if the main beneficiaries receive relatively high output assistance. An activity’s level of assistance should incorporate all forms of assistance, including inputs and outputs, as well as negative assistance. Conceptually at least, this is what the effective rate of assistance does. The subsidy also introduces its own distortions and inequities. It advantages crops that use nitrogenous fertilizers intensively (rice and sugar) over other crops and livestock activities. It provides most assistance to better-off small farmers, who tend to use more fertilizer. Exempting large estate users from the subsidy to contain budgetary costs, while possibly justified on equity grounds, raises efficiency concerns.

### Table A5.6: Development of Domestic Fertilizer Consumption in Indonesia, 1975–1998

<table>
<thead>
<tr>
<th>Year</th>
<th>Urea ('000 tons)</th>
<th>AS ('000 tons)</th>
<th>TSP/SP 36 ('000 tons)</th>
<th>KCl ('000 tons)</th>
<th>Total ('000 tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>676</td>
<td>94</td>
<td>235</td>
<td>34</td>
<td>1,039</td>
</tr>
<tr>
<td>1980</td>
<td>1,776</td>
<td>330</td>
<td>949</td>
<td>123</td>
<td>2,723</td>
</tr>
<tr>
<td>1985</td>
<td>2,607</td>
<td>475</td>
<td>1,048</td>
<td>290</td>
<td>4,420</td>
</tr>
<tr>
<td>1990</td>
<td>2,983</td>
<td>605</td>
<td>1,261</td>
<td>510</td>
<td>5,359</td>
</tr>
<tr>
<td>1991</td>
<td>3,097</td>
<td>606</td>
<td>1,256</td>
<td>444</td>
<td>5,403</td>
</tr>
<tr>
<td>1992</td>
<td>3,410</td>
<td>608</td>
<td>1,290</td>
<td>482</td>
<td>5,790</td>
</tr>
<tr>
<td>1993</td>
<td>3,095</td>
<td>639</td>
<td>1,173</td>
<td>366</td>
<td>5,273</td>
</tr>
<tr>
<td>1994</td>
<td>3,288</td>
<td>615</td>
<td>1,125</td>
<td>302</td>
<td>5,330</td>
</tr>
<tr>
<td>1995</td>
<td>3,710</td>
<td>653</td>
<td>1,070</td>
<td>404</td>
<td>5,837</td>
</tr>
<tr>
<td>1996</td>
<td>3,918</td>
<td>588</td>
<td>900</td>
<td>375</td>
<td>5,781</td>
</tr>
<tr>
<td>1997</td>
<td>3,324</td>
<td>351</td>
<td>663</td>
<td>350</td>
<td>4,688</td>
</tr>
<tr>
<td>1998</td>
<td>4,290</td>
<td>408</td>
<td>869</td>
<td>330</td>
<td>5,897</td>
</tr>
</tbody>
</table>

Growth Rate per Year (%)

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount ('000 tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975/80</td>
<td>21.3</td>
</tr>
<tr>
<td>1980/85</td>
<td>8.0</td>
</tr>
<tr>
<td>1985/90</td>
<td>2.7</td>
</tr>
<tr>
<td>1990/95</td>
<td>4.6</td>
</tr>
<tr>
<td>1995/98</td>
<td>5.0</td>
</tr>
<tr>
<td>1990/98</td>
<td>4.6</td>
</tr>
</tbody>
</table>

AS = ammonium sulfate, KCl = potassium chloride, SP = superphosphate, TSP = triple superphosphate.

Source: Gregory (1999).

### The Fertilizer Industry

The food crop sector absorbed 76% of total domestic fertilizer consumption in 1991–1997. Java accounts for about 75% of urea use, 64% of superphosphate (SP) 36 use, and about 75% of potash use. Urea use on rice, particularly in Java, has averaged about 95% of recommended rates, or about 250 kg per ha, and dosages of 300 kg per ha, induced by the highly subsidized price, have not been uncommon. On the other islands, urea use on rice is about 30% below recommended dosage; phosphate and potash use are negligible.
Indonesian urea is quite competitive in Southeast Asian markets, with estimated production costs of $61–65 per metric ton. In addition, PKG also produces SP 36, ammonium sulphate (AS), and cement in an integrated production process, while PUSRI, PKT, and PIM also produce hydrocarbon-based chemicals.4

Current Fertilizer Subsidy

The fertilizer subsidy has been removed and restored several times since the financial and economical crisis. In line with the IMF package, the subsidy was eliminated in 1997. The IMF correctly felt that it was no longer necessary, since the fertilizer market in Indonesia (especially in Java) had matured and farmers were now well aware of the benefits of fertilizer use. But the fertilizer subsidy was quickly reintroduced in 1997 for food crops. The budgetary costs escalated largely because of leakage of subsidized fertilizer to the estate crop (plantation) sector and because of illegal exports. The subsidy was again removed in December 1998. Spot shortages of fertilizer occurred in the domestic market. In 2001, a different type of fertilizer subsidy was introduced. Instead of a direct subsidy to fertilizer manufacturers, the state-owned petroleum company Perusahaan Tambang Minyak Nasional (PERTAMINA) had to supply gas to the state-owned urea fertilizer manufacturers at prices below the world price.5 The subsidy was therefore funded by PERTAMINA, and indirectly by the Government.6 But it was abolished in December 2002.

In the 2003 budget, the “old-style” direct subsidy was reintroduced to reduce urea fertilizer prices by 15-20%, at an annual cost of Rp.1.2–1.5 trillion (Alisjahbana and Manning 2002). It was paid only to state-owned fertilizer manufacturers, thereby acting as an entry barrier to private manufacturers, and applied to specific fertilizers (urea, SP 36, AS, and nitrogen-phosphorus-potassium) used only by small-scale farmers until 2005. Plantation/estate farms were ineligible, as were exported and imported fertilizer. This dual pricing structure between small and estate farms opened up scope for abuse and leakage, and raised administrative costs. Horticulture and rice farmers were the main beneficiaries of the subsidy.7

Despite the IMF reforms, fertilizer prices are still administered, and manufacturing and distribution are still dominated by state-owned enterprises, which do not compete with each other, as they generally supply specific provinces or regions. While the private sector and non-KUD (nonfarm) cooperatives may now distribute fertilizer, including imports, to the food crop and plantation sectors, they cannot give farmers access to subsidized credit.

The inefficient and costly state-owned distribution system creates distortions in cropping patterns and in land and fertilizer use. More competitive and private-based marketing would eliminate the high costs of parastatal distribution operations, improve allocative efficiency, and reduce fertilizer prices to farmers (Gregory 1999).

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4 Most fertilizer is produced by six state-owned companies, namely, PT Pupuk Sriwijaya (PUSRI), Palembang and South Sumatera; PT Pertokmia Gresik (PKG), Gresik and East Java; PT Pupuk Kalimantan Timur (PKT), Bontang and East Kalimantan; PT Pupuk Iskandar Muda (PIM), Lhoksumawe, Naggroe Aceh Darussklama (NAD); PT Pupuk Kujang (PK), (Cikampek and West Java; and PT Asean Aceh Fertilizer (AAF), Lhoksumawe, NAD. AAF is a joint venture between the Indonesian Government (60% equity) and governments of other ASEAN countries. Its fertilizer production is limited to exports to ASEAN countries.

5 In fact, the natural gas subsidy to fertilizer manufacturers has also operated previously. Up to December 1998, the Government had instructed Pertamina to charge no more than $1 per MM BTU and had paid Pertamina a subsidy of $0.50 per MM BTU.

6 The price of natural gas for fertilizer manufacture was set at $1.35 per MM BTU to enable urea to be sold at Rp1,150/kg. Because of an increase in the price of gas in the market, the Government in January 2003 increased the price of urea to Rp1,400/kg, a portion of which (17.8%, or Rp250) was paid through the government budget (APBN).

7 Quantitative limitations on the use of subsidized fertilizer exist and the subsidy level varies from Rp94 to Rp250 (for urea) depending on fertilizer type.
Policy Implications

Reintroducing the direct fertilizer subsidy is difficult to justify. The fertilizer market in Indonesia has matured, and the benefits of fertilizer use are widely known. Moreover, well-targeted and effective extension services are now viewed as a better way of solving problems in farming practices than selective fertilizer subsidies, which inevitably discriminate between inputs and farming activities. It is also unclear to what extent fertilizer manufacturers and small farmers benefit from the indirect input subsidy on natural gas sold by PERTAMINA. This hidden subsidy discriminates against both fertilizer imports and other domestic gas users. The circuitous path of using administered gas prices to subsidize domestic fertilizer manufacturers and, indirectly, farmers’ consumption of fertilizers is prone to unintended distortions.

Paying fertilizer manufacturers a direct subsidy to provide farmers with subsidized fertilizer prices raises similar concerns. The manufacturers should pass the full benefits on to farmers through lower prices. There is little pressure on manufacturers or distributors to make this happen, since the subsidy is not paid on imported fertilizer and the Indonesian fertilizer and distribution market is noncompetitive and largely handled by the same state entities.

The Indonesian system relies on state domination and regulation through administered fertilizer prices to farmers and close monitoring of prices by the Ministry of Agriculture (MOA) to ensure that farmers benefit from the direct and indirect subsidies. While this system may have worked in the past, it is administratively costly and does not guarantee the intended outcome.

Paying the subsidy only on domestic production allows domestic manufacturers much room to appropriate a significant share of the subsidy despite the administrative arrangements employed to stop it. If the fertilizer subsidy is to benefit the farmers, the subsidy should be extended to nitrogenous fertilizer imports. Imported fertilizer would thus be more competitive with domestic production, and the farmer could decide between domestic and imported fertilizers on the basis of quality and price factors alone, unaffected by the subsidy. Domestic fertilizer manufacturers, however, would most likely resist such moves and push for the status quo. For the indirect fertilizer subsidy paid to manufacturers through lower gas prices, no such remedy exists, even though the same concerns are raised regarding who ultimately benefits.

If paying a fertilizer subsidy is deemed to be good public policy on either efficiency or equity grounds, then excluding imports from the subsidy cannot be justified. Imports would mainly replace domestic production, so including them in the subsidy would not greatly alter the total budgetary cost. Moreover, excluding plantations from the fertilizer subsidy runs counter to efficiency considerations. The subsidy also introduces inequities, giving most assistance to those farmers who use the most fertilizer and discriminating against other farmers. Like any other farm assistance, a fertilizer subsidy is therefore a very poor means of providing targeted welfare assistance to farmers, and should be rejected on both efficiency and equity grounds. A far more preferable policy response would be to deregulate the state-owned fertilizer and distribution markets to ensure that they operate efficiently and provide farmers with imported and domestic fertilizer at competitive world prices. In addition, if a significant share of the fertilizer subsidy actually assists manufacturers/distributors, MOA should not fund the entire subsidy, but only the portion that assists farmers. The rest should be funded by the MTI.

Indonesia’s Agricultural Competitiveness

A common measure of production efficiency, and hence of comparative advantage, is domestic resource cost (DRC), which measures the value of domestic resources needed to earn a unit of foreign exchange from exports of a given commodity or to save a unit of foreign exchange through import substitution. DRC therefore indicates the efficiency with which a country producing that commodity domestically can earn or save foreign exchange; it is usually calculated using a
shadow exchange rate. Economic activities or commodities with a DRC lower than unity are said to have a comparative advantage, since it means that the economy saves foreign exchange by producing the goods domestically, either for export or for import substitution, because the opportunity cost of the domestic resources and nontraded factors used in producing the good is less than the foreign exchange earned or saved. In contrast, if the DRC exceeds unity, domestic costs are above the foreign exchange cost or savings, and so the good should not be produced domestically but should instead be imported. A decline in the DRC ratio over time indicates an increasing comparative advantage.

Another approach to measuring efficiency is to estimate an activity’s assistance levels using nominal and effective rates of protection assistance. Since an activity’s efficiency and level of government assistance are normally inversely related, highly assisted commodities are generally much more inefficient than poorly (or negatively) assisted commodities. The effective rate of protection assistance is a better measure of an activity’s total assistance than the nominal rate on output, because it can cover all forms, including negative assistance or penalties, on both outputs and inputs. It also relates an activity’s total assistance to its unassisted value added. On the other hand, a nominal rate of assistance on output measures only output assistance, and may therefore omit some important forms of assistance or penalties.

Indonesia’s comparative advantage in producing several food crops has decreased over time, largely reflecting the long-run changes in world commodity and input prices, opportunity costs of domestic factors of production (labor, capital, and land), and production technologies used in farming or marketing (Monke and Pearson 1989). World food production has increased substantially over the past two decades and, between 1995 and 1999, global prices fell for rice (–7.23%), maize (–5.01%), soybean (–5.06%), and sugar (–15.83%) (Sawit 2001). The food crop studies summarized in this study indicate that Indonesia has the highest comparative advantage for rice and maize. It has dubious comparative advantage in soybean and none in sugar.

Rice

Since Java is more industrialized and has exhausted the potential for productivity growth in this crop, rice production seems to be more competitive in other regions (Masyuhri and Fukui 2003). But, while DRCs in these other regions are still under unity, they appear to have risen substantially since the mid-1980s, indicating that much of the comparative advantage has disappeared, at least in some regions. This decline also seems to have been associated with increased government assistance, particularly since the late 1990s. Recent observations suggest that rice farming has remained profitable in all areas studied, because a tremendous rise (128%) in the farm gate price of rough rice had offset a sharp increase in fertilizer, pesticide, and seed prices over the last 2–3 years (BAPPENAS et al. 2003).

It will, however, be difficult to increase rice production to meet rising demand because of limited water resources, strong competition from other (food) crops, rapid conversion of rice fields (sawah) into other uses, and decreasing world rice prices. The decrease in world prices, driven primarily by well-documented terms-of-trade changes against rural commodities, should translate, through trade liberalization, into lower domestic prices in Indonesia. Otherwise, rice protection would have to increase and the gap between domestic and world rice prices (at a constant rupiah exchange rate) would widen, reducing Indonesia’s national welfare, contrary to its long-term economic interests. Recent evidence indicates that higher assistance does not mean more efficiency. On the contrary, rising protection is normally symptomatic of inefficiency among domestic producers, who need more assistance to compete with imports.

Hence, to maintain global competitiveness in rice production, the solution is not more protection, which would only compound the problem and is likely to accelerate the decline in comparative advantage. Rather, Indonesia should invest in research, irrigation, and rural infrastructure to raise yields and improve rice quality and cropping patterns (Masyhuri and Fukui 2003).
Maize

The decline in comparative advantage is less obvious for maize. Maize farming seems promising in some areas like Klaten (Central Java), Kediri (East Java), and Sidrap (South Sulawesi), where DRCs have generally remained well below unity. The incentive structure for maize shows that, although input costs are higher because of the incentive structure (the nominal protection coefficient on tradable inputs is larger than 1), output assistance is relatively low in some areas. This implies that the assistance structure is disadvantaging maize production by providing relatively low (and perhaps negative) effective assistance, at least in some regions.

The future of maize farming seems to depend on developing an animal feed market based on an expanded livestock industry. Demand for livestock products like eggs, meat, and milk will increase over time as incomes rise in Indonesia.

Soybean

Compared with rice and maize, Indonesia’s comparative advantage in soybean farming is less clear. This commodity has enjoyed high protection, indicated by high effective assistance rates. DRCs have also generally been close to unity, at least in more recent years. Soybean is a subtropical crop and hence has lower yields in tropical countries like Indonesia. For example, Indonesian yields average about 1.2 metric tons per ha compared with more than 3.0 metric tons per ha in the US.

Sugar

Indonesia has no comparative advantage in producing sugar. The very high levels of protection are symptomatic of this and of inefficiency. The longer term costs of protection are likely to rise if Indonesia maintains its sugar self-sufficiency program. The main issue still appears to be the conflict between the entrenched vested interests of the sugar mills and of the large farmers’ lobby, and the interests of both consumers and potential producers of agroprocessed commodities, who use sugar as a major input (Mackie and O’Malley 1988, Gonarsyah et al. 1991, Alisjahbana and Manning 2002).

The drive for sugar self-sufficiency will likely be at the expense of rice production. Sugarcane areas in Java, where irrigation systems are most extensive, have been decreasing in any event, as farmers diversify into more profitable crops or convert land to industrial, commercial, and other uses (Gonarsyah et al. 1991, Athukorala 2002).

Links Among Trade, Growth, and Poverty Reduction

Trade and agricultural liberalization in Indonesia can positively contribute to living standards and reduce poverty in the country. Open-trade policies provide static and dynamic efficiency gains to the economy. Countries can specialize in what they do best (comparative advantage) and allocate resources to their most productive uses. This, together with more competitive markets from imports, raises productivity and contributes to economic growth. Growth not only creates the necessary jobs, but also generates the wealth governments can tax to obtain the resources they need to serve the poor.

Most people accept the need for economic growth to address poverty, but many do not accept the link between trade openness and economic growth. Empirical evidence supports economic theory to indicate that trade openness is an important determinant of growth (Berg and Krueger 2003). Moreover, empirical studies show a “strong presumption” in favor of trade liberalization reducing poverty through growth (Winters et al. 2002). There is certainly no evidence
that trade liberalization harms growth or increases poverty. It is also generally acknowledged that repeated attempts by many countries to use import substitution (trade protection) to promote sustainable growth have failed seriously.

Indonesia’s Experience with Trade Liberalization

Until the Asian crisis in 1997, Indonesia actively pursued a more open trade and investment regime since the mid-1980s to promote growth and to reduce poverty. This policy was very successful. Economic growth was relatively high, averaging more than 6% yearly for much of this period. Income per capita increased from $60 to about $1,000, and poverty declined from about 70% of the population to below 15% (Hill 1996).

Indonesia’s Paths to Liberalization

Indonesia has combined unilateral, regional, and multilateral approaches to reform to varying degrees. Its successful trade reforms in the mid-1980s were initially a unilateral response to serious economic difficulties, including the oil crisis, and were not part of an IMF/World Bank program or conditional on reciprocity (Basri and Hill 2003). However, unilateral reforms were slowed in 1991 by difficulties in reforming politically sensitive sectors like agriculture (sugar, wheat flour, garlic, soybean, clove, milk and dairy products) and manufacturing (motor vehicles, cement, and plastics) (Feridhanusetyawan and Pangestu 2003).

Another wave of unilateral investment and trade reforms, which began in 1994, was spurred by Indonesia’s external commitments, especially its important role in hosting the 1994 meeting of the Asia-Pacific Economic Cooperation (APEC) in Bogor (see Box A5.1) and encouraging member economies to endorse the Bogor objective of “free and open trade and investment” by 2020 at the latest. Indonesia announced a comprehensive tariff reduction package and other trade reforms as part of its voluntary APEC commitments. Unilateral trade reforms were also part of the 1997 IMF crisis recovery program, especially in the first few years. Many of these affected sensitive areas in agriculture, such as BULOG’s import monopolies on rice, sugar, and other sensitive commodities. But some of these reform commitments were not fully implemented or are now being reconsidered (Feridhanusetyawan and Pangestu 2003).

Trade reforms in the mid-1990s were also encouraged by regional initiatives, especially the decision of member countries of the Association of Southeast Asian Nations (ASEAN), of which Indonesia is a part, to phase in the ASEAN Free Trade Area (AFTA) and the common effective preferential tariff (CEPT) by 2008. Since the crisis, the trade reforms have been accelerated to 2002–2003 for the original members of ASEAN (see Box A5.2). Economically, AFTA has contributed little in additional welfare gains to Indonesia because it is mostly trade diverting. But trade diversion has been contained, because AFTA tariff preferences are generally small and have been reduced by the ASEAN members, which are generally reducing most-favored-nation (MFN) tariffs. Some have argued that the main benefit of AFTA has been to speed up the unilateral liberalization of many ASEAN countries, including Indonesia (Feridhanusetyawan 2001).
Box A5.1: Asia Pacific Economic Cooperation

APEC was created in 1989 in the wake of trade tensions between the US and Japan. The main impetus for APEC liberalization came in 1993, when the first meeting of leaders in Seattle provided a vision of free trade and investment in the Asia-Pacific region. A year later, the voluntary (nonbinding) Bogor targets were set for free and open trade, including services, and investment by 2010 for developed economies and by 2020 for developing countries. APEC envisages a process of “unilateral concerted” liberalization, or “open regionalism.” Members voluntarily undertake nondiscriminatory unilateral liberalization toward all countries (on a most-favored-nation basis). APEC contributes to the process through confidence building and peer pressure, relying on “champions”—often the economy hosting the APEC meeting—to voluntarily undertake these unilateral liberalization efforts. APEC, which involves many of the world’s major traders and WTO members like the US and now the People’s Republic of China, has also been seen as a catalyst for WTO progress. The informal meeting of leaders in 1993 paved the way for discussion and compromise to overcome the deadlock on agricultural liberalization that obstructed the completion of the Uruguay Round. In 1996, APEC provided the critical mass to launch negotiations under WTO. The negotiations resulted in an agreement to reduce tariffs on information technology products. APEC economies must now show major leadership and direction to revive the Doha Round of negotiations.

Box A5.2: ASEAN Free-Trade Area

Indonesia participates in AFTA as a founding member of ASEAN. For the five original ASEAN members (the others being Malaysia, the Philippines, Singapore, and Thailand), tariffs on intra-ASEAN trade (with at least 40% ASEAN content) were to be reduced under the CEPT to no more than 5% by 2002–2003. The newer ASEAN members are allowed longer transition periods. At the end of 2001, the inclusion list of tariff items covered by the CEPT represented, on average, 85% of the tariff lines of all ASEAN member countries (98% for original members); 93% of total tariff items covered by the CEPT for original members had maximum tariffs of 5% (38% were duty free). The average CEPT tariff on all members was 3.7% in 2001 (down from 12.8% in 1993), and fell to 2.7% in 2003. In 1999, members agreed to eliminate all import duties among original members by 2010 and among the newer members by 2015. Quantitative restrictions and other NTBs are also to be eliminated. Indonesia has transferred products progressively to the CEPT scheme. At the end of 2002, 99% of Indonesian tariff lines were covered, with tariff rates of 5% or less. Indonesia’s CEPT tariffs averaged 4.6% at the end of 2001 (down from 7.0% in 1993), and were to fall to 3.7% by 2003. At the end of 2001, Indonesia had 21 tariff items subject to temporary exclusions and another 4 items excluded as sensitive products. Since January 2003, Indonesia has had no temporary exclusions or sensitive products. The ASEAN countries are also negotiating intraregional service liberalization. Other agreements aimed at promoting intra-ASEAN trade, investment, and greater regional integration are the ASEAN Industrial Cooperation Scheme and the ASEAN Investment Area.

