

Promises and Predicaments

*Trade and Entrepreneurship in
Colonial and Independent Indonesia
in the 19th and 20th Centuries*

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17. Van der Eng, 'Konfrontasi and Australia's Foreign Aid Program'.
18. NAA, A1838/280 3034/10/1 PART 27, K. Shann to DEA (22 March 1966), p. 109.
19. See: Thee, 'The Indonesian Economy' in this book for a discussion of the context of the US aid programme to Indonesia.
20. NAA, A4940 C4341 Press statement by J.G. Gorton (27 March 1966); NAA A1838 555/7/142, Draft press statement, Australian embassy Jakarta (5 May 1966). At the same time the US government offered US\$8.2 million credit and the UK government US\$2.8 million credit for food purchases (Mahajani, *Soviet and American Aid*, 31).
21. During 1968-69, Australian company Ricegrowers' Co-Operative Mills Ltd sought to enter the Indonesian market. Its representatives discussed rice aid and exports to Indonesia with Bulog on several occasions. This contributed to a formal Indonesian request for rice aid to the Australian government. Despite strong reluctance of the aid-administering Department of External Affairs to link aid and exports, the government granted 6,500 tons of rice aid. Due to the urgency of the matter, the company was given the aid contract without tender, and it received additional commercial orders for 14,000 tons of rice from Bulog. NAA A1838 2020/1/32/8 PART 1.
22. Hopkins, 'Evolution of Food Aid'.
23. Clay, 'Review of Food Aid Policy'.
24. Van der Eng, *Agricultural Growth in Indonesia*; Van der Eng, 'Food for Growth: Trends in Indonesia's Food Supply'. See also Frankema, 'The Green Revolution' in this volume.
25. Rice 'Sumitro's role'; NAA A4359 111/5/4 PART 1, M. Loveday to DEA (5 August 1968).
26. NAA A1838 2020/1/32/8 PART 1, 'The rice situation and food aid', Inward Savingram No.56 (14 October 1969), No. 57 (22 October 1969), No. 60 (7 November 1969).
27. Magiera, 'Role of Wheat', 52-3; Sato, 'Salim Group', 414-5.

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The Green Revolution in Indonesia: A Replicable Success?

Ewout Frankema

Introduction

Indonesia experienced one of the most successful agricultural transitions of the twentieth century. After decades of gradual decreases in domestic per capita food supply and simultaneous increases in food imports and food aid, the acceleration of rice yields in the late 1960s turned deeply pessimistic views on the ability of Indonesian society to overcome mass poverty into hopeful prospects based on tangible improvements in rural income levels.¹ Indeed, few students of the Indonesian economy in the 1960s, if any, had foreseen the speed and depth of the post-1967 agrarian transition. On the contrary, in view of the economic collapse during the final years of the Sukarno regime and the mounting political instability and violence leading up to, and accompanying, the installation of Suharto's New Order, the long-term economic prospects of Indonesia appeared even bleaker to most observers than the Malthusian doom scenarios sketched for other parts of Asia.²

This chapter aims to disentangle the complex causal underpinning of the success of Indonesia's 'green revolution' in order to assess which aspects of it are, in principle, replicable in other parts of the world, and which aspects should be attributed to historical and ecological conditions