Some are skeptical of the role of AFTA in promoting unilateral liberalization. It is not entirely clear how almost completely unutilized CEPT concessions could have made ASEAN countries more willing to cut utilized MFN tariffs, which were outside the AFTA process. If the concessions did not affect their willingness to cut MFN tariffs, then AFTA merely created an impression of activity and success by taking advantage of decisions to liberalize trade that were made for other reasons—such as the implementation of the Uruguay Round; the gradual realization that countries that abandoned import substitution grew faster than those that clung to it; and, in Indonesia’s case after 1997, the need to satisfy the conditions demanded by IMF for crisis lending (Fane 2002).

Indonesia also participated actively in the Uruguay Round of multilateral negotiations under the General Agreement on Tariffs and Trade (GATT)/WTO. Its WTO commitments, to be phased in by 2005, cover areas like increased tariff bindings of all agricultural items, reduction in industrial and agricultural tariffs, and removal of import licensing schemes and other nontariff barriers on industrial products (Feridhanusetyawan and Pangestu 2003).

Choosing the Best Path Forward

Such a multifaceted approach to trade liberalization has worked well for Indonesia. But each type of reform has its own merits and does not necessarily complement the others. Unilateral liberalization offers the best prospects for trade reforms. Policy makers and politicians must, however, understand and be deeply committed to trade liberalization as being in the country’s economic interests, and the institutional and policy-setting environment must clearly show the “winners and losers” from protectionist policies and the economic costs of protection. Once it is appreciated that trade policies are best based on economic efficiency and national welfare grounds instead of narrow sectoral interests, reforms can be implemented relatively quickly and will not depend on reciprocity.

In contrast, multilateral or WTO liberalization is inherently slow, mainly because commitments must be negotiated in several rounds among all WTO members and then implemented progressively within an agreed upon period. Members’ multilateral commitments normally approach the “lowest common denominator” because of the inherently mercantilist and reciprocity approach of the negotiations. The priority is getting other members to reduce their trade barriers rather than reducing one’s own. Offers to improve market access are seen as a concession that must be given in exchange for improved access to other markets. Moreover, since many of these negotiated reductions apply to maximum instead of actual trade barriers, multilateral commitments often have little or no immediate impact on a country’s trade barriers. In the case of Indonesia, the commitment in the Uruguay Round to bind most of its tariffs across the board at a ceiling rate of 40% had little impact on actual trade liberalization because its average applied tariff rate was already much lower.

Thus, multilaterally negotiated trade liberalization is likely to be “watered down” as each member tries to liberalize as little as possible while exacting maximum trade liberalization abroad. Members also often refrain from offering liberalization measures so as to keep these as “negotiating coin” for future negotiations, a strategy that is likely to be welfare reducing for the country concerned. Nevertheless, multilateral negotiations can still provide a means to “lock in” trade reforms internationally. In this way they can be an important corollary to unilateral reforms. Both unilateral and multilateral liberalization are deeply rooted in nondiscriminatory or MFN liberalization and therefore reinforce each other. MFN liberalization is economically the most efficient liberalization, as it ensures trade creation and an unambiguous and maximum increase in national welfare.

Regional liberalization, on the other hand, is based on discriminatory liberalization: countries negotiate preferential trading arrangements bilaterally or with a few trading partners. Such arrangements risk substantial trade diversion, which may outweigh any positive trade creation
effects, thereby reducing a country’s overall national welfare. At best, the national welfare gains are substantially below those generated from MFN liberalization; at worst, they may be negative. Preferential trade agreements also systemically weaken the multilateral system by seriously eroding the MFN or nondiscrimination principle on which the GATT/WTO was founded.

Preferential trading arrangements are proliferating. Indonesia intends to have comprehensive bilateral trading arrangements with countries like Canada, Chile, Japan, and the US. As part of ASEAN, it has also agreed to set up an ASEAN-China Free Trade Area in 10 years, and is examining the prospects of an East Asia Free Trade Area with the People’s Republic of China, Japan, and the Republic of Korea (ASEAN + 3). The increased attractiveness of preferential trading arrangements is understandable, given the difficulties of the Doha Round following the Cancun failure, which are indicative of the many problems and often slow outcomes associated with WTO. But the impasse in the multilateral negotiations and the stampede to regionalism are also stark reminders of the real dangers to the world trading system of a weakened WTO. Members must work together to put the multilateral negotiations quickly back on track.

Estimating the Gains to Indonesia

The strong preference in economic theory for nondiscriminatory unilateral liberalization, supported by effective multilateral commitments, over regional (discriminatory) liberalization has wide empirical support. Studies repeatedly show that unilateral market-opening reforms are most beneficial to a country, primarily because greater competition from imports improves the efficiency of domestic resource use. The economic gains accrue mainly to those that liberalize, even in a multilateral context. Unfortunately, this message is often lost in WTO trade diplomacy because of the mercantilist focus on exports and greater market access abroad.

Feridhanusetyawan and Pangestu (2003) confirm that, according to the Global Trade Analysis Project model, Indonesia’s trade liberalization brought substantial economic benefits through improved resource allocation at home. The study estimates that full implementation of the Uruguay Round commitments (excluding service liberalization) would result in $1.5 billion (in 1995 dollars) in annual gains to Indonesia. If the commitments were combined with unilateral liberalization to reduce all tariffs to 5%, the gains would increase by one third to $2.2 billion (many of these additional gains would come from agricultural liberalization).

Using a different model, Stoeckel (1999) estimates global gains from full liberalization, including services, at $630 billion in 2010. Indonesia’s gains are almost $25 billion (about 14% of the current gross domestic product [GDP]). About two thirds of Indonesia’s gains come from its own liberalization; the rest come from multilateral liberalization. The main sources of gains measured in this study are resource-use efficiency, dynamic gains from capital accumulation, endogenous productivity gains from trade openness, and risk reduction from more open markets.

Global Agricultural Market Reform

Distorting Trade Policies

Global agricultural markets are heavily distorted, mainly because of the protectionist policies of many Organisation for Economic Co-operation and Development (OECD) countries. The protection takes many forms, but these fall essentially into three categories: First, many countries impose high trade barriers on competing imports. Second, many rich countries also subsidize exports; without the subsidies, farmers would incur losses or not earn enough from exports, because their production costs exceed or are close to world prices. Third, domestic payments, such as production subsidies or price support schemes, often support farm production; taxpayers generally fund export and production subsidies, while consumers finance assistance from trade barriers and price support by paying above world prices.
OECD Assistance Levels and Trends

OECD support for agriculture was estimated at $235 billion in 2002, about the same as in 2001 but below 1986–1988 levels (OECD 2003). Assistance represented 31% of farm receipts in 2002 (38% in 2001). Much of it came from higher prices. On average, OECD farmers received 31% more than world prices in 2002 (30% in 2001). Support levels vary widely between countries and commodities. In 2002, the countries with the highest agricultural assistance, measured by the producer subsidy equivalent (PSE) as a percentage of gross value of farm receipts, were Switzerland (75%), Norway (71%), the Republic of Korea (66%), Iceland (63%), Japan (59%), and the European Union (EU) (36%). The lowest assistance was provided by New Zealand (4%) and Australia (1%). Canada (20%), Mexico (22%), and the US (18%) also provided substantial assistance.

The highest-assisted commodities in 2002 were rice, sugar, milk, other grains, wheat, mutton, beef, and veal. The average level of support across all commodities in OECD was 31% in 2002.

Most OECD assistance (67% in 2000–2002) still takes the form of market price support or output payments. These distort domestic production most, as the amount of assistance received is directly linked to production levels, and hence do most harm to global markets. While this share has declined substantially (from 82% in 1986–1988), it varies widely between countries. Of the highly assisted countries, Japan, the Republic of Korea, and Iceland had the largest shares (more than 80% of PSE), followed by Norway (more than 75%) and Switzerland, the EU, and the US (more than 65%). These shares have fallen substantially, especially in the EU and Switzerland, but other forms of assistance, such as payments based on area planted, have been introduced. Although these new forms of assistance are less distorting than market price support and output payments, they are nonetheless still likely to affect production.

Market price support is funded by consumers, who pay higher prices. In 2002, the total transfer from OECD consumers to producers from higher prices was $143.7 billion.

Effects of Agricultural Protectionism

High agricultural protection in many OECD countries distorts the decisions of farmers and encourages overproduction. Exporting surpluses, often assisted by substantial subsidies, depresses the global prices of key commodities and thus reduces the export returns of efficient exporters. Such effects are particularly damaging to developing countries that rely on agricultural growth and exports for development. Therefore, reforming agricultural protectionist policies in major OECD countries would benefit not only their economies by improving resource-use efficiency and lowering food prices for consumers, but also many developing countries by raising world export prices and providing better access to major OECD markets. The reforms would contribute significantly to world development and poverty reduction of poor producers.

Many studies estimate the extent to which world food prices would increase following full liberalization of OECD farm policies. By one estimate, global agricultural trade would increase by more than 50%, and international food prices would go up by 5% on average (Anderson 2003a). But since OECD levels of protection vary widely among commodities, the price effects of liberalization would differ substantially by commodity. It has been estimated that the largest price increases would be in mutton (22.2%) and milk (23.6%). Other substantial price increases were also estimated for refined sugar (8%), wheat (3.9%), soybean (3.2%), and maize (3.1%).

Such price increases would benefit countries that are potentially net exporters of these commodities. Countries that are net importers, on the other hand, would suffer terms-of-trade losses, as import prices would go up. Indonesia imports many of the commodities that would
increase in price following agricultural reforms, such as rice, wheat, sugar, milk, and meat. But it is also a significant exporter of many other agricultural products, such as fruits and plantation crops. These exports would benefit from the improved efficiency resulting from Indonesia’s liberalization, as well as from better access to major markets resulting from accompanying multilateral reforms. The evidence suggests, therefore, that even many food-importing developing countries would benefit from the farm policy reforms of high-income countries (Anderson 2002).

Policy Response by Indonesia

Countries like Indonesia that may endure adverse terms-of-trade effects should not make these a reason to resist multilateral agricultural reforms or, more importantly, their own trade liberalization in agriculture or other sectors. Agriculture is only one, albeit a very important part, of the opportunities for multilateral liberalization. Other areas like textiles, clothing, and services would provide multilateral gains to developing countries, including Indonesia. Such gains are very likely to substantially outweigh any terms-of-trade losses to individual developing countries, so that net benefits would accrue to the countries from participating in multilateral negotiations.

Perhaps more importantly, although some net-food-importing countries may suffer a terms-of-trade loss from multilateral agricultural liberalization, the empirical evidence indicates that in nearly all cases, the efficiency gains from their own agricultural liberalization exceed the terms-of-trade losses (Tokarick 2003).

Empirical Estimates of Benefits of Multilateral Agricultural Reforms

Modeling studies show that global gains from multilateral liberalization for agriculture are substantial and exceed other gains, except for service liberalization; agricultural protection hurts most the countries that impose such policies, and agricultural reforms benefit most the countries that undergo the reforms; and countries with substantial trade barriers would gain the most from unilateral trade liberalization.

A study by Anderson (2003a) shows that most of the gains from further merchandise trade reforms after the implementation of the Uruguay Round come from agriculture (Table A5.7). Not surprisingly, reforming agricultural policies in high-income countries would generate most of the global gains from agricultural liberalization. But most of the gains accrue to those that liberalize. It is not only the rich countries that limit access to their agricultural markets; developing countries are increasingly imposing trade barriers, especially tariffs, against agricultural imports from other developing countries. Anderson’s estimates show that low-income countries as a group benefit more (almost three times as much) from their own agricultural trade reforms than from reforms by high-income countries.

This study also concludes that the global gains from multilateral agricultural liberalization would be substantial—about $128 billion yearly (at 1997 prices). Such gains go mainly to the countries undergoing the reforms. Developing countries would reap 75% of these gains. Complete agricultural liberalization by developed countries would produce global welfare gains of about $100 billion, of which 92% would accrue to developed countries; the rest, about $8 billion, would go to developing countries. Liberalization by developing countries alone would bring $24 billion in gains, of which about 88% would accrue to developing countries. Thus, agricultural liberalization by developing countries would give these countries substantial gains of about $21 billion, or almost three times what they would gain from liberalization by developed economies. This is because developing countries, which have few trade-distorting subsidies, levy import tariffs that are generally higher than developed-country tariffs.
While the Uruguay Round included agriculture in the multilateral system, established international trade rules, and secured some farm policy reform, WTO has made only limited progress in recent years in reducing agricultural protection and creating more open markets, in both industrialized and developing countries (Anderson et al. 2001). Hence, global markets in many major commodities are still heavily distorted.

### Indonesia’s Uruguay Round Commitments

The agriculture agreement required members to make commitments on three categories of farm support, namely market access (tariffs and tariff quotas), export subsidies, and domestic support. Indonesia’s commitments have had little impact on liberalizing its agricultural trade barriers, because the commitments substantially exceeded its actual import restrictions and levels of support, allowing it to increase tariffs and other measures without breaching obligations. “Special and differential” treatment for developing countries, such as smaller negotiated reductions in farm tariffs and more generous de minimis provisions, have also reduced the value of commitments.

### Market access

Indonesia bound all agricultural tariff items in the Uruguay Round. While many items were bound at ceiling rates of 40%, many other items, especially agricultural commodities, were bound at much higher rates. Agricultural bound rates range from 9% to 210%. Since the applied tariffs on the commodities were generally much lower, the bindings had little real impact on reducing applied tariffs.
Export subsidies for rice. Indonesia bound export subsidies on rice at ceiling amounts of $28.3 million and 299,750 tons in 1995, to decline to $21.5 million and 257,785 tons by 2004. These amounts were well above any previous export subsidies. Since the implementation of the agriculture agreement, Indonesia has not subsidized rice exports.

Domestic support. Indonesia maintains several domestic support programs, mainly market price support under the administered price schemes for rice and sugar. Indonesia notified WTO of an estimated value of Rp2,203 billion for the aggregate measurement of support (AMS)\(^8\) for the administered price scheme for rice in 2000. It used administered domestic and external reference prices of Rp2,645 and Rp1,632 per kg, respectively, and eligible production of 2.173 million tons, based on BULOG’s procurement (WTO 2001). No AMS notification was given for sugar.

Most of Indonesia’s other domestic support measures appear to fall under the “green box” or under “special and differential” treatment, and need not be reduced as a result of WTO commitments (Magiera 2002). The green-box programs cover the provision of general agricultural services, public stockpiling of food for security, domestic food aid, and natural disaster relief (Table A5.8).

Doha Round of Negotiations

The WTO agenda, including agricultural negotiations, has been weighed down by the increasing unwillingness of members, both developed and developing, to offer market-opening commitments (as they should to receive similar “concessions” from others). This suggests that the negotiations are being dominated by political rather than economic considerations. Strong direction is needed to cut through the political pressures and refocus on maximizing the economic gains to all members from trade liberalization.

The Doha Round is an ambitious agenda. A successful conclusion hinges on members being able to agree to substantive outcomes on agriculture. As Cancun amply demonstrated, agriculture remains a very sensitive issue, and there are substantial differences in the reform positions of major economies.

<table>
<thead>
<tr>
<th>Type of Measure</th>
<th>Monetary Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Services (billion rupiah)</td>
<td>366</td>
</tr>
<tr>
<td>Payments for Natural Disaster Relief (billion rupiah)</td>
<td>3</td>
</tr>
<tr>
<td>Domestic Food Aid (billion rupiah)</td>
<td>–</td>
</tr>
<tr>
<td>Public Stockpiling of Food for Security (billion rupiah)</td>
<td>32</td>
</tr>
<tr>
<td>Total Green Box (billion rupiah)</td>
<td>401</td>
</tr>
<tr>
<td>Exchange Rate (Rp/US dollar)</td>
<td>2,249</td>
</tr>
<tr>
<td>Total Green box (US$ million)</td>
<td>$178</td>
</tr>
</tbody>
</table>

Source: Magiera (2002).

Indonesia must take a coherent and effective position at multilateral agricultural negotiations. Agriculture, despite contributing less to GDP in recent years (17% in 2000), remains of crucial importance to Indonesia. While the country produces major food crops (rice, maize,
cassava, soybean, and peanut) mostly for domestic use, it is one of the largest exporters of tree crops like rubber, copra, palm kernel, palm oil, coffee, cocoa, and spices, and has considerable export potential in tropical fruits. Its future economic interests will be best served by a strategy that looks after its export interests. The strategy should emphasize Indonesia’s trade liberalization in agriculture and even in services and on this basis apply maximum pressure on other countries, especially rich ones, to reform their highly protectionist trade policies and liberalize global markets.

**Special and Differential Treatment**

Indonesia has come out strongly for “special and differential” treatment (S&D) for developing countries in market access, domestic support, and export subsidies. Indonesia proposes that all trade measures used by developing countries to meet S&D objectives should be excluded from WTO reduction commitments and disciplines.

Of most importance to Indonesia is market access. It believes that developing countries should not have to commit to reduce tariffs on strategic products. (Although not specified by Indonesia, these would seem to include at least rice, sugar, soybean, and maize.) If such products were excluded from the reductions, it would be prepared to accept some formula tariff reductions in agriculture. It also believes that bound tariff reductions in developing countries should be linked to reductions in developed countries’ agricultural support. In its view, the tariff reduction formula to be negotiated must accommodate developing countries’ nontrade concerns, and address the problems of tariff peaks and escalation in developed countries.

On domestic support, Indonesia believes that developing countries should be able to exclude food security, rural development, and similar measures from reduction commitments. On export subsidies, it feels that developing countries should retain flexibility in using these, while developed countries should eliminate or substantially reduce them. Indonesia fully supports the establishment of a food security mechanism to address this problem in developing countries.

Indonesia’s negotiating position seems attractive from a political and trade negotiating perspective. Requiring Indonesia and other developing countries to make little or no reduction commitments in sensitive areas would give them maximum flexibility in setting their own policies. However, without undergoing trade reforms itself, Indonesia would receive very small economic gains from multilateral agricultural liberalization. Moreover, the S&D treatment it is using to delay its domestic reforms is also being used by other developing countries to bar Indonesian exports. Less open forms of S&D, such as slower tariff reductions, or sunset clauses to exemptions from commitments, would seem to be a far better compromise than indefinite exclusion of a range of sensitive products from commitments.

**Priorities for Multilateral Reforms in Agriculture**

Of the three types of support for agriculture in OECD countries, export subsidies are the most distorting and difficult to justify. They distort world markets and provide a marginal incentive for producers to expand production substantially beyond domestic requirements and turn countries from net importers to net exporters of certain commodities. Without export incentives, the marginal return from surplus domestic production would be based on the much lower world (unsubsidized) price. Production would be curtailed, as exports would be far less profitable. A priority for multilateral reform should therefore be to have agricultural export subsidies abolished.

Of the other two key support interventions, import barriers, especially tariffs and tariff rate quotas, appear to be more distorting and more damaging to developing countries than...
domestic subsidies (Hoekman et al. 2002). Reforming the import barriers of OECD and other developing countries should therefore also be a high priority for Indonesia. Since technical barriers to trade like sanitary and phytosanitary (SPS) measures (quarantine) also restrict market access for Indonesian exports, tightening the rules in the SPS agreement to limit the misuse of quarantine restrictions as de facto protection measures would also be in Indonesia’s interest. Moreover, lowering barriers to market access would weaken market price support schemes that rely on import restrictions to raise domestic prices above world levels. Other forms of domestic support like production subsidies have far less effect on developing countries (Tokarick 2003).

Policy retooling in OECD away from market access barriers to domestic support payments decoupled from production may be beneficial to developing countries. Moreover, domestic subsidies are taxpayer funded and open to budgetary scrutiny, while assistance from border protection is “hidden” and financed by consumers paying higher prices, and therefore much harder to reform.

Cairns Group Membership

Indonesia is a member of the Cairns Group of countries, a group of WTO members, mainly developing countries, that aims to eliminate all trade-distorting subsidies and substantially improve market access so that agricultural trade can proceed on the basis of market forces. The Cairns Group position on agriculture would appear to be consistent with the long-term economic interests of Indonesia, a food-exporting country that would benefit from open world agricultural markets.

Indonesian authorities have, however, indicated that the Cairns Group position is not entirely in line with Indonesian national interests and that Indonesia may therefore develop its own agricultural proposals in certain areas (WTO 2003). The S&D provisions, in particular, fall well short of its request to have strategic products excluded from tariff reduction commitments. Any decision not to support the Cairns Group proposals should be based on a clear understanding of what is in Indonesia’s best economic interests. As argued here, major multilateral agricultural reforms built on substantial trade liberalization at home offer the best economic outcome for Indonesia. These interests would not be met if efforts to reduce its WTO agricultural commitments through excessive (indefinite) S&D treatment weakened domestic reforms and contributed to missing opportunities to gain substantial global agricultural liberalization under the Doha Round.

Conclusions and Recommendations

Indonesia’s trade policies must promote agricultural and rural development to enhance economic growth and reduce poverty. Economic theory and empirical evidence support the belief that trade openness promotes economic growth. Generally, trade restrictions to achieve food self-sufficiency and food security are inefficient policies that impose economic costs on the economy and increase food prices. Food security is mostly about food affordability, especially for poor households, and trade links to ensure continuity of imports. Trade liberalization thus facilitates, not undermines, food security.

The following trade policy recommendations offer the most effective means of ensuring agricultural development, economic growth, and poverty reduction:

- Maintaining economic liberalization, and where possible further liberalizing agricultural trade, would promote efficiency in the agriculture sector. But in an economy where few effective instruments compensate short-term losers from tariff removal, social costs can

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10 Other members are Argentina, Australia, Bolivia, Brazil, Canada, Chile, Colombia, Costa Rica, Guatemala, Indonesia, Malaysia, New Zealand, Paraguay, Philippines, Thailand, Uruguay, and South Africa.
rise disproportionately, disrupting the stability of the system. For a smooth transition to trade liberalization in agriculture, better rural institutions and additional investments must be in place. As agricultural and rural economic efficiency is restored, trade restrictions and tariffs on rice and sugar should be phased out.

- Of particular concern has been the reintroduction of NTBs, such as sugar import controls, once again in the hands of BULOG. Higher tariffs, including the replacement of ad valorem rates with specific duties, as was done for rice and sugar, should also be avoided. But if the Government wants to maintain agricultural protection on some commodities, tariffs—preferably ad valorem and not specific duties—are always preferable to nontariff measures.

- If some protection is maintained as productivity-enhancing investments are made, the specific duties and tariffs applied recently to sugar and rice should be removed and ad valorem duties restored, preferably at lower levels.

- Fertilizer subsidies, both direct and indirect (through PERTAMINA), should be removed. At the very least, the indirect subsidy should be abolished and the direct subsidy should be extended to eligible nitrogenous fertilizer imports. A preferable policy response to fertilizer subsidies would be to deregulate the state-controlled fertilizer industry to establish a competitive market that would ensure efficient fertilizer prices to farmers at world levels. Savings from the elimination of the fertilizer subsidy should be invested in productive assets like agricultural research and rural infrastructure.

- Indonesia should strongly support the Doha Round and do all it can to restart the negotiations. With other developing as well as developed WTO members, it should apply maximum pressure on WTO countries like the EU, Japan, and the US to reform their highly protectionist agricultural trade policies, which greatly distort world food markets. Among rich and developing countries alike, the use of export subsidies should be banned, and market access restrictions like tariffs and tariff rate quotas should be reduced.
In Appendix 3, the high transaction costs for producers of high-value agricultural products (HVPs) were seen to be a major constraint to diversification in Indonesia. The high costs drive a considerable wedge between the prices that farmers receive and the prices that consumers pay, reducing the price incentive of farmers as well as consumer demand. As a result, both producers and consumers are trapped in a low-level equilibrium. One way to reduce transaction costs is to promote vertical integration. Vertical integration also has other benefits, like reducing risks. This appendix reviews the emerging vertical integration between Indonesian farmers and supermarkets, the market organization, and the value distribution that results from vertical integration.

Vertical Integration: What and Why?

Vertical integration is the degree to which a farm owns its downstream buyers (forward integration) or a supermarket or firm owns its upstream suppliers (backward integration). In Indonesia, where many farmers lack credit and the necessary management skills, backward integration is much more likely than forward integration. Though vertical integration commonly refers to ownership, it will also be here for integration through formal and informal contracts.

Risk plays a central role in farmers’ crop choice and degree of specialization. The two most important risks are price risks and production risks. Since prices of HVPs may vary from season to season, and since the public authority often makes no effort to stabilize prices, producers of HVPs are subject to higher price risks than producers of staple crops. Producers of HVPs are also subject to production risks, particularly to yield risks due to variations in inputs, weather, and other idiosyncratic risks. Production risks can be managed at the farm level to a certain extent but are still a substantial portion of the overall risk.

In developed economies, where futures and options for agricultural products are available, farmers can use futures for downside price protection or options to capture favorable price movements while ensuring downside price protection. Similarly, producers can use production insurance and other risk-mitigating instruments to reduce production risks. However, without markets for futures and options, as is the case in Indonesia, farmers who decide to specialize in HVPs are subject to price and production risks.
In addition to price and production risks, other factors that discourage farmers, particularly small farmers, from producing HVPs are lack of information about products, inputs, and markets; limited access to production resources, inputs, and credit; limited access to markets; and high transaction costs for their produce.

Vertical integration between farms and firms can be a potential solution. An arrangement where a firm shares risks with farms; provides information, credit, and production inputs; and ensures output disposal at a predetermined price can be highly beneficial for farms specializing in HVPs.

**Vertical Integration in Indonesian Agriculture**

Agriculture in Indonesia has been undergoing vertical integration with allied industries—food processors, distributors, and supermarkets. In a typical integration, the allied industries take on part or all of the production and marketing decisions. Farmers lose independence, but they also reduce their risks, constraints, and costs.

The process of vertical integration can be visualized using the value chain in Indonesia’s food markets. Consider a new supermarket chain in Jakarta that sells canned pineapples to consumers. In a typical setting without any vertical integration, the pineapples it sells are produced by farmers, sold in spot markets, bought by middlemen/traders, and sold to a processor, who sells the canned pineapples to the supermarket. The involvement of many nonintegrated agents creates two major problems: First, products like the pineapples may not be produced in the way that consumers want, since the farmers may not know enough about what consumers in the cities prefer. Second, transaction costs, including monitoring and enforcement costs, may be high, because transactions must be sought in the spot market. In an imperfect market, transaction costs are likely high. Vertical integration responds to the increased demand for HVPs, such as canned pineapples, while reducing transaction costs.

Direct coordination between farmers and supermarkets, through ownership or contracts, can reduce information asymmetries between urban consumers and rural producers, and is a direct response to the challenges posed by the changing food demand structure. Since coordination can also reduce the search cost of farmers to find buyers, their transaction costs are also reduced. Thus, this type of integration can induce commercialization and specialization at the farm level and diversification at the national level.

**The Modern Retail Sector**

**Emergence of Supermarkets and Fast-Food Chains**

The major changes in consumption patterns in Indonesia have been accompanied by major changes in retailing. Figure A6.1 shows the emergence of supermarket and hypermarket chains in the last three decades. Fruit imports are estimated to have increased from $1.65 million in 1985 to $5.79 million in 1990 and $105 million in 1996. By 2002, net import of fruits had increased to $350 million. Vegetable imports increased from $6.5 million in 1985 to $28.2 million in 1990, $75 million in 1996, and $95.7 million in 2002 (BPS, Indonesia Foreign Trade Statistics, 1980–2002).

In fact, one might argue that the changing patterns of consumption and forms of retail are mutually reinforcing. On the one hand, clearly changing consumption patterns in favor of high-value foods demand different forms of retail, and supermarkets have arisen to fill this demand (Box A6.1). On the other hand, the emergence of supermarkets has made HVPs more widely available and further increased their consumption.
Similarly, the rapid spread of fast-food chains in Indonesia is both a consequence of changing food consumption patterns and a force that drives changes in consumption patterns. While Indonesia had only seven fast-food companies with 38 outlets in 1987, by 1993, there were 71 companies with 476 outlets.

Supermarkets and fast-food chains in Indonesia are urban-centered but are not limited to Jakarta. They can also be found in Surabaya, Medan, and Bandung, as well as in smaller cities. Before the economic crisis, Indonesia had 940 supermarkets, 313 of which were in Jakarta (Canadian Embassy 2003).

Figure A6.1: Supermarket Outlets in Indonesia, 1971–2002


Box A6.1: Hero Supermarket

PT Hero Supermarket Tbk. was established in 1971. By the end of 2002, it had 106 outlets in all major cities on Java, Sumatra, Kalimantan, Sulawesi, and Irian Jaya. Recently, it expanded its business to hypermarkets. Its hypermarket chain, called Giant, has four outlets at present. The company had an annual turnover of about Rp2.4 trillion ($285.7 million) in 2002, a marked improvement in performance in the postcrisis period. It is now expanding and plans to do so aggressively.

The company maintains a central distribution center for its outlets. Local food procurement follows a typical pattern: from farmers to collectors to larger collectors to Hero’s central distribution center to Hero’s outlets.

Though the source of procurement depends on the location of an outlet, generally Hero gets more than three fourths of its fruit supplies (in terms of value) from abroad, and three fourths of its vegetables from domestic producers. Before procuring any product from domestic sources, Hero establishes a relationship with farmers through collectors; and it enforces strict quality controls both on-farm and off-farm.

Source: Case study for this publication.
Supermarkets and fast-food chains in Indonesia are expected to continue increasing in number. In 1998, Indonesia opened up its retail and wholesale trade sector, including agricultural products distribution, to foreign investment. Although some restrictions remain, foreign firms can now operate retail outlets in most major urban areas. Carrefour and Continent, hypermarket chains with French parent companies, have taken advantage of the regulatory changes. Before 1998, joint ventures with foreign operators were on the rise, as Indonesian retailers sought technical and managerial expertise from abroad.

With more and more urban consumers buying from supermarkets and more supermarket outlets opening, it is no surprise that supermarkets have become an increasingly important part of the retailing industry with a significant share of the industry. In 1992, 30% of Jakarta residents said they had never been inside a supermarket; by 1993, only 17% said so (RIRDC 1995). The proportion of supermarket “nonvisitors” also dropped during the same period in other major cities, from 43% to 36% in Surabaya, and from 41% to 23% in Bandung. According to the Indonesian Retailers Association, the share of modern retailing in total retailing increased from 6% in 1997 to 20% in 2001. Meanwhile, traditional retailing has been on the decline. Between 1992 and 1993, the traditional retailing markets in Jakarta managed by Pasar Jaya decreased from 164 to 162 (RIRDC 1995). Although dualism in the retailing industry will perhaps continue, the role of traditional wet markets, particularly in urban areas, has been rapidly shrinking.

Impact of Supermarkets

The emergence of supermarkets in Indonesia can affect farmers and consumers alike in several ways. Supermarkets can provide farmers with information on new products, inputs, credit and extension services, and marketing services, thereby easing their resource constraints and lowering their production and marketing risks. Some services that supermarkets may provide to farmers, such as information and extension services, can save scarce public resources. In fact, supermarkets have emerged as some of the most important buyers in some developing countries. Supermarkets in Latin America buy 2.5 times more produce from local farmers than what the region exports to the rest of the world (Reardon and Berdegué 2002).

For consumers, supermarkets are important, since they are the closest to urban consumers, and in a demand-driven diversification, as shown in Appendix 3, are the first agents to know consumers’ preferences and to act accordingly. However, supermarkets can also influence consumer preferences by introducing new products and packaging. Therefore, there is a two-way interaction between consumers and supermarkets.

Other agents that will be affected by the emergence of supermarkets are traditional vendors in villages and subdistricts, and wholesalers in districts and big cities. These are likely to be bypassed in the modern procurement system, which caters to the needs of supermarkets and the modern retailing industry.

Changes in the procurement system can have important implications for farmers as well. In Latin America, the shift from traditional wholesalers to centralized procurement and specialized wholesalers gives supermarkets the incentive and capacity to impose standards (Balsevich et al. 2003). Similarly, in Indonesia, supermarket chains like Hero and hypermarket chains like Giant get most of their local produce from specialized wholesalers, who have contractual relationships with farmers. Standards and safety in farm production are thus more easily enforced.

Vertical Integration in Fresh Fruits and Vegetables

The emergence of supermarkets and modern retailing in Indonesia has paved the way for vertical integration between supermarkets and farmers, and increased coordination in the value chain starting from production at the farm level to quality control at the intermediary level and marketing
at the retail level. From a supermarket’s perspective, two major issues motivate vertical integration: first, transaction costs versus the costs of the same activities in contract/ownership integration, and, second, control of outputs and the value chain. While control of outputs can deliver the products that the end consumers prefer, control of the value chain can bar the entry of potential competitors and lead to monopsony rents.

### Traditional Value Chain

Figure A2.2 shows the traditional value chain for fresh fruits and vegetables (FFVs) in Indonesia. In a typical setting, a farmer produces for home consumption and for the market, with little or no knowledge of grading and standards, nor of food safety. What is produced for the market is sold to a vendor (Vendor I), a village or subdistrict collector, who in turn sells to a wholesaler at the district level. Depending on the location of the farm, there could be another vendor between Vendor I and the wholesaler. District or subdistrict vendors either jointly or individually rent a vehicle to transport their products to the wholesale market after negotiating the price with the wholesaler by telephone. The wholesaler in turn sells to the wet market. Traditional retailers buy from wet markets and sell to consumers.

Traditional vendors in villages usually extend credit to farmers during the growing season. The farmers reciprocate by selling all their products to the vendor at the vendor’s price, which is based on the market price. The price cannot be far below the market price, since the vendors’ market in the districts and subdistricts, where there could well be more than 100 traditional vendors, is very competitive.

In the traditional value chain the production risk is partly shared between farmers and vendors, but only to the extent of the credit. Vendors themselves have credit constraints. Traditional vendors either have no access to formal credit or, if they do, they can seldom comply with the documentation requirements. Therefore, they can offer only limited credit to farmers. Vendors also do not share the price risk, since their product basket is very specialized.

Depending on their location, some wholesale markets in Indonesia appear to be very efficient with respect to price spread. The wholesale market for FFVs in Jakarta, for one, seems to transmit price information very efficiently. Because there are many wholesalers, and therefore price information spreads relatively quickly from the wholesale market to vendors in the districts and subdistricts, the price spread between wholesalers and vendors is small.

### Modern Value Chain

A typical supermarket outlet like Hero sells about 15,000 products, including around 200 types of fruits and 200 types of vegetables. There is a sharp contrast between FFV sources. Supermarkets source locally almost 80% of the vegetables they sell (in value terms) but import around 80% of the fruits (Source: Case study interview with supermarket managers for this study in 2003). However, the mix could vary with the location of the supermarket and over time. For instance, a supermarket outlet in Irian Jaya would perhaps source most of its imported products from Australia, while a supermarket outlet in Batam would get most of its imported products from Singapore.

Figure A6.3 presents the modern value chain for domestically procured FFVs. In contrast to the traditional value chain, the modern value chain usually
has fewer participants, a high degree of coordination, and highly integrated activities.

In the modern value chain, a farmer usually establishes a contractual relationship, mostly oral but still formal, with a vendor, and the vendor establishes a similar contractual relationship with a supermarket chain. There could be two vendors, as shown in the figure—Vendor I, who collects from farmers and supplies Vendor II, a relatively bigger collector who supplies the supermarket chains—or only one vendor between farmers and supermarkets. Individual supermarket outlets do not receive products directly from vendors. Instead, the vendors supply a central distribution system owned by the supermarket chain, which in turn supplies individual outlets.

Unlike traditional retailers, supermarkets maintain grades and standards in procurement. They give the guidelines to vendors, who must strictly follow them as part of their agreement. Each type of FFV procured locally must meet the grade and standard requirements of the supermarkets. To get the desired quality, supermarket chains usually monitor on-farm and off-farm activities by controlling fertilizer application, quality of seeds, and harvesting and postharvest handling techniques.

Vendors play a very important role in the value chain by reducing the information gap between supermarkets and farmers. They supply quality seeds, technology, and other inputs the farmers need to meet the supermarkets’ requirements. They train the farmers to achieve the required standards. Some of them also link the farmers to financial institutions where they can get credit. The vendors may set harvesting schedules with the farmers and procure FFVs according to the grades and standards agreed upon.

Vendors also add value to the products through better postharvest processing and handling, from cleaning, trimming, sorting, grading, and packaging to distribution. Since quality matters most to supermarkets, products are sorted and graded according to shape, color, taste, odor, and maximum physical defects. Vendors add value as well by putting the products on a tray; wrapping them in plastic, cellophane, or net; or simply tying them together, depending on the products’ characteristics and consumers’ preferences.

**Value Distribution**

To analyze the distribution of the total gross value generated in the value chain, data on the price spread of various FFVs were collected. The sample includes three supermarket/hypermarket outlets in Jakarta and Bogor, three vendors who supply supermarkets/hypermarkets in those same areas, and traditional markets in Bogor and Bandung. How the value generated in the chain is distributed among the different participants, from farmers to consumers, can be examined in at least two ways: (i) by calculating the share of gross value that each participant receives in each of the value chains and comparing the participants vertically within a value chain and horizontally between the two value chains; or (ii) by comparing the absolute prices between the two value chains, particularly for farmers and consumers. However, two essential caveats are differences in product quality between the two value chains, and the fact that the sample on which the analysis is based is not representative.

Figure A6.4 shows the distribution of gross value within each value chain. The numbers to the right of each chain show the gross value distribution within the chain. These values are based on the average prices of six vegetables—cabbage, carrot, chili, potato, shallot, and tomato—at each level of transaction, from farmers to retailers. The numbers in parentheses are the standard deviations. A simple example pertinent to the modern value chain would be 1 kg of HVP bought by a consumer for Rp100 from a supermarket. The farmer sold the HVP for Rp26 to Vendor I, who sold it for Rp35.6 to Vendor II, who sold it for Rp47 to the supermarket chain. The price difference between levels is the gross margin at that level.

Figure A6.4 also allows for horizontal analysis between chains. In the traditional value chain, 35.4% of the gross value goes to farmers, 7.4% to vendors, and so on. Therefore, after
the farmer, the wet market appropriates the highest value in the traditional chain. However, in
the modern value chain, farmers receive only 26% of the total gross value, while supermarkets
receive 53%.

Interestingly enough, although vendors in the modern value chain play a crucial role by
providing information, inputs and technology, credit, and marketing services to farmers, thus
reducing the farmers’ production and price risks, their relative share is not very different from
that of traditional vendors. This is surprising, since modern vendors invest more in human and
physical capital than their traditional counterparts. One possible explanation is that, although
their investment requirements are high, unlike traditional vendors, who deal with many buyers
(traditional wholesalers in the present case), modern vendors operate in an oligopolistic market
(supermarkets), which shifts the distribution of value in favor of supermarkets.

It is obvious from Figure A6.4 that farmers in the traditional value chain, on average,
receive a higher share than farmers in the modern value chain, as confirmed by the relatively low
standard deviations. Yet the absolute prices that they receive present a reverse picture. Table A6.1
shows the prices received by farmers in traditional and modern value chains for the same categories
of vegetables that were used to derive the value distribution in Figure A6.4. For each of the
vegetables except tomato, farmers linked to the modern value chain receive much higher prices—
around 30% more, on average—than farmers linked to the traditional value chain.
### Table A6.1: Price Received by Farmers in Traditional and Modern Value Chains

<table>
<thead>
<tr>
<th>Product</th>
<th>Traditional ($)</th>
<th>Modern ($)</th>
<th>Traditional/Modern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabbage</td>
<td>0.07</td>
<td>0.27</td>
<td>25.9%</td>
</tr>
<tr>
<td>Carrot</td>
<td>0.13</td>
<td>0.27</td>
<td>48.1%</td>
</tr>
<tr>
<td>Chili</td>
<td>0.24</td>
<td>0.37</td>
<td>64.9%</td>
</tr>
<tr>
<td>Potato</td>
<td>0.19</td>
<td>0.25</td>
<td>76.0%</td>
</tr>
<tr>
<td>Shallot</td>
<td>0.31</td>
<td>0.37</td>
<td>83.8%</td>
</tr>
<tr>
<td>Tomato</td>
<td>0.18</td>
<td>0.15</td>
<td>120.0%</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td></td>
<td></td>
<td><strong>69.8%</strong></td>
</tr>
</tbody>
</table>

**Note:** Traditional and modern chains are likely to differ in product quality; better quality is likely to be associated with higher costs to farmers.

**Source:** Data collected for this publication.

The quality difference in products produced by the two groups of farmers was not considered. On the one hand, if the higher quality demanded by supermarkets comes at a cost that is higher than the increase in the gross margin for the farmers, then the farmers operating in the modern value chain may not be better off than those dealing with a traditional value chain. On the other hand, unlike traditional markets, supermarkets link the integrated farmers with consumers who are ready to pay for quality. Therefore, the net welfare gain or loss requires more cautious analysis.

Two other important aspects were not taken into account in the analysis. First, since farmers operating in the modern value chain receive inputs and technical support from vendors, integration definitely reduces production risks. Similarly, since those vendors buy their products (from integrated farmers) at a price correlated with prices in supermarkets, integrated farmers very likely deal with smaller price fluctuations than do their traditional counterparts. Second, transaction costs are lower for integrated farmers than for their traditional counterparts, since integrated farmers know their buyers and do not need to engage in a costly search. Repeated transactions with the same vendor(s) also lower their monitoring and enforcement costs. Therefore, the reduction in price and production risks and transaction costs due to integration likely improve the overall return to farmers linked to the modern value chain.

Consumers who buy from modern retailers clearly pay much more than those who buy from traditional retailers. The price difference is not due to information asymmetry between the groups but, most importantly perhaps, to differences in product quality, hygiene and safety, and convenience.

The vertical integration between farms and supermarkets that has been emerging in Indonesia may allow supermarkets to extract excessive rents because of their monopsony position and control over the modern value chain. But supermarkets need to invest large amounts in the value chain, and the exact size of the rent is not known.

### Partnerships to Incorporate Smallholders into the Modern Value Chain

In an age of market liberalization, globalization, and expanding agribusiness, small farmers in many countries may find it difficult to fully participate in the market economy as larger farms become increasingly necessary for a profitable operation.

Appropriate arrangements to better incorporate small farmers into high-value, vertically integrated farming must therefore be explored in more detail. In 1975, the Indonesian Government launched a smallholder sugarcane intensification program to raise productivity and improve the domestic supply of sugar. In 1978, it promoted the Nucleus Estate Smallholder program for estate crops, fisheries, and livestock. However, these programs were perceived as unfavorable to
smallholders, with companies deciding the major variables in the partnership (Daryanto and Sumardjo 2001).

The five major forms of partnership between farmers and companies or the retail sector are the following: (i) the nucleus-plasma system, where the nucleus company provides the land, production infrastructure, technical guidance, and management; and purchases, processes, and markets the production outputs; (ii) contract farming, which revolves around a contract that specifies the volume, price (either predetermined or based on the actual market price), quality, and time of delivery, and that may or not include support for inputs like credit or fertilizer; (iii) common trade, where suppliers and sellers together market the final product, often on consignment, with the farmers or trader getting paid only after the goods are sold; (iv) agency trade, where small companies market the farm products of a larger company, which is responsible for product standards and quality; and (v) agribusiness operational cooperation, commonly found in sugarcane plantations, tobacco estates, and horticulture, where the companies provide capital, management, and inputs; and the partners provide land, infrastructure, and labor.

According to Daryanto and Sumardjo (2001), the main weaknesses of partnership systems are (i) farmers’ lack of managerial capacity and information; (ii) farmers’ poor knowledge of quality control and product standards; (iii) the generally low level of investment in agribusiness; and (iv) farmers’ weakened capitalization because of the consignment system, where they get paid only after their goods are sold. Community assistance facilitation centers (CAFCs) (see Appendix 2) could monitor and arbitrate the various forms of partnership, to make sure that farmers know their rights and obligations in partnership agreements.

Daryanto and Oktaviani (2003) compiled case studies on alternative forms of partnership between farmers and companies in Indonesia for several commodities—sweet potato, tobacco, maize, horticulture products, rice seed, milk, poultry, and shrimp. The partnerships offer advantages to both farmers and companies and the retail sector: They give smallholders access to large and stable markets and to credit and technical assistance, while ensuring a more reliable and high-quality supply of raw material for the companies and the retail sector.

The case studies of Daryanto and Oktaviani (2003) and the studies done for this publication show that companies reduce the supply risk through a wide variety of contractual arrangements, depending on the farm size, location, and product specifications (Box A6.2).

**Constraints and Future of Vertical Integration**

From a public policy perspective, vertical integration between farms and supermarkets and other forms of market integration that have emerged in Indonesia (and other developing countries) provide services to farmers that public agencies used to provide. Therefore, they save scarce public resources that could be used for other public goods like rural infrastructure and agricultural research.

In Indonesia, the modern vendors are the closest agents to farmers and play a critical role in reducing price production risks and transaction costs. Therefore, public authorities should design incentives for modern vendors. They should also design incentives to help the modern retailing industry flourish in small cities and urban centers close to farmers. In addition, public authorities must ensure that small farmers are integrated into this emerging value chain. Minot (1986) argues that the small-scale production of many high-value commercial crops, such as FFVs and flowers, can compete with large-scale production. This implies that there may not be any economies of scale in the production of these HVPs that would constrain small farmers.

Evidence (for example, Saung Mirwan) shows that smallholders are just as competitive and can participate in the emerging vertical integration through modern vendors. But they have credit constraints, since they have no access to formal credit institutions like commercial banks, and often end up paying much higher interest rates in the informal market.
Box A6.2: Partnerships Between Smallholders and Companies

**Saung Mirwan**

Established in 1983 near Bogor, PT Saung Mirwan grows vegetables and flowers, works as a vendor, and supplies the central distribution centers of supermarkets. The company’s goal was to become a leader in agribusiness by producing high-quality agricultural products with the proper technologies, establishing partnerships with farmers and other institutions, and developing human resources. Saung Mirwan has been highly successful in producing high-quality products, partnering with smallholders, and promoting the employment of women in high-value agriculture. The company has its own farm, storage, grading, and packing facilities at a single location. At present, it grows 18 types of flowers and more than 40 vegetables. The cultivation area is divided between a greenhouse and an open field. In 1991, the greenhouse area was only about 1.5 hectares (ha); by 2001, it had expanded to 3 ha. But most of the products that the company supplies to supermarkets come from partnerships with farmers. In 1992, Saung Mirwan entered into partnership with five traditional farmers near the company site. Later the partnerships were expanded to Megamendung (Bogor) and Cisurupan (Garut). Fifty partner farmers, including 40 smallholders with an average cultivable area of less than 0.5 ha, now grow vegetables for Saung Mirwan. The company provides them with production technologies, expertise, equipment, seeds, and fertilizers; monitors on-field activities; and collects the harvest. Since 1999, Saung Mirwan has had 265 field workers—169 males and 96 females. The latter work in the greenhouses, quality control areas, and packing houses, and are responsible for sorting, grading, and packaging the produce. In addition, there are 95 temporary female workers.

**Santori Company, East Java**

There are three types of partnership programs between feedlots and smallholders: (i) fattening of feeder cattle, (ii) maize silage, and (iii) breeder cattle. In 1997, Santori Company had 4,140 smallholder partners for the fattening of feeder cattle, with 19,700 head of cattle per cycle; 4,200 smallholder partners for maize silage, with 6,700 ha of silage; and only 270 smallholder partners for breeder cattle, with 370 head of cattle. In the partnership program for poultry and beef cattle, the partner feedlots and feed mills provide the livestock farmers with the designs of beef cattle shelter houses and chicken houses, technical guidance, and intensive supervision. The field technicians are graduates of the junior college or polytechnic for livestock sciences. Five field technicians are supervised by a graduate from the faculty of animal husbandry or veterinary medicine. Farmers also receive information on prices of all inputs and guaranteed output prices, as well as information on standard feed conversion ratios (FCRs). They are rewarded if they achieve FCRs above average, but are not penalized for ratios below the standard. Instead, the technicians and supervisor responsible are penalized, through salary reduction or demotion. Conversely, the technicians and supervisor are rewarded by the company for consistent improvements in the farmers’ FCRs. The success of the partnerships in the livestock industry seems to be related to marketing capability, the openness and honesty of all parties, a guaranteed minimum price for the product, product quality control and assistance, interdependence between parties, the reward and punishment scheme for farmers and industry staff, and the timely sale of the product and market research.

Source: Case studies for this publication.

Not all agricultural products require vertical integration between farms and firms. Staple crops like rice, which are not perishable and have efficient spot markets, do not need vertical integration. Since integration involves costs for both farms and firms, any potential reduction in transaction costs and risks through integration must be weighed against the costs of integration through contract or ownership.

Supermarkets pose a challenge to traditional retailing, as more and more consumers are choosing them over traditional retailing. However, this does not mean that supermarkets must be restricted. The Government must simply see to it that supermarkets do not use unfair practices that undermine competition. The adjustment in the retailing industry may require appropriately designed transfer programs for traditional retailers.
Private investors could invest in distribution infrastructure. In an archipelago as large and diverse as Indonesia, with more than 14,000 islands, an efficient distribution system for FFVs is extremely difficult to build. Not surprisingly, Indonesian retailers vary in their FFV distribution capacity. Modern storage and distribution capacity is scarce. Although trucking is still the preferred means of distribution, the availability of refrigerated trucks is very limited (DFAT 2003). As a result, a modern collection and distribution system for FFVs remains a major constraint on the further development of internal and external markets for them.

Conclusions and Policy Implications

Structural changes in the Indonesian food supply and demand have been accompanied by major changes in the retail sector, as represented by the growth of modern supermarkets. To cater to changed urban consumption needs, supermarkets have been integrating with farmers through formal and informal contractual arrangements and partnerships. Vertical integration between farms and supermarkets has helped implement grades and standards, improve quality, and reduce transaction costs and information asymmetries. Integration has also helped reduce price and production risks at the farm level and has ensured higher prices (but perhaps also higher production costs) for farmers compared with their traditional counterparts. The participation of smallholders in vertical integration currently depends, to a large extent, on vendors, and the fear that smallholders are being left out in the modern value chain is not unfounded. CAFCs could monitor and arbitrate the various forms of partnership between farmers and vendors who supply the supermarkets, particularly to make sure that farmers have enough information about their rights and obligations in partnership agreements. Other types of farmer organizations, like cooperatives, could become the basis for smallholders to implement grading and quality standards and then directly supply supermarket warehouses. However, this is not likely to happen soon in most Indonesian regions.

Some policy Implications of these observations are discussed below.

Finance Modern Vendors to Finance and Integrate Smallholders

Credit is a major constraint on smallholders in the production of HVPs. Information asymmetries and high transaction costs make commercial banks unwilling to lend to smallholders. Financing modern vendors to finance smallholders can ease the credit constraints. The financing can be arranged through private banks or specialized public banks that place a ceiling on the interest rate that vendors can charge the farmers (see also Appendix 7).

Build the Capacity of Traders

Since traders are the agents closest to smallholders, increasing the number of modern traders by training traditional traders in grades and standards, and in product quality and product safety, can help integrate smallholders into the emerging value chain. It can also reduce information gaps and incentive problems. The training can be arranged by public authorities in partnership with private traders and retailers’ organizations.

One problem of selling to traditional traders is that market information does not pass from consumers to farmers immediately. In addition, when farmers trade with traditional traders, they are not sufficiently rewarded for improved quality and therefore have no incentive to improve the quality of their products. Investments in information and communication technology, as described in Chapter 4 and Appendix 2, will be important in improving smallholder-supermarket communication.
Provide Incentives to Smallholders

The Government should provide incentives to counteract the apparent weaknesses in partnerships, such as the weak position of farmers because of their lack of managerial skills and information, and their poor knowledge of quality control and product standards; the lack of investment in the agribusiness sector; and the persistence of the consignment system. For this purpose, the formation of farmer organizations at the village level can be promoted, training facilities can be set up, and smallholders can be given better access to credit.

Encourage Vertical Integration, Grades and Standards, and Food Safety

Recent experience suggests that vertical integration can improve agricultural competitiveness through more efficient transactions. The ability to respond to the changed demand of urban consumers at home and abroad depends on efficient vertical integration in the sector. The final product is the result of actions taken by different actors starting from seed production to retailing. Therefore, institutions, partnerships, and contracts must be developed for efficient coordination.

Maximize Supermarket/Hypermarket Benefits While Handling Concerns Carefully

Supermarkets already promote coordination, impose grades and standards, and improve food safety and food quality. They should be encouraged to continue doing so, to increase the export opportunities for HVPs.

However, anticompetitive practices by large retail chains could increase market concentration and harm both farmers and consumers. Therefore, supermarkets and modern retail chains should be brought under general competition law and regulatory oversight.
APPENDIX 7

The Rural Nonfarm Economy

The rural nonfarm economy (RNFE) refers to all income-generating activities that are not agricultural but located in rural areas. (This appendix uses “nonfarm” and “nonagricultural” interchangeably.) “Agricultural” in this definition means all primary production of food, flowers, wood, and fibers from the farming, forestry, and fishery subsectors. The RNFE therefore includes food processing, trade and service enterprises, and other nonagricultural primary sectors like mining and quarrying. It also includes rural infrastructure and institutions like schools, roads, and hospitals.

Employment and income are the two main benefits of the RNFE to the rural poor. An employment-based definition of RNFE in Indonesia includes jobs ranging from formal employment, which often require access to assets like education or credit, to self-employment, such as ambulant peddling (kaki lima), which has low barriers to entry and low asset requirements. An income-based definition of RNFE is not confined to activity-based income (wage employment or self-employment) but can also include non-earned income (e.g., interest, pensions, and remittances from relatives outside the village).

The RNFE may also be defined and measured based on dichotomies, some of which overlap, e.g., on-farm vs. off-farm, business vs. wage income, rural village vs. town activities, earned vs. unearned income, tradable vs. nontradable, and activity-based vs. income-based classification.

RNFE in a Livelihood Diversification Framework

In the broad context of livelihood, rural household income can be on-farm (from the core or main crops, and secondary or diversified agricultural products) or off-farm (from other farms or from nonfarm, nonagricultural enterprises), or it can be unearned (pensions, interest, remittances, and other transfers).

Most empirical research on the RNFE revolves around livelihood and income diversification. According to Ellis (2000), a household’s sources of livelihood are its assets and activities, and its access to them. Assets are the resources with which the household makes a living. The term “asset” is broad and all-encompassing. It includes several categories of capital: physical (land, water, animals, machines, buildings), natural (soil type, sunshine, precipitation), human (education, skills, experiences), financial (savings, credit), and social (kinship, ethnic ties, contact network, rural organizations).

The nonfarm activities of rural villagers in a developing country are typically wage employment and micro- and small business enterprises. A household’s nonfarm activities depend largely on its assets (owned or accessed). How those assets are capitalized on or leveraged into a flow of incomes will depend on the interplay of factors like government policies and incentives,
entry barriers, local market competition and infrastructure, and the family’s entrepreneurial and management capabilities.

The RNFE may be viewed at two levels: as a rural economic growth strategy of the government, and as a “defensive” survival strategy of a poor rural household. (See also Appendix 2 for a discussion of less-favored areas.) Many rural villages of Indonesia, especially in overpopulated Java, have more people than agriculture can employ or feed in a sustainable manner. In those villages, the nonfarm sector is an alternative source of livelihood. As a defensive survival strategy for the poor, nonfarm activities should be seen as managing risk and minimizing vulnerabilities. A rural household that depends completely on monocrop agriculture is vulnerable to crop failure caused by weather or pests. To reduce income variances and risks, rural households diversify their income sources within agriculture or in nonagriculture sectors.

Development analysts used to believe that the diversity of activities in the predominantly agricultural villages of developing countries indicated a lack of economic development, and that the way to progress was through specialization of labor and efficiency-improving technologies (Lewis 1954). Nowadays, the diversity of activities and income in rural villages is considered as poverty reducing, and even a potential vehicle for rural economic growth. The benefits from the RNFE are derived not only from the additional income generated but, more importantly, from the multiplier effects from production and consumption linkages with the agriculture, industry, and service sectors. Estimated regional income multipliers are typically in the range of 1.5–2.0. Thus, for each dollar increase in agricultural value added, there is an additional $0.50–1.00 increase in value added in the rural nonfarm sector. About 67%–80% of this increment is due to household consumption linkages (Rosegrant and Hazell 2000).

The RNFE literature often distinguishes between demand-pull and distress-push diversification. Distress-push diversification generally occurs in an environment of risk, local market imperfections, and disguised agricultural unemployment. It is usually triggered by economic adversity or other unfavorable environmental conditions (e.g., natural calamities), which can lead to a downward trend in rural household income. Distress-induced diversification is forced on the poor and vulnerable rural families, and therefore implies activities that may be less productive or less rewarding than full-time agricultural production. Demand-pull diversification, on the other hand, is usually a response to emerging market or technological opportunities, and offers a household the chance to increase labor productivity and income.

Generally, distress-push diversification is prevalent in geographically isolated rural areas with poor physical infrastructure, low-quality human capital, underdeveloped markets, few resources, and perhaps recent shocks in the natural environment or in agriculture. On the other hand, demand-pull diversification is possible under conditions of expanding technological innovations, market development, or well-developed links between a rural village and nearby towns or external markets.

Poorer households get more of their nonfarm income from wage employment, while richer households have more opportunities to be in business for themselves. And since the relatively poor outnumber the relatively rich households in the rural villages of developing countries, distress-push diversification tends to be more prevalent than demand-pull diversification. In Indonesia, demand-pull diversification is often found in the relatively more affluent villages of Java that are sometimes close to large urban markets, and in the provinces of Bali and East Kalimantan, which depend on tourism and on oil and gas, respectively. Distress-push diversification is more prevalent in the rural villages of remote islands outside Java that are less developed and have poor infrastructure.

In a study of the developing transition economies in Eastern Europe, Davis and Pearce (2001) summarize the push and pull factors in livelihood diversification among farm households. Push factors are population growth, increasing scarcity of arable land, decreasing access to fertile land, declining farm productivity, declining returns to farming, lack of access to farm input markets, decline or deterioration of the natural resource base, temporary shocks or sudden adversities,
and lack of access to rural credit. Pull factors are higher return on labor in the RNFE; higher return on investments in the RNFE; lower risks in the RNFE than in on-farm activities; economic opportunities in urban centers and outside the region or country; and the appeal of urban life, particularly for younger people.

**Evolution and Importance of the Rural Nonfarm Economy**

**RNFE in a Global Context**

On average, nonfarm sources contribute from 29% (in South Asia) to 45% (in eastern and southern Africa) of total household income in developing countries. Rural nonfarm sources of income generally consist of wage employment and business enterprises. Trade, transport, and services are important employment sources throughout the developing world.

**RNFE in Indonesia**

The Indonesian countryside used to be dominated by subsistence-oriented and primarily agricultural households. The level of monetization was low, and the villagers had no purchasing power to buy consumer products produced in the urban areas. The lack of roads, transportation, and market facilities also accounted for the lack of trading.

Population growth and technology-induced agricultural development helped change this subsistence mind-set. Moreover, the increasing demand for food from the growing population gave the subsistence farmers the motivation to use productivity-enhancing techniques, purchase modern inputs, and produce beyond their consumption needs. Trade increased gradually. As their cash income increased, farm households were able to buy consumption goods from the nonagriculture sectors.

Increasing trade in the rural villages encouraged farmers to specialize in production according to their skills, resources, and market opportunities. Rural towns grew in importance as the rural economy continued to grow. Trade with larger urban centers expanded as more consumer goods became available and affordable. These urban goods displaced many traditional rural products, forcing structural changes in the composition of the rural economy. This transformation received further impetus from rising wages; but it drove workers out of many traditional but low-productivity off-farm activities. For example, mobile rice mills from the towns competed successfully against the local mills in the rural areas of East Java.

Agricultural growth is generally considered essential for RNFE growth. New agricultural technologies need inputs produced and distributed by nonfarm enterprises. The resulting increase in agricultural production stimulates downstream activities like drying, milling, processing, packaging, and distribution. The trading of marketable surplus adds to the income of farm households and allows them to buy more consumer goods and services from the nonfarm sector.

**RNFE Importance in Employment**

The role and importance of the nonfarm economy in the life of Indonesian rural villagers may be gleaned from its contribution to employment and household income. Table A7.1 shows the percentage shares of farm and nonfarm employment in both rural and urban areas of Indonesian provinces in 2002. Five provinces stand out, because their shares of rural employment in the nonfarm sector were all above 40%: East Kalimantan, Bali, West Java, Central Java, and Yogyakarta. The economy of East Kalimantan is dominated by the oil and gas industry, while Bali depends heavily on tourism. The other three have diversified rural economies. Their urban, commercial, industry, education, and service sectors are relatively substantial.
Table A7.2 shows how nonfarm employment increased in the rural areas from 1977 to 2002. The 1997 financial and economic crisis reduced nonfarm employment, which is still reflected in the 2002 numbers, as many retrenched laborers in the town and urban enterprises went back to their villages and worked on farms, either as unpaid family labor or as temporary wage labor in neighboring farms.

RNFE Importance in Household Income

The increasing importance of the nonfarm economy in rural household income is shown in Table A7.3. There have been no time series or cross-section studies of whether the long-term shift from agricultural to nonagricultural income sources was attributable to distress-push or demand-pull factors. What is certain, however, is that in Java, arable land is continuously decreasing, while the supply of rural labor is increasing. At the same time, nonfarm income opportunities in Java are growing because of better rural infrastructure and better access to information, credit, and markets. The growth of the nonfarm economy in rural Java may therefore be attributed to a combination of demand-pull and distress-push factors. The relative magnitude of their influence would depend on the economic situation of a farm household at the time of the diversification decision, its access to resources, and its consumption needs, among others.
Table A7.2: Farm and Nonfarm Employment in Rural Areas in Indonesia, 1977–2002 (%)

<table>
<thead>
<tr>
<th>Province</th>
<th>1977</th>
<th>1996</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agric</td>
<td>Non-Agric.</td>
<td>Agric</td>
</tr>
<tr>
<td>NAD</td>
<td>83.13</td>
<td>16.87</td>
<td>37.48</td>
</tr>
<tr>
<td>North Sumatra</td>
<td>75.07</td>
<td>24.93</td>
<td>78.60</td>
</tr>
<tr>
<td>West Sumatra</td>
<td>78.47</td>
<td>21.53</td>
<td>61.93</td>
</tr>
<tr>
<td>Riau</td>
<td>76.98</td>
<td>23.02</td>
<td>70.14</td>
</tr>
<tr>
<td>Jambi</td>
<td>76.99</td>
<td>23.01</td>
<td>71.29</td>
</tr>
<tr>
<td>South Sumatra</td>
<td>84.93</td>
<td>15.07</td>
<td>76.76</td>
</tr>
<tr>
<td>Bengkulu</td>
<td>90.02</td>
<td>9.98</td>
<td>82.05</td>
</tr>
<tr>
<td>Lampung</td>
<td>79.65</td>
<td>20.35</td>
<td>69.15</td>
</tr>
<tr>
<td>DKI Jakarta</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>West Nusa Tenggara</td>
<td>70.84</td>
<td>29.16</td>
<td>57.11</td>
</tr>
<tr>
<td>East Nusa Tenggara</td>
<td>89.39</td>
<td>10.61</td>
<td>74.44</td>
</tr>
<tr>
<td>West Kalimantan</td>
<td>86.02</td>
<td>13.98</td>
<td>83.51</td>
</tr>
<tr>
<td>Central Kalimantan</td>
<td>92.48</td>
<td>7.52</td>
<td>73.91</td>
</tr>
<tr>
<td>South Kalimantan</td>
<td>56.61</td>
<td>43.39</td>
<td>61.84</td>
</tr>
<tr>
<td>East Kalimantan</td>
<td>78.75</td>
<td>21.25</td>
<td>67.07</td>
</tr>
<tr>
<td>North Sulawesi</td>
<td>73.14</td>
<td>26.86</td>
<td>65.71</td>
</tr>
<tr>
<td>Central Sulawesi</td>
<td>89.74</td>
<td>10.26</td>
<td>73.89</td>
</tr>
<tr>
<td>South Sulawesi</td>
<td>64.95</td>
<td>35.05</td>
<td>72.50</td>
</tr>
<tr>
<td>South East Sulawesi</td>
<td>81.65</td>
<td>18.35</td>
<td>66.43</td>
</tr>
<tr>
<td>Maluku</td>
<td>71.86</td>
<td>28.14</td>
<td>72.60</td>
</tr>
<tr>
<td>Papua</td>
<td></td>
<td></td>
<td>86.66</td>
</tr>
<tr>
<td>Indonesia</td>
<td>70.17</td>
<td>29.83</td>
<td>59.85</td>
</tr>
</tbody>
</table>

NAD = Nangroe Aceh Darussalam.

Table A7.3: Contribution of Nonfarm Sources to Rural Household Income in Indonesia, 1983–2002 (%)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonfarm sources</td>
<td>25.83</td>
<td>26.02</td>
<td>41.15</td>
<td>42.62</td>
</tr>
<tr>
<td>Wages and salaries</td>
<td>14.71</td>
<td>14.66</td>
<td>20.09</td>
<td>22.05</td>
</tr>
<tr>
<td>Business</td>
<td>11.12</td>
<td>11.36</td>
<td>21.06</td>
<td>20.57</td>
</tr>
<tr>
<td>Agriculture</td>
<td>63.85</td>
<td>57.73</td>
<td>47.11</td>
<td>43.12</td>
</tr>
<tr>
<td>Wages and salaries</td>
<td>7.36</td>
<td>7.73</td>
<td>8.05</td>
<td>8.82</td>
</tr>
<tr>
<td>Farming</td>
<td>56.49</td>
<td>50.00</td>
<td>39.06</td>
<td>34.30</td>
</tr>
<tr>
<td>Others</td>
<td>10.32</td>
<td>16.25</td>
<td>11.74</td>
<td>14.26</td>
</tr>
<tr>
<td>Total</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>

In the islands outside Java, with relatively poorer physical infrastructure; lower population density; and less access to markets, credit, and information, the evolution of the RNFE was probably due more to distress-push diversification.

Distress-push diversification is generally stronger among landless and very small farmers. Larger farms usually have larger farm returns, which can be reinvested into the farm, or outside the farm in response to pull opportunities. Aside from having more capital for investment, bigger farmers tend to have more access to information, credit, and markets. Booth (2000) examined long-term (1975–1998) changes in the contribution of nonfarm income to the income of farm households with different farm sizes (Table A7.4). Her study revealed that all farming households, regardless of farm size, increased the contribution of nonfarm sources to total household income. The only difference is in the magnitude of the increase. Over the 23 years, nonfarm income doubled its share among very small farms, tripled among medium-sized farms, and increased by a factor of six among the largest farms.

Table A7.4: Contribution of Nonfarm Income to Farm Household Income in Indonesia, by Size of Farm, 1975–1998 (%)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Small (&lt; 0.5 ha)</td>
<td>37.8</td>
<td>27.8</td>
<td>41.6</td>
<td>47.1</td>
<td>50.6</td>
<td>73.8</td>
</tr>
<tr>
<td>Medium (0.5–1 ha)</td>
<td>22.6</td>
<td>35.6</td>
<td>39.3</td>
<td>39.5</td>
<td>41.9</td>
<td>67.2</td>
</tr>
<tr>
<td>Large (&gt; 1 ha)</td>
<td>11.1</td>
<td>13.6</td>
<td>14.7</td>
<td>46.6</td>
<td>41.4</td>
<td>65.2</td>
</tr>
</tbody>
</table>

Source: Booth (2000).

Structural Changes in Rural Household Income

Table A7.5 shows how the components of rural household income changed from 1993 to 2002, by which time some of the extraordinary impact of the financial and economic crisis had presumably been “sanitized.” The trend shows uniform increases in income except for asset rentals and financial transactions, which decreased in share, probably because of the lingering negative impact of the substantial rupiah devaluation.

But as a percentage share of nonfarm income, nonagricultural wages/salaries increased only from 19.4% to 22.0%, while nonagricultural enterprises stagnated at slightly more than 20%. The largest increases were in agricultural enterprises and transfers, including remittances from relatives working outside the village.

Rural Women and the RNFE

In the conservative and paternalistic Indonesian rural society, women and men have different legal, customary, and cultural rights and therefore experience poverty differently. Women are responsible for homemaking and child rearing. The evolution of rural nonfarm activities gives women new opportunities for value-adding activities.

Women as Entrepreneurs

The Indonesian woman has a strategic role in the life of the rural family. Aside from being a housewife and her children’s first teacher, she often helps augment the family income by operating microenterprises, in the public market or in a roadside stall (warung) beside the house. A study of 2,709 women’s groups in six provinces under the Program Peningkatan
Pendapatan Petani/Nelayan Kecil (P4K), an income-enhancement program for very small farmers, fishers, and women, showed that the primary income-generating activities of rural women in 2003 were as shown in Table A7.6.

Secondary income-generating activities were handicrafts and snack and cake making. These activities are popular among Indonesian housewives, because they have low barriers to entry and do not require full-time involvement. The women can still perform other household chores and family responsibilities while earning extra income.

Table A7.6: Income-Generating Activities of Rural Women

<table>
<thead>
<tr>
<th>Province</th>
<th>Income-Generating Activity</th>
<th>% of Women’s Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Java</td>
<td>Trading</td>
<td>24</td>
</tr>
<tr>
<td>Central Java</td>
<td>Livestock raising</td>
<td>35</td>
</tr>
<tr>
<td>Yogyakarta</td>
<td>Livestock raising</td>
<td>76</td>
</tr>
<tr>
<td>East Java</td>
<td>Trading</td>
<td>42</td>
</tr>
<tr>
<td>Bali</td>
<td>Livestock raising</td>
<td>83</td>
</tr>
<tr>
<td>Lombok</td>
<td>Trading</td>
<td>70</td>
</tr>
</tbody>
</table>

The Proyek Hubungan Bank dengan Kelompok Swadaya Masyarakat, a project that links banks with community groups, showed women’s groups to be more successful than men’s groups (Tjiptoherijanto 1997). Analysts attribute this to the greater discipline of women’s groups in handling money (greater aversion to risk) and paying back their debt. Women are also less likely to move out of the village to seek employment elsewhere. As such, they are often better credit risks for the banks than men.

An analysis of the relative profitability of 18 types of farm and nonfarm enterprises of the women’s groups in the P4K showed that nonagricultural enterprises yielded higher returns than
agricultural ones (Table A7.7). This is consistent with the attraction of the pull factors previously mentioned. The results augur well for the attractiveness and potential of the nonfarm economy in reducing poverty in the poor villages of Indonesia.

Employment of Women in the Nonfarm Sector

According to performance indicators for Indonesia relative to the United Nations Millennium Development Goals, the employment participation of women in the RNFE in 2002 ranged from 20% in North Maluku province to 37% in Riau, with a national average of 28%. There was no discernible difference across provinces. There was also no clear relationship between the level of development of a province and women’s employment. West Java, which has a bigger nonfarm sector and is relatively more developed, had a participation of only 24%, while North Sulawesi had a participation rate of 33%. Women’s participation had gradually increased over the previous 5 years in most provinces but in some provinces had declined compared with the participation of men. Quite noticeable was the significant increase in women’s participation across provinces in 1998, perhaps indicating that many women were forced to work to help the family cope with the effects of the financial and economic crisis.

RNFE and Rural Industrialization

The RNFE in Indonesia is dominated by micro-, small, and medium enterprises (MSMEs) in trading and services, as shown in previous tables. Manufacturing is still generally only a small portion. The structural transformation of the rural areas from primarily agricultural to the present mix of farming, trading, and services has been a relatively long one. The next stage, rural industrialization, will probably take even longer because it requires higher technical skills.
Phases of RNFE Development

Davis (2003) identifies three distinct phases in RNFE development.

**Phase 1: Isolated rural economy, with little development.**

Activities are highly diverse, since production is for most of the village. The main products are construction materials, utensils, tools, furniture, clothing, and handicrafts. Services include repairs, construction, transport, trading, education, health, healing, religious services, and entertainment. Migration may be an important source of income due to remittances sent back to the village.

**Phase 2: The rural economy becomes more closely connected with the urban economy.**

Imports from urban industries such as textiles and plastic goods replace some local (artisanal) manufacture. Increased local purchasing power stimulates some parts of the RNFE, chiefly retailing, construction, transport, and entertainment. Government spends more on formal education, health services, physical infrastructure, and utilities.

**Phase 3: The rural economy becomes well integrated into the whole commercial and industrializing economy.**

The RNFE becomes larger, driven by increased local and government spending, but becomes more specialized as goods and services are brought into the village, or villagers travel to urban centers to purchase better consumer goods and services. The RNFE focuses on nontradables: retailing, transport, education, health, and construction. New opportunities in leisure and tourism emerge. In some cases, domestic or foreign manufacturing companies locate in the rural areas to take advantage of lower labor and land costs. Many go into subcontracting, as in garments and agroprocessing (contract farming). In periurban areas, household and housing services are provided. With decentralization and devolution, the local government may become a significant employer. Private sector business activities expand in many sectors as physical infrastructure (roads, ports, airports, transportation, communication, electricity, water) is developed and as physical and commercial links between the rural villages and the urban areas are established.

Rural Industrialization Experiences

The experience of the People’s Republic of China (PRC) has shown that rural industrialization can stem or even reverse the migration of unskilled rural laborers to the cities, which can create social and environmental problems in the urban areas. The PRC program of rural industrialization moved many villagers from farms to the nonfarm sector in the same rural area by developing township and village enterprises and encouraging individual entrepreneurship. Small- and medium-sized enterprise (SME) clustering was encouraged and supported, so that enterprises in an area could sell to one another in a semi-integrated production and supply chain agglomeration. The PRC’s rural industries include medium-scale agroprocessing firms, scaled-down fertilizer and cement plants, medium-scale agricultural equipment manufacturing, and consumer goods manufacturing. Lessons from rural industrial clustering in the PRC could apply to Indonesia, but environmental impacts should be carefully monitored.

In contrast, Indonesia’s rural industries consist mainly of MSMEs engaged in simple manufacturing such as grain milling, oil milling, wood processing, forging, blacksmithing, brick or tile making, handicrafts, and food and beverage processing (ketchup, tofu, tempe, and fruit
juices). Their low technology, lack of standardization, and weak quality control make their products inferior and uncompetitive with the products of urban manufacturers. As a result, MSME markets are often limited to local consumers.

Rural industrialization in Indonesia is constrained by the following characteristics of rural areas: raw agricultural products that, while abundant, are scattered and easily spoiled, and with insecure property rights; unskilled or at best semiskilled rural human resources; and the small number of potential entrepreneurs, most of whom have low business skills and capital.

Because of these characteristics, rural industrialization needs to undergo three long phases in its evolution. The first phase is simple postharvest and home-based primary processing of farm products. In the second phase, there would be larger agroprocessing, assembly, downstream, and allied or auxiliary industries such as packaging. Full-scale industrialization, with relatively more upstream industries to fill the gaps in the industrial structure, would come in the third phase.

A “techno-economic jump” from predominantly agricultural directly to full-scale industrialization, without passing through agroindustrialization, would be unrealistic or expensive for Indonesia. Even if the country could afford the huge capital investments, it would still be hamstrung by the lack of technical manpower; weak linkages with upstream, downstream, auxiliary, and support industries; and the small size of the domestic market. These were probably the problems faced by the now-moribund state-owned aircraft manufacturing company established during the Soeharto era.

Industry Clusters, Business Networks, and SMEs in Indonesia

Business networks and industrial clusters are considered powerful mechanisms for overcoming the size constraints of SMEs and succeeding in a globalized and competitive market environment. Collaboration among SMEs, large corporations and state-owned enterprises, supporting private and public institutions, and local/regional governments offers opportunities for locational and competitive advantage.

Networks and clusters are applications of social capital in private business endeavors. Business networks are closed systems consisting of groups of firms that collaborate on large projects without necessarily being near one another. Industry clusters, on the other hand, are open systems involving interdependent firms located near one another, providing one another with inputs, raw materials, primary agricultural production or farming systems, processing, handling, packaging, storage/warehousing, distribution, transportation, marketing, and services.

Horizontal integration among SMEs in the same position in the value chain, and belonging to a cluster, can provide economies of scale through the bulk purchase of inputs, optimal use of machinery, and pooling of production capacities to supply large orders. Likewise, vertical integration with other SMEs or large firms can facilitate division of labor and enable individual SMEs to specialize in what they do best (core business based on core competence). Clusters also facilitate collective learning and synergistic strategies, such as common branding, standardization, distribution, and collective interest representation against monopsonistic practices.

Cluster Development Initiatives of the Government

In the late 1970s, the Program Pembinaan dan Pengembangan Industri Kecil (BIPIK), managed by the then Ministry of Industry, promoted small clusters (sentras) by training producers and providing them with equipment; extending small loans for new machinery; putting up common service facilities (CSFs) for several clusters; subsidizing the visits of producers to trade fairs; linking local SMEs with universities and research institutions; introducing SMEs to large, foreign-owned enterprises to facilitate subcontracting, particularly in metal processing and in the oil palm and prawn industries; and investing in transport and communication infrastructure and facilities such as small industrial estates and business incubators in several clusters.
Key Success Factors in Cluster Development

The growth of the Jepara, Sukoharjo, and Yogyakarta clusters described in Box A7.1 may be attributed to the following success factors: strong local sector associations; long exposure to and experience with foreign tastes and design preferences, a spillover from the growth of international tourism; considerable medium-scale direct investments by immigrant entrepreneurs from Western countries who married Indonesians and put up export-oriented businesses; and the significant role of trading houses in brokering and organizing exports.

Box A7.1: Case Study: Cluster and Business Network Development Successes

Wooden Furniture Cluster in Jepara

In the late 1980s to the early 1990s, the Indonesian Government implemented a comprehensive cluster development package in Jepara, consisting of the technical upgrading of the production capabilities of SMEs through a CSF for wood drying, training in exporting, financial and other facilitative support for participation in domestic and international trade fairs, and regional infrastructure investments (e.g., container facilities, roads, telephones). The Jepara cluster, with thousands of enterprises employing more than 60,000 workers, is one of Indonesia’s largest. More than 70% of its furniture sales were for export.

Small Industrial Estate in Sukoharjo, Central Java

The Sukoharjo industrial estate has a CSF consisting of wood processing and a showroom. As in Jepara, selected producers were given support for trade fair participation. Sukoharjo is now a leading exporter of wood, rattan, and metal furniture and of interior decoration articles. It benefits significantly from its proximity to a large metal-casting cluster in Klaten, Central Java.

Yogyakarta

Though more geographically dispersed than the Jepara and Sukoharjo clusters, the leather goods, batik, silverworks, and traditional handicraft SMEs in Yogyakarta are also thriving clusters. But they did not seem to have the same support from the national Government as the other two clusters, probably because the traditional handicraft industries in Yogyakarta do not require sophisticated machinery or processes.

Main Causes of Failure of Agribusiness Clusters

Agribusiness clusters that failed did so for the following reasons: Some focused too much on the technical upgrading of production capacity and not enough on the emerging and larger scale marketing problems brought about by increased production. The nucleus-plasma contract farming arrangement in Java was hampered by the limited availability of wide tracts of land for plantations, and farm production problems due to weather, pests, and other related causes that are unique to agriculture. Other agribusiness clusters failed because they ignored the importance of existing market relationships of farmers, neglected or eroded the SMEs’ self-organization potential, or received inadequate infrastructure and other support from the government.

A medium-scale baby-maize canning plant in Sukabumi (1993) and a pineapple juice concentrating plant in Subang (1994), both in West Java, failed and eventually closed down because the local farmers already had thriving and more lucrative supply relationships with the fresh product markets in metropolitan Jakarta and Bandung.
The CSFs provided a focal point for cluster members of the BIPIK Program and stimulated a cooperative spirit and learning. But instead of gradually turning over the management and financing of the facilities to self-help organizations, cooperatives, or SME associations, and thereby cultivating local ownership of the project, the program retained the CSFs under government management and budgetary support. As budgetary resources declined, the equipment was not maintained or updated, contributing to their decline.

**Ministry of Agriculture, Agribusiness Development, and RNFE**

The traditional view of agriculture and of rural and industrial development is that they are separate processes that are promoted, coordinated, and controlled by separate departments or bureaucracies. The Agricultural Development Program (ADP) for 2001–2004 was the first good attempt to think differently. It recognized that the sequential stages in the vertical agribusiness system are interlinked and interdependent; a bottleneck in one stage will immediately be communicated and felt in later stages in the form of shortages and higher prices. Agroprocessors depend on raw materials from farms, which, in turn, depend on suppliers of production inputs, especially seeds, water, chemicals, and fertilizers.

The achievements of the ADP are difficult to assess objectively for the simple reason that it had no specific goals or quantitative targets. In other words, the ADP was not really a program, since a program should have objectives, measurable targets, activities, responsible lead agencies, budgets, and a timetable, and the ADP did not have these. The Ministry of Agriculture (MOA), acknowledging these shortcomings, has referred to the ADP as an agricultural development reference.

The ADP also suffered from problems of overlapping as well as bureaucratic compartmentalization. The effective implementation of an agribusiness/agroindustrial development program requires the close functional collaboration (if not structural integration) of at least two ministries: agriculture, and trade and industry (MOIT). And yet the ADP gave the official mandate for rural industrialization to MOIT, while considering agribusiness development (which includes agroprocessing and agroindustries) to be the domain of MOA.

Another lesson involved the critical role of the private sector in any sector development. The ADP primarily addressed government agencies, although agribusiness and agroindustries can develop only if the private sector is properly motivated and actively involved. The private sector invests, takes risks, and makes the operating decisions that result in employment, production, and sales of products and services. Government agencies create and maintain a business environment conducive to private sector investment. More details on the roles of the government and private sector in advancing rural development are given in Chapter 5.

**Micro-, Small, and Medium Enterprises (MSMEs) and the RNFE**

The RNFE of Indonesia is dominated by MSMEs. During the 1997 financial and economic crisis, MSMEs absorbed retrenched employees from bankrupt corporations, and maintained the flow of food from farms and consumer goods from urban centers.

Different government agencies define MSMEs differently. Under the rules of the Capital Market Supervisory Agency, SMEs have total assets of not more than Rp100 billion; are not affiliated with or controlled by large companies; are not engaged in the mutual funds business; and, if they go public, have no more than Rp40 billion in initial public offering (IPO) shares.

This definition is irrelevant to many MSMEs in rural areas, where most have no immediate prospects of going public. The SME Task Force under the Asian Development Bank (ADB) SME Development Technical Assistance hosted by the State Ministry of Cooperatives and SMEs has proposed a more suitable definition: microenterprises have 1–9 employees; small enterprises,
10–50 employees and annual turnover of up to Rp3 billion; and medium enterprises, 51–250 employees and annual turnover of up to Rp15 billion.

According to a survey in Central Java by the International Labour Organization (ILO), micro- and small enterprises generally produce light consumer goods such as clothing, furniture, food, beverages, and handicrafts; are very small sole proprietorships, employing fewer than five workers; have a workforce made up mostly of proprietors and family workers; are often part-time endeavors; and usually get their initial capital from personal savings or loans from relatives, not from banks or government.

Berry et al. (2001) identified the following main sources of productivity growth among SMEs in Indonesia:

- Exporting SMEs in the rattan, wood furniture, and garment industries increase their productivity and competitiveness through suppliers and buyers, by subcontracting and employing expatriates (especially in the rattan and garments for exports subsectors). Subcontracting and other commercial linkages between small and large firms are more developed in export-oriented industries.
- Equipment suppliers are moderately useful as providers of technological information.
- Public and private nonprofit organizations are more important to very small firms and to indigenous entrepreneurs (pribumi) as sources of productivity growth than private consultants, public sector providers, industry associations, and foster parent companies.

The study concluded that SMEs are very valuable to the Indonesian economy, because they do better than microenterprises in generating productive employment. They have better potential to grow into larger firms than microenterprises do to small or medium enterprises; they often achieve rising productivity over time through investments and technological change; they are more flexible than larger firms, an important quality in rapidly changing markets; and they are generally more resilient, because they can exploit market niches and concentrate on activities with economies of agglomeration rather than economies of scale (clustering of SMEs, rather than vertical integration). SMEs can also make goods that are not easily mass produced.

According to the records of the Ministry of Cooperatives and SMEs, in 2001 there were more than 40 million micro- and small enterprises, about 58 million medium, and more than 2,000 large enterprises.

The major growth constraints for micro- and small rural enterprises in Indonesia are the following:

- **Small player in very competitive local markets.** The local market of rural trading and service enterprises is small in many ways: small customer base, low purchasing power of customers, and limited geographic reach. Businesses are also very competitive because of low entry and exit barriers.
- **Financing and credit.** Most micro- and small enterprises have limited equity capital to begin with. They also have limited access to institutional credit because of their lack of credit history and acceptable collateral.
- **Family consumption needs.** Because of poverty, the meager profits of micro- and small enterprises are usually not reinvested for growth, but rather are used for consumption by the family. Thus, lacking the wherewithal to expand into small or medium enterprises, warungs generally stay micro in scale.
- **Low entrepreneurial and managerial skills.** Most market traders, warung owners, and service shop operators go into business not because of any prior training or preparation but because a neighbor or acquaintance is engaged in it, and it looks easy enough; the initial capital requirement is small enough; and the work is something a housewife can do part-time, when she is not needed at home or on the farm.
These constraints are interrelated and mutually reinforcing. The small size of the local market limits the sales turnover and profitability of the MSMEs, which in turn constrain their ability to get credit. The low level of entrepreneurial and managerial skills, combined with low capital and lack of credit access, limits investment and opportunity-seeking possibilities, thereby keeping the enterprises small.

**Strengthening RNFE Growth**

**Determinants of RNFE Growth**

**Local Natural and Physical Resources**

The availability of local resources gives initial advantages, but equally critical to growth is how the resources are used. Resource abundance may lead to complacency and overdependence on primary resources, where the economic returns are low relative to more value-adding development. Japan and the Republic of Korea are examples of successful development despite scarce natural resources.

**Quality of Local Governance**

The quality of governance is manifested in the degrees of corruption, government stability, policy consistency, transparency, accountability, participation and involvement of civil society, and democracy. In general, central governments of agricultural countries are relatively insensitive to RNFE development, as agricultural concerns dominate economic development planning and discussion of issues. Thus, the RNFE stands a better chance of growth through integration into the development agenda of local governments, which tend to have less urban bias and are more sensitive to rural needs.

**Local Physical Infrastructure**

This includes the density of the road and telephone networks and household services. Jalan and Ravallion (1998) note that in the rural PRC, road density is a determinant of household prospects of escaping poverty.

**Proximity to Towns and Linkages with Urban Areas**

Rural growth often depends on links with urban areas through the purchase of industrial and consumption goods, commuting wage incomes, or marketing of rural products in towns. Rural towns are also important because they provide public services, information, credit services, economies of scale, and agglomeration, besides serving as ports for sea links with the national or global market.

**Trade and Regional Growth**

Most of the evidence shows that the open economy model better serves the development of the RNFE (see Appendix 5).

**Common Constraints on RNFE Growth**

The common constraints on RNFE growth are lack of or inadequate rural infrastructure (farm-to-market roads, interprovincial highways, ports, drying and storage facilities, markets, electricity,
telecommunications, transportation, schools, hospitals), local market and trade distortions (unfavorable or discriminatory regulations of local governments, unfair competitive practices, etc.), low purchasing power and small size of the local market, lack of access to rural financing institutions and services, weak entrepreneurial and managerial skills of the rural villagers, and lack of trained technical manpower for manufacturing and rural industrialization.

**Strengthening Farm–Nonfarm and Rural–Urban Linkages**

The agricultural progress achieved by Indonesia in the past 30 years has not sufficiently improved the farm product marketing system. Most farm households still sell their farm products unsorted, ungraded, and unprocessed. Farm products are sold on the spot at harvest time, or even when the fruits are still on the tree (preselling). Many small farmers need and receive advance payment before harvesting (ijon), which always means loss of bargaining power, and relatively lower prices. Poor farm households often use the advance payment for consumption and are thus trapped in a vicious cycle of poverty and perennial indebtedness (see also Appendix 6).

The market vulnerabilities of farm households are caused by many factors, but the most important one is the weak linkage with the town markets and the nonfarm sector. Rural-urban linkages consist of physical infrastructure and the enabling institutional, social, and regulatory framework. Without roads, bridges, transportation, and communication facilities, trade linkages between farmers and consumers, and between rural villages and towns, would be nonexistent or very weak. Price and market integration would be very weak as well: raw farm products do not move efficiently from farms to markets so that there are pockets of surplus at harvest time, which lead to spoilage, while in the cities there is shortage and unmet demand. In Java, most of the rural villages are physically linked with the towns. But in many areas outside Java, especially in the eastern provinces, some rural villages still have no links to town markets.

Transactional linkage between the farm and nonfarm sectors takes the form of production, income, or investment activities. Production linkages may be either upstream or downstream. Upstream linkages occur when the farming sector grows and induces growth upstream in the supply of inputs and services, or when the growth of local manufacturing reduces the price and increases the availability of inputs upstream. On the other hand, downstream linkages take place when activities that rely on farm products, such as agroprocessing and distribution, increase. Income linkages occur when income earned in one sector is spent on the outputs of the other, and investment linkages take place when profits from one sector are invested in the other. All these linkages are important in the development of the RNFE.

Linkages are not always positive. Constraints on the farm sector may affect the nonfarm sector, and vice versa. Downstream constraints may raise processing and distribution costs, and upstream constraints may raise input costs. On the other hand, positive linkages occur when increased opportunities for rural and nonfarm employment can absorb the excess labor in agriculture, thereby resulting in increased labor productivity. Unfortunately, agricultural labor is generally disadvantaged by low skills and educational level, which limit employability in the nonfarm sector.

RNFE growth and development can be supported and accelerated by strong rural-urban and farm–nonfarm linkages, starting with physical infrastructure. The Government must build farm-to-market roads and a network of interprovincial highways to facilitate the flow of goods and people, and to create multiplier effects from agricultural progress that can be transmitted to the other sectors through farm–nonfarm linkages.

But physical infrastructure, while necessary, is not enough to attract and motivate a dynamic private sector. The private sector, which creates jobs and employment opportunities, can be attracted to invest and take risks only if there are favorable incentives with competitive or relatively undistorted market conditions.
Making Local Markets Competitive and Conducive to RNFE Growth

The free flow of production factors and products within and between regions promotes efficiency, growth, and development. A free domestic market, with a multitude of producers, distributors, and consumers, is a more efficient mechanism for allocating investments, costs, and profits than a government agency.

Because Indonesia is large, diverse, and archipelagic, domestic trade is hampered by long distances and inadequate infrastructure. And when local governments impose more taxes as well as nontariff barriers on trade, the efficiency of the domestic markets, especially the market for perishable agricultural products, suffers.

Ray and Goodpaster (2001) present the following benefits of free and open domestic trade:

- **Economic efficiency.** A more integrated domestic market provides more opportunities for specialization and economies of scale than smaller, separate, and dualistic local markets. An unrestricted and undistorted domestic market also promotes competition and encourages innovation and efficiency. Consumers benefit from more and better products, and more competitive prices.

- **Economic development.** Unrestricted and undistorted trade between regions allows each region to specialize and exploit its comparative advantages.

- **National integrity.** Trade barriers between regions can undermine national integration.

- **International competitiveness.** Regional tariff and nontariff barriers make Indonesian goods more costly and less competitive in export markets.

- **Poverty reduction.** Restrictive marketing arrangements, such as geographic allocation of markets (rayonisasi) and forced monopolies sanctioned by the government, tend to increase the difference between the wholesale market and farm gate prices, because traders pass the levies back to the farmers in the form of lower purchase prices.

Policies and Laws Affecting the Competitiveness of Regional Markets

In the 1980s and the first half of the 1990s, Indonesia’s rural sector was heavily taxed and regulated. Producers of agricultural products and other rural goods received decreasing shares of the final prices. Downward pressures on agricultural incomes distorted prices and reduced incentives to improve production and productivity.

Therefore, in 1997 and 1998, the Government initiated the reduction of tariff and nontariff barriers to domestic trade.

**Law 18/1997**

Law 18/1997 significantly reduced the number of trade-distorting taxes and levies. Provincial and district governments could not tax agricultural products. To offset the loss in fiscal revenues, the regions were allowed to collect taxes on land transfer, gasoline, and mining, as well as to levy underground water charges.

World Bank-funded studies in 1996–1999 to monitor the impact of Law 18/1997 showed that the share in the final wholesale prices accruing to farmers increased from 74% to 83%. Local government revenues, however, decreased. Thus, there has been widespread clamor from the regional and district governments and other advocates of regional fiscal autonomy to amend or repeal the law.

But according to Montgomery et al. (2000), the decline in local tax revenues was really due not to Law 18 but to the general decrease in tax collections from new vehicle registrations and vehicle transfers following the financial and economic crisis. Furthermore, at the district level, local tax revenues (pendapatan asli daerah) contributed only an average of 9% to local
budgets in 1998/1999, such that any decrease in locally sourced revenues was relatively insignificant compared with the allocation from the central Government (dana alokasi umum, or DAU).

Trade Deregulation and Other Reforms After Law 18/1997

Domestic trade was further deregulated after Law 18 with the issuance of policy reforms, most of which were included in the letter of intent signed by the Government and the International Monetary Fund on 21 January 1998. Government regulations and presidential decrees prohibited or removed all taxes, fees, and levies on export products; removed trade restrictions and prohibited government officials from restricting trade within or between provinces; removed all formal or informal requirements for sugarcane planting; decontrolled the trading of clove; eliminated restrictions on the trade of livestock between provinces; prohibited the imposition of any tax or levy on export goods and removed all restrictions on trade between provinces, districts, and islands; and repealed or amended all local regulations (peraturan daerah) related to taxes and levies.

Law 34/2000

To pacify the local governments, and to give more meaning to financial autonomy and decentralization, the Indonesian parliament passed Law 34/2000 authorizing district (kabupaten) governments to levy new taxes and levies, as long as they satisfy the following conditions: the new imposition should be a tax, not retribution; the tax object has relatively low mobility, and only serves the public in the relevant regency or municipality; the new tax should consider justice and public welfare; the object and basis of tax assessment should not contravene public interest, and should not adversely affect the economy or the environment; and the tax object should not be already a tax object of the province or central government (no double taxation).

Law 34 also set criteria for determining the legality of retribution levies. The criteria are classified into three broad categories, as follows:

- **Public service retribution.** The fee should be in return for specific services or benefits, and should aim at a better service delivery. It should be within the authority of the region, and not in contradiction with central government authority; and should be collected efficiently and effectively.

- **Business services retribution.** The fee can be for commercial services not adequately provided by the market, or services that can be provided through the use of underutilized assets owned or controlled by the local government.

- **Specific licensing retribution.** The required licensing, for which a fee is charged, should “protect the public interest.” The licensing fee can cover the technical and administrative costs of the local government in the licensing.

Other Restrictions on Domestic Trade

Voluntary contributions. To some extent, Law 34/2000 negated or reversed the free trade–enhancing provisions of Law 18/1997. Local governments have also become creative in taxing, restricting, and regulating domestic trade. Third-party contributions (sumbangan pihak ketiga, or SPK), for example, require local businesses to make “voluntary” contributions to local governments. In the province of Nusa Tenggara Barat, tobacco producers were obliged to “voluntarily give” Rp80 to the local government for every kilogram produced. The SPK thus often becomes a de facto tax on domestic trade. But because it is not recorded in government accounts as a tax but as a contribution or gift under Other Sources of Income, it is not affected by the reform measures under Law 18/1997.
Nontariff barriers to domestic trade. These barriers include restrictive marketing practices, quotas and export restrictions, local processing requirements, licensed monopolies or monopsonies, and forced partnerships.

Price controls. Administrative or legal price controls prevent the market from giving appropriate supply, demand, and price signals, thereby distorting production decisions. Producers often try to evade the controls by smuggling products to sell at higher prices outside the region, or by buying at lower prices from outside the district. Both activities adversely affect the local economy.

Quantitative restrictions. Quotas on goods that flow in inter- and intraregional trade only raise marketing costs without adding value.

Forced sale to local producers or monopsonists. Local farmers and producers are sometimes forced to sell their produce to local processors, to develop the local processing industry and leave more value added within the region. Another trade-distorting requirement in some regions is for farmers to sell their produce to local buyers.

Regional allocation of markets (rayonisasi). The system of allocating markets for favored buyers or producers allows the favored parties to pay lower prices for raw materials, charge higher prices for their products, or otherwise produce inferior goods.

Forced partnership (kemitraan). The stated intention of forced partnerships between farmers and processors, or between small and larger enterprises, is good and egalitarian. They aim to transfer technology and improve the condition of the farmers and small enterprises. In practice, however, the compulsory element dilutes or distorts the promised benefits, as the farmers or small enterprises can be exploited by the more sophisticated partners.

Other market restrictions or distortions. Other trade restrictions involve health, safety, and transport regulations. Again, these restrictions are justified on paper, but their implementation often harms domestic trade. Because of some restrictions aimed at protecting producers and products from competition, consumers pay higher prices or must endure inferior goods. At the same time, local producers lose the incentive and market discipline to innovate, apply better technologies, or improve their productivity.

Domestic trade restrictions and distortions are anticompetitive and antidevelopmental, and should be minimized, if not eliminated outright. Unfortunately, most district governments tend to focus more on selfish, short-term gains. Taxing the private sector can raise revenues in the short term but decrease them in the long run if disincentives to business shrink the tax base.

At this stage in Indonesia’s efforts to devolve governmental functions and services to the districts, the central Government seems to be caught in a dilemma between the political imperatives of decentralization and the economic benefits of a freer and more competitive domestic trade. Fiscal decentralization and free domestic trade are not mutually exclusive. What is urgently needed is a comprehensive national law to create and maintain free, open, and competitive internal markets.

Law 34/2000 already allows the national Government to repeal any local regulation that contradicts the public interest, within 1 month of receipt of the new regulation. (Local governments must submit all new regulations for central government review within 15 days of issuance.) In practice, however, the review of so many new regulations from about 360 district governments, and the repeal of those that are opposed to public interest, has not been smooth. Many
objectionable regulations still exist because of disputes and disagreements between the central and local governments. There would be far less debate and easier administration if Law 34 unambiguously defined the boundaries between national interest and local interests.

Government regulations, whether national or local, are needed to protect consumers, conserve the environment, or prevent unhealthy competition. Too many regulations, however, increase the transaction costs of businesses, limit their growth, and create opportunities for corruption and bureaucratic abuse.

**RNFE and Rural Infrastructure**

Rural infrastructure—paved roads and other transport facilities, electricity, communications, local markets—promotes RNFE growth by lowering transport costs, increasing access to markets and employment opportunities, and stimulating demand.

**Land Infrastructure**

**Roads**

Travel by land is the main mode of transportation in Indonesia, despite its archipelagic nature. From 1978 to 2000, total road length increased by 4.8% annually, to 358,000 kilometers (km), and the paved road length increased by 6.8% per year, to 236,500 km in 2000. Moreover, in 2001, 1.8 million registered trucks transported goods on these roads.

Road density—the ratio of road length to surface area—varies greatly across provinces. In 1999, road density was highest in Jakarta, at 9.66 km of road for every square kilometer area, followed by D.I. Yogyakarta with 2.45 km/km². Bali ranked third with 1.06 km/km², followed by Central and East Java with densities of 0.78 km/km² and 0.67 km/km², respectively. On the other hand, six provinces had road densities below 0.1 km/km²: Maluku and South Sumatra (both with 0.09 km/km²), West and Central Kalimantan (both with 0.06 km/km²), Irian Jaya (0.05 km/km²), and East Kalimantan (0.04 km/km²). In the 1990s, more than 10,000 km of roads were added in Irian Jaya, East Java, and North Sumatra. Overall road density in Indonesia at 0.18 km/km² was less than in Malaysia (0.20), Philippines (0.67), and Viet Nam (0.28), but higher than the PRC (0.14) and Thailand (0.13). However, these figures say little about the location and quality of the road network.

Government expenditures on roads accounted for more than half of total investments in transportation infrastructure during the Five-Year Development Plans (REPELITA) I–VI up to the late 1980s, followed by marine transportation (20%), railroads (15%), and air and river transportation (10%). Road expenditures were about 10% of total government development budget expenditures in the mid-1980s. The contribution of road investments to the total development budget peaked in 1993/94 at 22% of total investment and then declined to around 10% in the late 1990s.

Hayami and Kawagoe (1993) showed that road improvement in Indonesia improved farmer incomes by reducing transport costs, increasing competition, and thus narrowing the gap between farm gate and retail prices.

**Railways**

Indonesia has about 7,000 km of railroad track, mostly in Java (75%) and Sumatra. The railways are owned and operated by the Government.

Railway passengers numbered about 159 million just before the Asian crisis, 192 million during the crisis, and 176 million in 2002. Almost all railway passenger traffic is concentrated in
Java (98%); the rest is on Sumatra. Railway freight traffic has been relatively stable, at about 18 million tons in 1997–2002. Sumatra contributes about 72% of this total (BPS 2002, based on Indonesian State Railways). Much of the railway network needs renovation.

Railways are suited to hauling bulk items such as fertilizer, cement, and coal. Passenger trips on railways are mostly in excess of 100 km. Since the 1980s, railways have also carried shipping containers to ports.

**Port Infrastructure**

Indonesia has more than 300 seaports, four of which are major gateway ports: Tanjung Priok in North Jakarta, Surabaya in Jawa Timur Province, Belawan near Medan in North Sumara, and Ujungpandang in South Sulawesi.

From the 1960s to the 1980s, shipping trade and ports were highly regulated. The Indonesian national shipping company (Pelni), established in 1952, controlled most of the interisland trade until the mid-1960s and had a virtual monopoly on passenger travel thereafter. Five classes of shipping licenses were introduced, shipping licenses were issued to majority-owned indigenous (pribumi) businesses, and transshipment through Singapore was discouraged.

Interisland (nusantara) shipping declined over time as better road/ferry links between Java and Sumatra led to a shift to road transport. If alternatives are available, sea transport is not competitive in door-to-door costs, except for bulk shipments, which are an important component of interisland shipping (Dick 1985).

In 1985, the shipping trade was deregulated. In 1988, shipping licenses were reduced to two categories—oceangoing/regional shipping and interisland shipping. Foreign joint ventures were permitted with no restrictions on size of fleets, some commercial businesses could operate their own fleets with no additional license, and more flexible route permits were issued (AsiaTradeHub 2003).

By 1989, the domestic merchant fleet had 35 oceangoing vessels with a capacity of 447,000 deadweight tons (DWT); by the earlier licensing categories there were 259 interisland vessels (466,000 DWT), more than 1,000 modernized local ships (158,000 DWT), almost 4,000 traditional ships (200,000 DWT), and 1,900 special bulk carriers (more than 2 million DWT). About 60% of the cargo shipped, mostly crude oil and natural gas, was on these carriers. Of the general cargo carried by ship, about 80% was carried on oceangoing or interisland class vehicles; the rest was split evenly between local and traditional craft. In fiscal year 1989, cargo totaled about 40 million tons. There were also some 21,600 km of inland waterways, 48% of which were in Kalimantan and 25% in Sumatra.

**Airports**

In the early 1990s, Indonesia had about 470 airports, 111 of which had permanent surface runways, and 6 of which could handle wide-body jets. The major airport is Sukarno-Hatta International Airport in Banten province, close to Jakarta. Other important airports are in Denpasar, Medan, and Surabaya, and on Batam Island.

The government-run Garuda Indonesian Airways is the main international Indonesian air carrier. Domestic service is also provided on smaller, no-frills companies like Merpati Nusantara Airlines and Lion Air.

**Electricity**

Indonesia’s power consumption increased rapidly between 1985 and 2000, from 78 kilowatt-hours (kwh)/capita to 384 kwh/capita. The rate of increase in consumption, at 11% yearly, was impressive, particularly when compared with the rate in other countries in the region like the
Philippines. But it is still low when compared with Malaysia’s 2,628 kwh/capita, Thailand’s 1,448 kwh/capita, and the PRC’s 827 kwh/capita (all 2000 estimates) (WDI 2003). Challenges ahead include increasing the rate of household electrification, which is still low at only 57%, solving the recurrent power shortage, and mobilizing financial resources for the massive investments needed to meet future power demand (World Bank 2003).

**Rural Financial Services and the RNFE**

In the 1960s and the 1970s, subsidized and targeted agricultural credit programs such as BIMAS were common in Indonesia. Rural financial institutions (RFIs) delivered credit from official sources (government or multilateral lenders or donors) but did not mobilize rural savings. In other words, they did not perform real financial intermediation. These programs, with their high nonrepayment rates, weakened the RFIs. Furthermore, the interest rates they charged were below full cost recovery.

In a sense, the agricultural credit programs were inequitable, because the same benefits were not extended to the RNFE, particularly to the micro- and small enterprises. And even in the farming sector, subsidized and targeted agricultural credit programs were systematically biased against the poor. Larger farmers always had better access because of social status, proximity to the source, collateral, and political connections. The program implementing agencies also had no incentive to reach out to the very poor, especially those in remote villages.

**Rural Finance as a Constraint on RNFE Growth**

Despite the relatively extensive village roads and highways to towns and cities, especially in Java, there has been no significant graduation of micro- and small enterprises to medium-scale ones. But in urban and periurban areas, private sector–established malls and outlets (kiosks, shops) have grown rapidly. The main constraint on the growth of MSMEs has been lack of liquidity and access to institutional credit.

For cash-strapped farm households, access to credit is critical. Without credit, they cannot purchase production inputs and farm tools, dry and store their raw produce, or diversify and take advantage of market opportunities.

The rural poor lack access to institutional credit because of the following factors:

- **Physical access.** There are very few or no RFIs in remote and poor rural villages, or within reach.
- **Eligibility.** Many poor farmers, micro- and small entrepreneurs, housewives, and other poor villagers are not considered bankable.
- **Business opportunities.** Poor rural villages lack feasible new business opportunities. Feasibility depends on market demand and physical infrastructure, among others, and both are very low or poor in those villages.
- **Internal problems of RFIs.** Some RFIs ascribed their low credit portfolio in agriculture and agribusiness to staff inability to do high-quality and prudent credit analysis because of inadequate knowledge of agribusiness; overly rigid and formal credit appraisal and supervision procedures; aversion to the natural and market risks in farming and agriculture in general; and the short term of their deposits versus the longer term credit needs of farmers.
- **Information and facilitative linkages.** There is a dearth of information linkages between the RFIs in the urban areas and the credit-needy farmers and micro-, small, and medium entrepreneurs in the rural villages. This lack, combined with physical distance and the small size of the credit needed, makes it costlier for RFIs to lend to MSMEs than to larger urban borrowers.
- **Interest rate pricing.** While avoiding the mistake of providing interest rate subsidies, Bank Rakyat Indonesia (BRI) could revise its pricing policy downward to make its loans more accessible.
Credit is not always the most important problem of farmers and nonfarm enterprises in the rural areas. Often, marketing problems are more pressing and limiting. But many marketing problems cannot be solved without credit, simply because the entrepreneurs have no reserve funds. Farmers need financing for even simple postharvest activities like drying or storage. They also need financing if they do not sell their crops at harvest time, in the hope of higher prices in the future. Similarly, nonfarm enterprises usually need credit to get better-quality raw materials or improve product design (handicrafts and furniture), packaging, and distribution.

The banking system and the business sector are in an interesting situation. The banks have large amounts of loanable funds but they do not lend to the farmers and MSMEs that need the money because the bitter experience of high nonperforming loans during the financial and economic crisis made them risk-averse, or their capital adequacy ratios are still low, or riskless central bank securities (Sertifikat Bank Indonesia) are more attractive. The policy challenge now is to create a functional and sustainable mechanism for channeling the funds in the banks to the rural villages.

A good case can be made for a wholesaler-retailer collaboration between the funds-rich commercial banking system in the urban areas and RFIs and microfinance institutions (MFIs) in the rural areas. The partnership can be synergistic. The commercial banks have the funds but lack the community presence. The RFIs/MFIs are near the borrowers, but they lack the funds. After 3–5 years of collaboration, the RFIs/MFIs can become stronger and more self-sufficient as they expand their deposit base.

For this institutional collaboration to materialize, the commercial banks and RFIs/MFIs must be protected by a well-defined legal and regulatory framework, including clear and enforceable bankruptcy laws. RFIs and MFIs should be allowed to develop their institutional capacity to respond efficiently to changing demand from the rural poor and to offer them a full range of financial services at market or commercial rates.

Sustainable Rural Financial Institutions

Financial services to the poor must reconcile outreach and sustainability (Zander 1997). Outreach is the extent to which financial systems and their instruments reach the poor directly and increase their participation in market and political processes. A sustainable rural financial infrastructure that can serve the full range of financial needs of farmers and nonfarm enterprises is more important than targeted or subsidized credit. The lending should be demand driven, not donor or supply oriented.

Indonesia has a fairly well-developed microfinance system that has provided financial services to a large segment of the rural population. But the system is still evolving and is influenced by sometimes overlapping and inconsistent policies. Realizing the need to make financial services more accessible to the poor, the Government has begun to commercialize rural microfinance by encouraging viable and sustainable MFIs.

In 2002, there were about 54,000 microfinance outlets nationwide, serving about 45 million depositors and around 32 million borrowers. This network includes

- MFIs affiliated with commercial banks, regional development banks (bank pembangunan daerah, BPDs), and people’s credit banks (bank perkreditan rakyat, BPRs); and
- Nonbank MFIs (NBMFIs) established as savings and loan cooperatives, local government financial institutions, Islamic-based cooperatives, credit unions, rural finance and credit institutions, village credit institutions, informal small savings and lending groups (USPs), and microcredit institutions.
The microfinance system underwent a major transformation in the 1980s. The financial sector deregulation in 1983 set the stage for the “big bang” reform of the BRI unit desa system. Then the reform package of October 1988 enabled the entry of new, privately owned people’s credit banks (BPRs). The BRI units and the BPRs now compose the majority of the microfinance banking sector. Together, they provide a broad range of financial services not limited to savings mobilization, emphasize viable and sustainable financial intermediation based on market interest rates, and provide credit for all purposes.

BPDs are commercial banks owned by provincial and district/city governments. They were established in 1961–1965 as development finance institutions to promote regional development, increase regional income, and help develop rural financial institutions. BPDs have extensive networks operating in all districts and cities in their region, and in many cases have established relationships with, or are shareholders of, local BPRs or NBMFIs. Growth in both deposits and loans has been impressive. BPDs direct a significant part of their lending to microborrowers (loans of up to Rp10–25 million). But BPDs have registered stronger growth in mobilizing current bank deposits, which represent more than half of their source of funds. This has hindered their ability to engage in longer term or development financing. Most of their customers are local government officials. Their financing services are not always accessible to the rural poor, because they do not have branches in every subdistrict, let alone at the village level.

Of the 54,000 MFIs nationwide, the vast majority (35,000) are USPs. In savings mobilization, BRI, with its 3,800 or so unit desas throughout the rural areas, is the leading MFI. The units, found mostly down to the subdistricts, generate 62% of loan accounts and 74% of deposits. Cooperatives are next with around 24% of loan accounts but only 4% of the deposit base, while BPRs rank third in significance with 10% of loan accounts and 19% of the deposit base.

BRI intermediates almost 40% of the outstanding microcredit, followed by BPRs with 30% and USPs with 18%. In terms of clients, Perum Pegadaian’s pawnshops account for almost half of all borrowers, but because the loans are very small, these outlets serve only 7% of the outstanding loan amount. Cooperatives, which serve about one third of all borrowers, are second.

BRI’s unit desa network is considered one of three “flagship” RFIs in Asia (the other two are the Bank for Agriculture and Agricultural Cooperatives in Thailand and Grameen Bank in Bangladesh). BRI pioneered and succeeded in providing credit at market interest rates without subsidies, and still achieved very high loan collection rates from the rural poor. In effect, its lending changed from a production orientation to a financial orientation. As a state-owned bank, BRI has been used as a government instrument for achieving rice self-sufficiency by channeling Farm Extension/Credit Program (BIMAS) loans. The paradigm shift strengthened BRI and made it a highly sustainable RFI. Indeed, when BRI partly privatized itself by selling shares to the general public in 2003, the IPO was oversubscribed by three times. The challenge for the Indonesian RFIs now is to spread BRI’s rural financial intermediation experience and technology to the other RFIs through capacity building and institutional collaboration with small community-based credit organizations or institutions.

Conclusions and Recommendations

Conclusions

The RNFE in Indonesia has been growing, especially in Java, as evidenced by its contribution to rural employment and income. During the 1997 financial and economic crisis, it employed retrenched migrant workers from the urban areas. The RNFE is therefore a safety net for farm households and rural communities, supplementing income and reducing their vulnerability to economic and natural adversities.
The RNFE is dominated by MSMEs, most of which are in trade and services. Those sectors are attractive mainly because of their low entry and exit barriers (low capital and skill requirements). The P4K program in Indonesia has shown that nonfarm enterprises (such as snacks and handicrafts) yield higher returns than agricultural ones (such as livestock raising).

Rural industrialization has been slowed mainly by the low education and technical skills of rural manpower, weak entrepreneurial skills, lack of capital and access to credit, and weak linkages with upstream and downstream industries. Rural industrialization in a heavily agricultural country like Indonesia must pass through the intermediate phase of agroindustrial processing before it can go to high-technology or sophisticated industrialization. The agroindustrial processing phase increases the income and purchasing power of the farm households, which will become the primary market for industrial and consumer goods; absorbs and adds value to the raw farm products of the rural villages; and builds the industrial skill base in the rural areas.

Common determinants of RNFE growth that are directly relevant to Indonesia are local natural and physical resources, quality of local governance, local physical infrastructure, proximity to towns and strength of linkages with urban areas, and trade and regional growth.

In Indonesia, RNFE growth has been constrained by inadequate physical infrastructure, low access to institutional credit, local market distortions and trade restrictions, low management and business skills among the rural villagers, weak institutions and regulation, and the small size of local markets.

Decentralizing administration without first building capacity and providing adequate fiscal support has forced many local governments to pass tax laws and other regulations that make it more costly to do business, without increasing public services or improving governance. The new regulations may raise tax revenues in the short run, but if they stunt the growth of SMEs and the RNFE and thus result in a shrinking tax base, they will eventually prove to be contrary to the best interests of local governments.

Rural women in Indonesia are considered to be better and more successful in running micro- and small enterprises because they tend to be more patient and more risk averse, and are better credit risks than men.

**Recommendations for Promoting RNFE Growth**

The growth of the rural nonfarm sector can be nurtured and accelerated by loosening or removing the main constraints identified earlier. These recommendations are not meant to be comprehensive or exclusive, but are the most important and urgent.

Physical infrastructure, especially roads, ports, electricity, communication facilities, markets, and transportation systems, are needed to facilitate the flow of goods and people between rural and urban areas. Since the Government cannot build or pay for all the infrastructure, it should attract the private sector and rural communities to collaborate in planning and construction through build-operate-transfer and other schemes.

An innovative infrastructure financing scheme that the Government might find worth trying is issuing domestic long-term bonds (25–30 years), to be collateralized by future tax receipts. The physical infrastructure to be built with these bonds can go a long way toward attracting new investments. The expanded private sector and RNFE are expected to increase employment and rural income, thereby increasing the local tax base. The increased tax collection in later years can be used to amortize the long-term debt, denominated in rupiah.

Credit is the second most important constraint on the growth of MSMEs and the RNFE in general. The Government should give incentives for commercial banks and other urban-based financial institutions to extend credit to RNFE enterprises, either directly or in wholesaler-retailer collaboration with community-based credit institutions. The experience of BRI in microlending has shown that lending to the rural poor can be profitable, even without subsidies.
Good physical infrastructure can significantly reduce transaction costs and market bottlenecks, but they are not enough. The Government should also provide support and assist MSMEs and the RNFE with training, technology, and market information. Disseminating market, financial, and technical information to the rural communities can not only reduce transaction costs but also build the quality of human resources and social capital in the rural villages.

To help MSMEs with their business problems, the Government should consider setting up small business assistance centers (like the community assistance facilitation centers described in Appendix 2), to provide training and information, disseminate subcontracting opportunities, and facilitate subcontracting or contract farming negotiations.

The Government and the private sector can collaborate in establishing centrally located technology parks and industrial estate sites to promote clustering and subcontracting among SMEs, especially in garments, handicrafts, agroindustries, manufacturing, and tourism.

Local tax and other regulations, whether agricultural or nonagricultural, that are unfriendly to the private sector should be repealed or amended. If the changes would reduce the revenues of the regional government, the central Government should make a commensurate DAU transfer so public services do not suffer.

Poor local governance and regulations unfriendly to business discourage investments and can stunt RNFE growth. Enforcing laws consistently and providing incentives for good governance should promote good public and corporate governance in the regions. Civil society organizations should be encouraged to participate actively in the consultations that precede the passage of new laws. They should also exercise social control on local government officials and on the local private sector to promote transparency and accountability in public governance.
APPENDIX 8

Environmental and Resource Challenges

This appendix examines the condition of the natural resources in Indonesia that are directly related to agricultural production and rural livelihoods in order to identify the roots of environmental and natural resource problems, and to look for solutions in innovative policies and governance.

State of Natural Resources and the Environment in Indonesia

Land Resources

In 2000, agricultural land in Indonesia was about 50 million hectares (ha), or 26% of total land area (see also Appendix Table A1.3). Of this total, 54% was in Java and Bali, where only about 10% of the agricultural land is still under forest cover. In the outer islands, on the other hand, forest cover is still the predominant use of land, but deforestation is high.

Three major issues related to land resources will influence the future of agricultural development in Indonesia: land use changes, land degradation, and governance of land resource.

Forest Resources

Indonesia has one of the largest areas of tropical rainforest in the world. About 110 million ha, or 60% of Indonesia’s land area, was covered by forest in 1995, about 50 million ha of this in parks, reserves, and protected areas; and 60 million ha in production forest. The mangrove forests, estimated at 3.78 million ha in 1985 (World Bank 2001a, FWI/GFW 2002), are also among the most extensive in the world. However, the rich biodiversity and many functions of these tropical rainforests are under threat from deforestation.

Land under forest cover has declined substantially over the last 20 years. In 1985, forestland made up 61% of the land area. By 2000, it had declined to 47%. Among the various forest types in Indonesia, lowland forest, which is the most easily accessible and has the greatest potential for large-scale development, suffered the biggest losses. About 60% of Indonesia’s lowland forest in the three major islands (Sumatra, Sulawesi, and Kalimantan) was cleared between 1985 and 1997.

Conversion to estate crops and timber plantations, rampant illegal logging, forest fires, and smallholder conversion and settlements are the main factors accelerating deforestation.

To boost Indonesia’s export revenues, at least 14 million ha of natural forest has been approved for conversion to industrial timber or estate crop plantations, particularly for oil palm.
Only 25% of forestland has actually been converted into timber plantations, and only 38% into 
estate crop plantations. Around 10 million ha of former forestland is therefore idle or unproductive.

Kartodihardjo and Supriono (2000) ascribe this situation to two causes: First, timber 
plantation companies were given generous subsidies to acquire forestland, and they were allowed 
to harvest timber from natural forests before developing plantations, such that they often expanded 
the plantation areas beyond their needs, only to extract timber without replanting. Forest conversion 
is easier to carry out than conventional land acquisition, which involves many individual owners. 
Moreover, timber harvesting from natural forest before the development of plantations yields 
additional profit.

Second, excess capacities and partial development of plantations have fueled illegal logging. 
Rampant illegal logging has recently expanded into protection forests and national parks. The 
severe flooding in North Sumatra (Bahorok) may be related to illegal logging on the fringes of 
Gunung Leuser National Park.

Legal logging also contributes to deforestation, as it is often carried out in unsustainable 
The Ministry of Forestry reported in July 2000 that, of nearly 47 million ha of forestland operating 
under 432 concessions, about 30% was degraded, reduced to scrub, or converted to agriculture. 
As a result, legal timber supplies from natural production forests declined from 17 million cubic 
meters in 1995 to less than 8 million cubic meters by 2000 (FWI/GFW 2002).

In 1997/98, forest fires spread quickly through eight provinces because of drought brought 
about by El Niño. The burned area reached 9.7 million ha, about half of this forestland. The forest 
fires cost an estimated $7.4 billion to $8.3 billion to citizens and businesses, and $1.4 billion in 
carbon emissions, contributing to global climate change. The Government, in the past, tended to 
attribute deforestation from forest fires to shifting cultivation. After the 1997/98 forest fires, it 
acknowledged—with evidence from satellite imagery—that large estate companies, forest 
conglomerates, and transmigration contractors were primarily responsible.

Water Resources

Water resources in Indonesia are under serious threat, particularly in the densely populated regions 
in Java. The main problems are growing water shortages due to degradation of water resources 
and intersectoral competition, unsustainable and wasteful use, degradation of irrigation 
infrastructure, and pollution.

Water Supply and Demand

The potential reserve of surface water in Indonesia is 1,789 billion cubic meters (BCM) per year, 
distributed among various water bodies. The total groundwater reserve is also relatively high, at 
4.7 BCM per year.

The steady-state capacity of the surface and groundwater reserve is 691 BCM per year, 
less than 40% of the potential resources. The total water demand was estimated at 108.8 BCM 
per year in 1995, but was forecast to rise to 156.4 BCM by 2000. Although the total water 
reserve is far larger than total water demand, significant water deficits have already been reported 
in several islands and provinces.

Irrigation is by far the largest water user, with requirements of 74.9 BCM in 1990 and 
projected annual increases of 6.0%. The domestic water requirement was 3.1 BCM in 1990, with 
projected annual increases of 6.7%, whereas industrial water uses reached 0.7 BCM, with expected 
annual increases of 12.5% (Kementerian Lingkungan Hidup 2002a).

According to data for 2000, most Indonesian households that are not connected to a 
public water supply get their drinking water from groundwater. At the same time, access to
piped water in urban areas has been declining. Unless large investments are made in urban water supply infrastructure, the share of access to piped water is expected to continue to decline as the urban population increases.

Industries are also relying more and more on groundwater because of the increasing pollution of raw river water, particularly in larger cities. Overexploitation of groundwater has caused land subsidence in Jakarta, Bandung, and Semarang.

**Scarcity and Degradation of Water Resources**

**Allocation of water under scarcity.** In several catchment areas, particularly in those with large urban centers like Jakarta and Surabaya, surface and groundwater resources are reaching a critical stage of maximum use and intersectoral competition. To meet the growing demand from domestic and industrial users in Jakarta, for example, interbasin surface water transfers to the city must expand at least 600% over the next 20 years. This is possible only at the expense of irrigation. Competition between urban water requirements and irrigation, and insufficient reservoir capacity to store excess monsoon runoff have already reduced the supply of water for irrigated agriculture, which produces 79% of the country’s rice crop. To deal with the increased demand for nonirrigation water, irrigation must become more efficient and farmers must diversify to more remunerative and less water-intensive crops.

**Critical watersheds.** The number of critical watersheds in Indonesia—where the forest cover is severely degraded—has been increasing steadily in the past 20 years. In 1984, there were 22 critical watersheds; in 2003, there were 62, 42% of them in Java.

**Erosion and sedimentation.** High rates of soil erosion, due perhaps to a decline in forested areas (Kementerian Lingkungan Hidup 2002c), are degrading several watersheds. Sedimentation in the rivers is also increasing. The costs of increased erosion and sedimentation, including crop productivity losses, increased irrigation maintenance costs, and losses in reservoir yield and power production, are estimated at US$315 million yearly in Java (1988/1989 prices), while harbor dredging costs about $25 million–US$90 million per year (Water Resources Sector Adjustment Loan records 1999).

The number of lakes in the Jakarta-Bogor-Tangerang-Bekasi (Jabotabek) region has declined as well, with encroaching weeds, sedimentation, and settlements.

**Reservoir water level.** Reservoirs are particularly important in tropical areas like Indonesia, where 80% of annual runoff becomes available during the 5-month rainy season, while only 20% is generated during the dry months. Currently, only 10% of the total rainfall volume in Indonesia is controlled by reservoirs. Increased runoff flows and decreased base flows reduce inflows from catchments into reservoirs. Reservoir storage is largest for Java, but competition for water resources is also strongest.

**Groundwater table.** Groundwater overexploitation results in a lower groundwater table, land subsidence, and seawater intrusion in coastal areas. In Bandung, the decline in the groundwater table was 0.12–8.76 meters (m) per year in wells with intermediate depth (40–150 m) and around 1.44–12.48 m per year in deep wells (more than 150 m deep). Annual land subsidence of 0.1-1.0 m has also been observed in nearly all regions in Jakarta (Kementerian Lingkungan Hidup 2002b).

**Spring flow.** The flow of springs in Bogor, Purwokerto, and Malang has been declining, compared with 1970 levels, and serious rehabilitation efforts are needed to avoid further decline. The decrease in or loss of spring flow means that the entire spring ecosystem, and its surrounding catchment area, is degraded.
Water Quality

According to the Indonesia Environmental Status Report of 2002, (Kementarian Lingkungan Hidup 2002c), no major Indonesian river meets national water quality standards, either for potable water, for aquaculture and irrigation water, or for tourism.

As Green Revolution technologies spread, land and water ecosystems near intensive agricultural production have reported high levels of pollution from pesticide residues.

Cropland: Will the Food Supply Base Shrink or Expand?

The future availability of cropland in Indonesia is directly related to trends and likely changes in land use. In 1994–1999, land use change was dominated by two major trends: conversion of agricultural land (26,000 ha of rice fields yearly) to nonagricultural uses, especially in Java and Bali, and conversion of forestland (1.2 million ha per year), particularly in the outer islands, to agricultural production.

The Government states that about 40 million ha of land outside Java and Bali could potentially be brought into agricultural production. Of this total, about 16 million ha is swampland, which could be developed for irrigated agriculture, and 24 million ha is rain-fed area, which could be used for perennial and secondary food crops.

Irrigated lands are still the predominant source of future agricultural development. But, as stated earlier, water use for irrigation must compete with increasing urban and industrial water needs. Irrigation should become much more efficient as water scarcity becomes more acute. In the outer islands, on the other hand, lack of investment is limiting expansion in area.

Cropland could be expanded by 15 million ha over the next 10 years—2 million ha in new irrigated land with improved irrigation efficiency, 3 million ha in new irrigated land as a result of new construction, and up to 9.6 million ha in new productive land after critical or degraded land is rehabilitated. On the other hand, 50,000 ha of cropland per year will be converted to nonagricultural uses. Thus, the overall balance seems to favor cropland expansion. But for this to be sustainable, the principles of good governance and participatory approaches must be applied.

Land Degradation: Productivity Effects

The encroachment of poor and landless farmers into protected areas in the uplands of Java has led to deforestation and increasing erosion from intensive cultivation on steep slopes. A study by Magrath and Arens in 1989 (cited in World Bank 1994) found that the rate of soil erosion was associated with productivity losses of 4–5% per year, and that the farmers themselves bore most of the costs. The total cost of soil loss was estimated at $340 million–$400 million per year (in 1989 dollars), of which about $315 million was due to on-site reduction in the productivity of the land, and the remainder to off-site effects like increased sedimentation of reservoirs, irrigation systems, and harbors.

Indeed, measures to prevent land degradation, as well as to rehabilitate and introduce more sustainable agricultural practices must remain a high priority for the 60 most critical watersheds. Another concern relates to the long-term sustainability of agriculture as a result of soil erosion.

Experience with soil conservation policies and programs has shown that problems of land degradation cannot be solved through physical or technical approaches alone. Blaikie (1985) notes that soil conservation policies must also address the social and economic systems (land ownership and distribution, cropping pattern, wage rates, etc.) that determine the actions of the land users in the affected area, as well as the interests and power configurations in government.
Impact of Agricultural Policies on the Environment and Natural Resources

Agricultural development depends on the quality of natural resources. But it also determines the quality of the natural resources after their use, as well as the quality of the environment.

The impact of natural resource use on agricultural development will depend, to some extent, on development policies. Agricultural policies, particularly related to trade, input/output pricing, and investment in rural areas, that take the future of natural resources and the environment into account will typically have better outcomes for ecosystem functions.

Typically, agricultural policies are aimed at increasing agricultural productivity through modern technologies like high-yielding varieties (HYVs), modern production inputs, and more productive cultural practices. The Farm Extension/Credit Program (BIMAS) of the Government, for example, was an all-out effort to get the farmers to produce rice for all the people.

When the Panca Usaha (Five Efforts in Rice Production) program could not increase productivity further, the Sapta Usaha (Seven Efforts) program was launched, adding proper harvesting and postharvest handling to the use of HYVs, fertilizer, irrigation, plant protection, and improved cultivation methods. To support agricultural development, production input kiosks, village bank units of Bank Rakyat Indonesia (unit desa), and village cooperatives were established, and agricultural field extension personnel were stationed at rural extension centers in subdistricts.

The focus on HYVs and farm productivity has brought unprecedented increases in food production and human well-being. But the increased application of inputs has also led to declining soil fertility; micronutrient deficiency; soil toxicity; waterlogging and salinization; genetic resource loss; erosion; and pesticide contamination of food, soil, water, and human and animal life; as well as greenhouse effects (Fox 1991, Shiva 1991, Kishi et al. 1995, Adiwibowo 1997, Murphy et al. 1999). Moreover, the decentralization of the operation and maintenance (O&M) of irrigation facilities has led to a decline in irrigation O&M.

To reduce and perhaps reverse natural resource degradation, some agricultural policies must be improved and others formulated, particularly for the following:

- To improve the organic material of soils, organic fertilizers, perhaps from composted rice straw, must be included in rice cultivation technology.
- Crop rotations, particularly in irrigated rice fields, must give farmers enough time to prepare their land properly. Farmers must also be encouraged to plant secondary crops besides rice, preferably legumes, and to incorporate the plant residues in the soil.
- Farmers should be encouraged to build small water reservoirs (embung) to conserve water during the rainy season for use in irrigation and as livestock drinking water during the dry season.
- Biological pest and disease control measures should be enhanced, and the use of organic pesticides, rather than chemical or inorganic pesticides, and fungicides should be encouraged.
- Farming should adopt agroecological approaches.
- Agricultural extension should actively promote understanding of the need to avoid the degradation of natural resources and to conserve the environment.
- The ministers of agriculture and home affairs and related institutions must set policies to implement land use plans that do not degrade the land, and to discourage the conversion of good agricultural lands to housing or industrial areas.
- More emphasis must be placed on conserving natural resources and sustaining biodiversity by maintaining indigenous germplasm habitat and collecting the germplasm of crops and livestock.
Role of Regulations and Governance in Environmental Outcomes

Political Background

The Ministry for Environment and Development Supervision, set up in 1978, was the brainchild of a small group of academics and enlightened bureaucrats. At the time, according to former environment minister Sarwono Kusumaatmadja, the ministry had unclear authority and was underfunded and understaffed (Kusumaatmadja 2000). But it gave environmental groups a voice.

During the New Order regime of the Soeharto era, the environmental movement was also seen as an alternative to dissent (Kusumaatmadja 2000).

The mid-1980s up to the Asian financial and economic crisis was characterized by large-scale exploitation of Indonesia’s environmental resources; no institutional checks and balances; and a regime of runaway rent seeking, crony capitalism, nepotism, and corruption, all of which placed great strain on the environment (Katoppo 2000, Kusumaatmadja 2000, Robinson and Fitzpatrick 2000). Environmental policies were coopted by government, as illustrated by the bureaucratization of the Environmental Impact Mitigation Agency (Kusumaatmadja 2000), and environmental outcomes were determined more by informal exchanges of favors among government officials, business people, and local communities than by the law (World Bank 2001a).

Governance of Land Resources

Governance and control of land resources in Indonesia has long been a political as well as an economic issue. The Basic Agrarian Law of 1960 tried to reconcile adat (traditional or customary) law with Western law and to give small farmers and the landless more equitable access to land (Lucas and Warren 2000). But, more than 40 years after its issuance, the law has not been adequately implemented because of vested interests. In the early 1960s, land reform legislation was associated with the interests of the communist party (PKI) (Tjondronegoro 1991, Lucas and Warren 2000, Fauzi 2002). In the face of stiff opposition from large landowners in Java, land reform first slowed and then halted completely after the Sukarno regime and the prohibition of PKI and the Peasants’ Front in 1965–1967 (Tjondronegoro 1991, 2003; White 2002).

Momentum for land reform was created in 1978 when an interim report prepared by an investigating team called for a redistribution of land; more equitable rural relations; research on land tenure under the adat system; and the establishment of a Center for Land Policy, the predecessor of the National Land Agency (BPN) (Tjondronegoro 1991, Lucas and Warren 2000). But the proposed reforms were not implemented. Since no cadastral registration had been held in the outer Islands since 1870, the New Order Government could claim unregistered and uncertified land as state lands, implicitly disregarding adat and customary lands and setting the stage for conflicts over land.

As land disputes escalated, land resources were left underused, cultivation was less than optimal because of reluctance to invest over the long term, and investors were scared off (Como GmbH 2001). Rural dwellers, meanwhile, had very little access to land ownership. In 2001 only, 22% of rural households held land certificates from BPN, as against 51% of urban households. The share of rural households with land certificates was especially low in Banten (7%) and highest in Bali (49%). From an ecological standpoint, stalled land reform has encouraged erosion through the cultivation of marginal, unclaimed lands; depressed investment in land; and accelerated deforestation.
Deforestation in Indonesia, according to FWI/GWF (2002), has similarly resulted from a corrupt political and economic system that regards natural resources only as a source of revenue for personal gain. Logging concessions covering more than half the country’s total forest area have been awarded to timber companies, with little oversight.

**Governance of Water Resources**

Indonesia’s water resources and irrigation sector has been governed for almost 30 years by Law 11/1974 on water resources development. The sector faces increasingly complex long-term investment challenges and management problems, which, if not addressed, will constrain economic development and lead to a deterioration of food security, public health, and the environment.

The Government formed a task force in August 1998, to prepare a reform agenda for the sector. Around the same time, the World Bank concluded that further assistance to the sector would be contingent on major reforms. In April 1998, it proposed a water resources sector adjustment program, which evolved into the Water Resources Sector Adjustment Loan (WATSAL). In February 2004, the Indonesian legislature passed a new law on water resources.

**Water Resources and Irrigation Issues**

The main challenges facing the water resources and irrigation sector of Indonesia are lack of political will to implement laws, weak sector institutions, poor coordination among government agencies, ineffective provincial and district water resources and irrigation agencies, a customary preference for externally aided infrastructure projects over service delivery and regulation, organizational and staffing complexities that must be overcome to deconcentrate and devolve central government functions to regional and local governments, noninvolvement of stakeholders in decisions, and unreliable data.

Framework Legislation. As a result of decentralization, the following laws and regulations, among others, are being revised:

- **Basic water resource legislation.** A new law on water resources, which conforms to the decentralization legislation, was passed by Parliament on 19 February 2004.
- **Water resources management regulations.** The government regulation on water management (1982) sets the basis for river basin management. The government regulation on rivers (1991) delegates responsibility for river development and management to either the central or provincial government depending on economic importance. It does not provide for coordination with agencies managing related upper watersheds, groundwater, or coastal estuaries at this point.
- **Irrigation and drainage.** Government regulations delegate O&M authority to the provinces but do not envisage the transfer of irrigation and drainage management to empowered water user organizations above the tertiary network level.
- **Water rights and incentives for efficient water management.** No single government regulation establishes the rights of water use license holders. Many structural problems of water resource management are deeply rooted in the issue of property rights to water.
- **Water pollution abatement legislation.** Environmental provisions have been considerably strengthened by the passage of the law on environmental management. To improve water pollution abatement and water quality management, the government regulation on water pollution control needs to be replaced.

**River basin management institutions.** Five pilot river basin management programs were implemented in Java to test the establishment of river basin water coordination committees.
APPENDIX 8

(PPTPAs) and provincial basin water management units (Balai PSDA). A Balai PSDA, under provincial government control, collects basic hydrological data, samples water quality, maintains river infrastructure, and attends to the operational aspects of compliance with water allocation and abstraction as determined by the governor. Integrated water resources management will require clarifying the water resources management responsibilities of the provincial government and the organizational and financial provisions for implementing them.

Water user associations (WUAs). Many WUAs are not effective, because irrigator water use rights are nonexistent, there is no free choice in the cultivation of crops perceived to be profitable, and WUAs are not given authority concomitant with their responsibilities. Moreover, irrigation agencies pay little attention to building WUA capacity and involving WUAs in design and investment decisions, and in the evaluation of contractor performance.

Cost recovery policy. The transition from full government funding, which is fiscally unsustainable, to beneficiary funding by establishing equitable and practical procedures for setting service costs and environmental levies has been politically and economically difficult. Introducing such charges requires political will and strong leadership.

The wastewater discharge fee has not yet been implemented. The law should be revised to make provincial and district governments accountable for pollution control. The effluent discharge fee should be set high enough to discourage pollution. Who is to collect this fee and use it for administration and monitoring, and for water quality management, must be decided.

Sustainability of public irrigation. Because of the provincial culture of deferring maintenance, at least one third of the 3 million ha of government-designed irrigation schemes have had to be rehabilitated twice in the last 25 years. Apart from production losses, rehabilitation is six to seven times more costly in present value terms than regular maintenance. Since 1997, O&M funds have been part of the block grant transfer to provinces and districts. As a result, provincial governments allocate even fewer resources than expected to O&M.

The irrigation operations and maintenance policy (IOMP) of 1987 did not address the problem of irrigation sustainability, as no single agency had the mandate, responsibility, or authority to implement the policy. Central and provincial irrigation agencies are set up to carry out civil works and are therefore not service-oriented.

O&M budget allocation. Since O&M funding support is based on area under government control, there is every incentive to maximize the area by including village schemes and not turning them over to the WUAs. Cash-strapped provincial governments prefer periodic rehabilitation over routine maintenance and do not allocate enough funds for the latter, as they can always depend on the central Government to step in with externally funded rehabilitation projects.

Irrigation management turnover. Having the Government rehabilitate scheme facilities to their original design capacity before turning them over constricts the management responsibility of the WUAs. It would be more effective to turn over the schemes to the WUAs first, and then to review the rehabilitation needs with them, along with their equity contribution. Investment decisions would thus be more transparent and beneficiaries would be involved as owners in determining design priorities and ensuring construction quality.

Stakeholder involvement in institutions. Only government officials are included in the provincial water coordination committee (PTPA) and the PPTPA. Stakeholder views are not solicited. This is likely to change, though, as a result of decentralization (see Chapter 5).
Water Resources and Irrigation Reform

The reform of the water resources sector is based on the following principles: limiting the central Government to an enabling and regulatory role while promoting public-private partnerships at the regional and local level, and transferring resources to regional and local governments; devolving sectoral mandates and implementation authority to the provincial, district, and local governments; and reorganizing provincial governments to serve the districts and villages and limiting their executive role to extrajurisdictional functions and issues such as management of river basins that cover several districts or provinces. Institutions that facilitate public consultation and stakeholder participation will be created.

Specific sector reform objectives based on the guiding principles are directed at improving the national institutional framework for water resources development and management, the organizational and financial framework for river basin management, the implementation and regulation of water quality management in the regions, and national irrigation management policy, institutions, and regulations. The reforms will be implemented by amendment of appropriate legal and administrative instruments.

Completed Reform Actions and Ongoing Initiatives

Water resources sector coordination. In 2001, the Government formed a coordination team for water resources management (TKPSDA), a ministerial body under the coordinating minister for economic affairs. The same decree that created TKPSDA contained the principles of national water resources policy formulation, resource allocation, program implementation, and regulatory control, including intersectoral coordination and resolution of contentious issues. The TKPSDA chairman issued a decree on the national water resources policy to support and guide water resources management.

Stakeholder participation in river basin management. The Government has worked on explicit provisions for stakeholder representation on committees and other decision-making bodies. In support of stakeholder participation, the Government will amend or replace decrees regarding the PTPAs and PPTPAs. Increased representation of irrigating farmers in both PTPAs and PPTPAs could occasionally be observed. Only a few PTPAs and PPTPAs are now active in Java and some outer islands, but the Government will set up and activate PTPAs in all provinces, and PPTPAs in all developed river basin territories in eight provinces.

Integrated management in less-developed basins. To strengthen water resources management in less-developed basins, the Government is setting up Balai PSDAs under the PPTPAs. As a result of the move toward decentralization and regional autonomy, some Balai PSDAs are also being given an operational role in the management of irrigation networks that cross district boundaries. In general, provinces have maintained or reestablished control over larger irrigation systems (>3,000 ha) as well as those crossing district boundaries, often exercised through Balai PSDAs. The Government is working to define and strengthen the role and responsibilities of Balai PSDAs as regulators or operators of river basin management. The units are eventually expected to be functional in all provinces on Java and in about four provinces on the outer islands.

Water pollution control. The government regulation on water quality management and pollution control (2001) provides an opportunity to harmonize water resources management and environmental management at the regional government level. It regulates surface and groundwater pollution and vests in regional governments the responsibility for collecting waste discharge fees, while stipulating that the fee revenue must be used solely for water pollution control.
In 2003, the state minister for environment issued related decrees on the analysis of surface water quality, the analysis and management of wastewater discharge to water sources, and the measurement of the pollution load of water sources.

**Farmer irrigation organizations.** The Government revised the irrigation O&M policy (1987) to boost the sustainability of public irrigation. The regulation on irrigation (2001) states the Government’s policy of participatory irrigation management through the transfer of authority to self-governing WUAs. A decree issued by the minister of home affairs facilitates the development of legally recognized WUAs, which are federated up to governing bodies for entire irrigation systems. In such bodies, the WUA representatives have the majority voice in matters of O&M objectives and plans, irrigation service fees, and management rules and sanctions. Another decree issued by the Minister of Settlements and Regional Infrastructure gave guidelines for the management transfer of irrigation networks to WUAs.

In 2003, the Minister of Home Affairs issued guidelines specifying the authority, tasks, and responsibilities of provincial and district irrigation management institutions, and the Minister of Finance issued guidelines for district irrigation management funds.

**Law on water resources.** The law was subject to intense media scrutiny even before it was passed by Parliament in February 2004. However, revision of implementing regulations has been spread over a long period of time. Six issues are of concern: water resource conservation and ecosystem protection; water use rights and licensing; protection of (customary) community rights, daily water needs, and farmer interests in water use; privatization of water resources; use of water by foreign countries; and responsibility for the management of irrigation systems (Kompas, 31 December 2003).

The new law distinguishes between water use rights for basic needs and noncommercial uses (hak guna pakai air) and for commercial uses (hak guna usaha air). Rights for basic needs and noncommercial uses last for 5 years for irrigation and 10 years for other purposes, but can be renewed. Water use rights for commercial purposes (electric power generation, municipal water supply, industrial production, and agribusiness) are in effect for up to 25 years. This law is a significant step forward, but more reforms in the regulation-setting process would significantly improve the incentives for efficient and equitable water management. A study for the Asian Development Bank on water policy in Indonesia and the Brantas River Basin (ADB/IFPRI 2003) showed that well-established water use rights combined with market-based incentives can promote efficiency while sustaining farm income. Market-based incentives reduce water use in irrigated agriculture even as farmers maintain or increase their incomes, and urban and industrial water use increases.

**Water rights are the cornerstone of market-based strategies.** The sale or trade of water will not improve efficiency of use if ownership is ambiguous or open to dispute. Although some system of water rights is found to operate in virtually any setting where water is scarce, systems that are not firmly grounded in law are likely to be insufficient to support market-based approaches. Without such protection, vulnerable segments of the community can be exploited. A review of water rights policies (Sanyu Consultants and LP3ES 2003) identified properly functioning systems as having clearly defined rights; simple objectives; sensitivity to local custom, where possible; fairness and equity; transparency and accountability; inexpensive and responsive management; accessible and easily understood user information; inexpensive and well-accepted conflict resolution; and strong, fair, and rapid enforcement. The dual promise of water savings and the ability to redirect agricultural water without harming irrigators economically makes water rights for irrigators a top priority for water reform.

While water use rights and markets have great value in Indonesia, the political, institutional, and infrastructure barriers to implementation are significant. Market development is impeded by
third-party effects, including impact on the quantity or quality of return flows or level of economic activity in the water-supplying region, the difficulty of trading water over long distances, the potential for monopoly control over water resources, and the danger of overexploitation of open-access water resources like groundwater. Market transactions at the farm level are difficult, primarily because the infrastructure for measuring water deliveries by volume to large numbers of end users is too expensive. These complexities make the establishment of markets in tradable water rights in Indonesian river basins a longer term solution at best. But modeling simulations indicate that, if the barriers to implementation can be overcome, water management through market incentives can generate water savings and irrigator income.

Combining water rights with a water brokerage mechanism (the “charge-subsidy” approach suggested in Pezzey [1992]) achieves efficient outcomes and appears to be politically and administratively feasible, according to modeling results for the Brantas river basin in East Java. A fixed base rate would be charged to cover an appropriate portion of O&M costs and depreciation. The base rate would reflect the historical allocation (except in water-scarce basins, where it is likely to be lower), and WUAs would allocate the water among their members. The WUAs would then be charged (or paid) an efficiency price equal to the value of the water in alternative uses for demand above (or below) the base. This approach requires further development, including pilot testing in the basin to overcome the politically difficult, but feasible, challenge of establishing base rights, base charges, and efficiency prices. As already mentioned, sound water rights would enhance the political feasibility of such water pricing. Because efficiency prices apply only to marginal water use, they introduce nonpunitive incentives; and the reliance on WUAs to manage water within clearly defined subdivisions of the irrigation system makes water allocation more accountable, transparent, and flexible. Information costs would also be reduced, because local irrigators with expert knowledge of the value of water would bear the costs and generate the necessary information on the value and opportunity costs of water within each water management unit. Farmers would be protected against capricious changes in water allocation and would benefit from more efficient water use. In the longer term, the system would provide a basis for water trading among farmers and across sectors—for even greater efficiency in water use. Thus, the implementation of water use rights, accompanied by market-type mechanisms permitting the intersectoral sale and purchase of water, is the most effective approach to saving and reallocating water while protecting farm incomes, employment, and welfare.

**Impact of Property Rights on the Environment**

Agricultural growth, poverty reduction, and environmental sustainability are interlinked. The way these linkages play out is strongly influenced by the nature of property rights and the degree of collective action (McCulloch et al. 1998).

Property rights define actions that individuals or groups can take toward other individuals or groups regarding tenurial rules that limit access to and use of resources (Meinzen-Dick et al. 1997, Ostrom 1997, Meinzen-Dick and Knox 2001). Property rights to resources like water, land, and trees govern natural resource management, as well as the welfare of individuals, households, and communities that depend on those resources. Thus, proper and clear property rights can promote economic growth, equitable distribution, and sustainability of the resource base (Meinzen-Dick et al. 1997).

In many developing countries, the common property regimes that control access to and harvest of common property resources like forests, local streams, grazing areas, and coastal fisheries evolved over long periods but failed to have formal rights of ownership under the laws of the state (Ostrom 1997). This is also true in Indonesia, where all forest, land, and water resources that had not been registered as private property fell to the Government, without recognition of adat rights (hak ulayat), customary property rights, or common property regimes.
that limited entry to and use of common property resources. State control over resources that were previously controlled by local participants has usually proved to be less effective and efficient (Ostrom 1997, Meinzen-Dick and Knox 2001).

Lynch and Harwell (2002), in their study on legal relationships between the Indonesian State and resource-dependent communities in various regions, conclude that the history of Indonesia up to the present has been characterized by increasing appropriation of community-based property rights (CBPRs) and allocation of legal rights to self-interested state actors and allies. The Government continues to consolidate legal control over natural resources by centralizing authority and simplifying rights, commodifying landscapes and resources, and criminalizing local practices and presence in state-claimed resource territories. This situation has worsened the environmental degradation of many common resources and has fueled sometimes violent conflicts over natural resources.

Peluso (1993), Li (2000), McCarthy (2000), Benda-Beckmann et al. (2001), and Biezeveld (2002) have similar findings for Indonesia. Changing property regimes from customary to state regimes, particularly since the promulgation of the Basic Agrarian Law and during the New Order, have adversely affected common property resources and marginalized local peoples, making them poorer.

Enhanced Agricultural and Environmental Outcomes Through Innovative Policies

The last decades have witnessed a paradigm shift in conservation and natural resource management away from costly state control toward approaches where people participate much more actively in natural resource decisions and benefits through local organizations (Shackleton et al. 2002). In Indonesia, the period of Reformasi dramatically changed the policy and legal structure in support of increased environmental justice. The forest law (1999) acknowledges the role of local communities in sustainable forest management. A BPN decree defines and provides for the registration of community-based adat rights in at least some forested areas. Moreover, the National Human Rights Law specifically acknowledges the Government’s responsibility to recognize and protect the differences, needs, and cultural identity of indigenous peoples. Regional Government Law 22/1999 could accelerate the devolution of natural resource management. Most important for local communities in the outer islands is the second amendment to the Constitution, which explicitly recognizes the existence of adat communities and their rights (Article 18-B) and respect for cultural identities and rights of traditional communities (Article 28-I). In 2001, agrarian reform reached a new stage with the promulgation of an act with the principal mandate of legal protection, justice, and legal security of rights over natural resources (Moeliono 2002).

This new political atmosphere gave local peoples the chance to redefine territory and resource rights and to strengthen their adat identity, with the help of nongovernment organizations (NGOs), university scholars, and public interest lawyers. In many regions and districts, local communities have achieved legal recognition of their CBPRs through agreements with local government and forest department officials, and even with logging and plantation companies (Lynch and Harwell 2002). In 1999–2003, half of the 265 local government decrees and regulations issued concerned customary community institutions, adat traditions, and CBPRs. About two thirds of the regulations (154 regulations) came from village government or customary community institutions. This evolution demonstrates the remarkable birth of civil society in local communities struggling for a fairer and more equitable access to and use of natural resources.

Sustainable natural resource management demands joint management of the environment and agricultural development, in ways that allow agricultural productivity growth to coexist with an improving natural resource base and increasing smallholder incomes. Key policies for achieving this are strengthened property rights to land and water; acknowledging informal rights under
the agrarian reform law; agroecological approaches to farming that seek to manage landscapes for both agricultural production and ecosystem services; and innovative rewards to farmers for conservation, including payment for environmental services.

**Crop Management and Agroecological Approaches**

Besides increased investment in agricultural research and improved extension services, innovative techniques in crop management could significantly enhance crop yield growth. Rain-fed agriculture could be the key to sustainable development for water resources and food. Improved water management and crop productivity in rain-fed areas would help relieve pressure on irrigated agriculture and water resources. To exploit the full potential of rain-fed agriculture, however, the Government must invest in water-harvesting technologies; crop breeding for rain-fed environments; agricultural extension services; and access to markets, credit, and supply inputs in rain-fed areas.

While yield growth was slow in many resource-poor areas in recent years, farm yields have been observed to benefit from new approaches to increasing rain-fed yield like water harvesting and water conservation. In addition to research to boost crop yield growth, water-saving systems of rice production (when combined with incentives to reduce water consumption) could be important in reducing irrigation water use while preserving the economic viability of rice cultivation.

Evidence has shown that yields can be enhanced and water use reduced on carefully managed and monitored research plots using various experimental cropping systems. But irrigation systems require reliable and precise control over water supply and soil drainage. Considerable basic research remains to be done in controlled settings, and the dissemination of these water-saving technologies over wider areas will be a major challenge. But the technologies may hold considerable potential if combined with water policies that give incentives for using less water. With water available at virtually no cost, water-saving technologies are unlikely to be adopted without such incentives.

Case studies also indicate promising results from agroecological approaches to farming that seek to manage landscapes for both agricultural production and ecosystem services. Farmers can improve productivity by using inputs more efficiently, substituting natural capital for financial capital, organizing space more efficiently on the farm, and collaborating with other farmers to achieve economies of scale. These approaches can also reduce agricultural pollution through new methods of nutrient and pest management, create biodiversity reserves, and enhance habitat quality through modified management of soil, water, and natural vegetation. Important issues remain. Ways of scaling up agroecological approaches must be found, and research and pilot programs must be pursued to mobilize private investment; develop systems of payment for ecosystem services; and engage in participatory and multidisciplinary research, system development, and knowledge sharing.

Participation is the key to these innovative approaches to crop management. Collective action at the local level and the adoption of participatory approaches by government and NGOs working in these communities has enhanced the success of many programs (Pretty 1995). The inclusion of farmers during planning and their participation in maintenance and data collection has helped to ensure the acceptance and success of water harvesting and conservation techniques (Oweis et al. 1999). Participatory plant breeding plays a key role in successful yield increases through genetic improvement in rain-fed environments (particularly in dry and remote areas). Farmer participation in the very early stages of selection helps to fit the crop to a multitude of target environments and user preferences, and may be the only possible type of breeding for crops grown in remote regions, where a high level of diversity is required within the same farm, or for minor crops that are neglected by formal breeding (Ceccarelli et al. 1996, Kornegay et al. 1996).

Agroforestry practices on about 3 million ha in Indonesia offer food and nutritional security to poor farmers and biodiversity benefits to the environment. Agroforestry and social
forestry also protect vulnerable upland areas against erosion, temperature extremes, and burning. But recent studies indicate that no single agroforestry or social forestry model is appropriate everywhere (World Bank 1994, Tabor 1999), and that location-specific technologies must be discussed further. To date, these production systems have not yet made a large dent in the rapid rate of land degradation.

**Rewarding Farmers for Conservation**

Rubber agroforests provide economic advantages to small farmers such as low development costs and minimal risks. But these rubber forests give only a small return on land and labor compared with other land uses such as intensive food crop culture. Without any incentives, small farmers cannot be expected to forgo the opportunities of more profitable land uses for the sake of biodiversity conservation. The conservation community therefore rewards small farmers who are willing to conserve their agroforests, through ecolabeling of agroforest products. The sale of the products at a higher-than-average price increases the farmers’ economic returns (Gouyon 2003).

Furthermore, payments for environmental services, such as upstream watershed protection to secure downstream water availability, have been developing informally and appear to be highly successful in some particularly critical watersheds like the Segara watershed in West Nusa Tenggara.

**Conclusions**

Policies designed to achieve food self-sufficiency tend to undervalue goods not traded internationally, especially land and labor resources. As a result, food self-sufficiency in countries with an exhausted land frontier has come or could come at a high ecological and environmental cost. Appropriate policy reform, at the macro and sector levels, will go a long way toward arresting and possibly reversing the degradation, but the degree of degradation in many regions will pose severe challenges to policy makers.

In the less favorable areas, mining of soil fertility, soil erosion, deforestation, and loss of biodiversity impose high costs on those who depend on these areas for a living. Soil erosion contributes not only to lower yields on site, but also to siltation problems downstream, reducing the capacity and productivity of reservoir and irrigation schemes and thereby affecting an even broader area. Likewise, deforestation in upper watershed regions has had broader effects, for example by contributing to flooding problems in lowland areas.

In the water sector, the implementation of the reform program described here, particularly the establishment of secure rights to water for agricultural water users, will help conserve water in irrigation. Large investments will also have to be made in urban supply infrastructure to counteract the decline in the proportion of urban dwellers with piped access to water (see also Chapter 2). Policies to increase water prices for irrigation water are politically difficult to implement and could adversely affect poor consumers and farmers if badly designed or implemented. In the domestic and industry sectors, raising water prices to improve efficiency and equity is feasible and would encourage conservation, cover the costs of delivery, and generate enough revenues to finance the needed growth in the supply and coverage of clean piped water. Generalized subsidies should be replaced with subsidies targeting the poor.

The design of effective and equitable water pricing for agriculture is more difficult. High water prices are likely to severely reduce farm income. Irrigators thus strongly oppose attempts to establish or increase water prices. Moreover, water pricing at the farm level is difficult, because it would be too costly to measure and monitor deliveries to large numbers of end users as would be required to charge by volume of water use.
Despite these difficulties, water pricing systems based on water rights that would introduce incentives for efficient water use, recover at least O&M costs, and protect and even increase farm incomes can be designed and implemented. A water brokerage system with a river basin authority brokering water trades could establish incentives for efficient water use without reducing farm incomes. The establishment of base water rights would make water pricing more politically feasible by formalizing existing water rights rather than being seen as an expropriation of these rights. Reform of water incentives policy in Indonesia faces many technical, administrative, and political constraints, but with increasing water scarcity and declining financial resources available for irrigation and water resource development, such reform is essential.

The history of the Indonesian legal system has shown that the fate of the environment will probably be determined less by laws and courts and more by business persons, administrators, police, and community representatives. For more effective and efficient environmental management, the following issues need to be addressed: (i) recognition of preexisting local rights given by customary (adat) laws under the marga system, as the marga system has been the basis of social and administrative organization in rural areas of the outer islands; (ii) application of existing regulations in the forest sector in a transparent and accountable manner; (iii) implementation of the land reform legislation to address the increasing number of land conflicts; (iv) increase of the status and power of environmental concerns in public legislation; (v) devolution of natural resource management to local users, in particular, local communities having strong de facto property rights regimes based on customary community laws; (vi) consultation of the central Government with provincial and district authorities, and local people/stakeholders during the formulation of environment-related regulations; and (vii) establishment of clear responsibilities for environmental damage, such as forest fires.


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