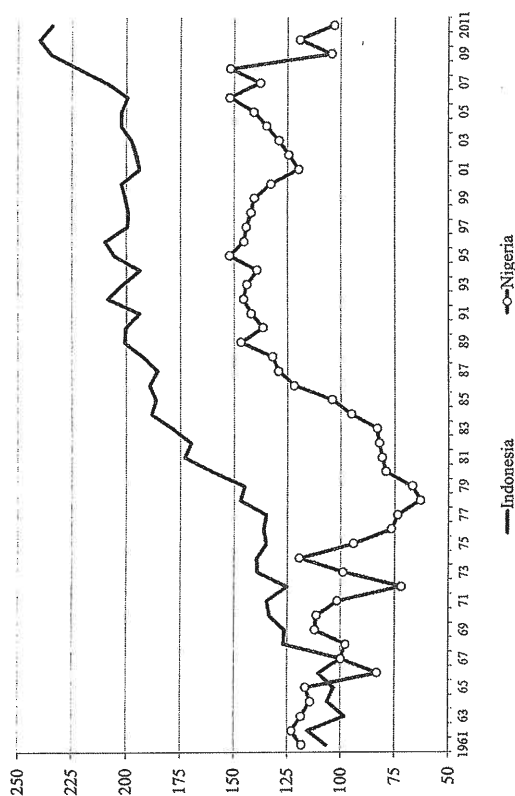
that are too context-specific to be replicated elsewhere. Although rice was certainly not the only (food) crop to witness impressive productivity growth, the discussion here will focus on rice, the key staple of Indonesian agricultural producers and consumers; on Java, the area where the majority of these farmers and consumers lived; and on the period just before and during the so-called 'take-off' of productivity growth.

Despite the fact that the advances in Indonesian agricultural productivity and its long-term welfare effects have been extensively documented and analysed in the literature, I contend that the continuing stress on global agricultural resources, which have sent global food prices through the roof in recent years, justify repeated reassessments of success stories.³ In particular, with regards to the current prospects of many sub-Saharan African (Africa hereafter) economies, where the lion's share of world population growth in the twenty-first century will occur, the Indonesian example contains some interesting analogies.

First, similar to Indonesia in the 1930s–60s, the majority of African economies have witnessed a long period of stagnating or even declining rates of per capita food production from the 1970s through the 1990s. Some countries have recently shown respectable output and productivity growth in a number of food crops (rice, maize, cassava), but the overall record remains rather fragmented.⁴ Second, increasing population pressures in Java have been regarded as a big threat to economic modernization by consecutive colonial and post-colonial administrations since the late nineteenth century. Similar concerns play an important role in the current debate about Africa's long-term growth prospects.⁵

Third, Indonesia's green revolution occurred under a dictatorial regime, which did not shun the use of large-scale violence to consolidate power. African countries have a long legacy of post-colonial conflict, violence and prolonged dictatorships. Fourth, the Asian green revolution unfolded in the context of Cold War politics, where foreign intermingling in terms of financial aid and economic assistance programmes were regarded as legitimate means to pull Suharto into the Western capitalist camp.⁶ A similar competition for influence, including massive aid and investment programmes, is presently detectable between the Chinese and several Western powers in sub-Saharan Africa.

The most interesting contrast from an African point of view, however, is the way in which the Suharto regime prioritized rural development and also maintained these policies during the years 1973–79, when spiking oil revenues were releasing pressure. Yet, instead of using foreign reserves to return to cheap(er) food imports and satisfy the demands of



Source: FAOSTAT 2013 [accessed 20 August 2013].

Figure 16.1: Index of per capita cereal production in Indonesia and Nigeria, 1961–2011 (1967 = 100)

(urban) consumers at the expense of rice farmers for political gain, the oil money was used to, amongst other things, extend rural credit facilities and extension services, step-up investments in irrigation infrastructure, subsidize the use of chemical fertilizer, expand national fertilizer industry, and strengthen the state monopoly on domestic and international trade in agricultural commodities.

By using oil revenues to revitalize smallholder agriculture, Indonesia posed a striking counter-example to many other major oil-producing countries in the developing world, such as Nigeria, Iran, Saudi Arabia, Mexico and Venezuela. Especially the contrast with Nigeria has raised ample attention, as both countries experienced huge oil windfalls in the 1970s, but spent the money in very different ways.⁷ Figure 16.1 shows that in the fifty years between 1961 and 2011, per capita cereal production in Nigeria has recorded a net decline, whereas cereal output per capita in Indonesia more than doubled. Many resource-rich African economies are again enjoying windfall gains from rising world market prices. Since the debt crisis of the late twentieth century has been overcome, these gains could of course be used to jump-start agricultural growth.

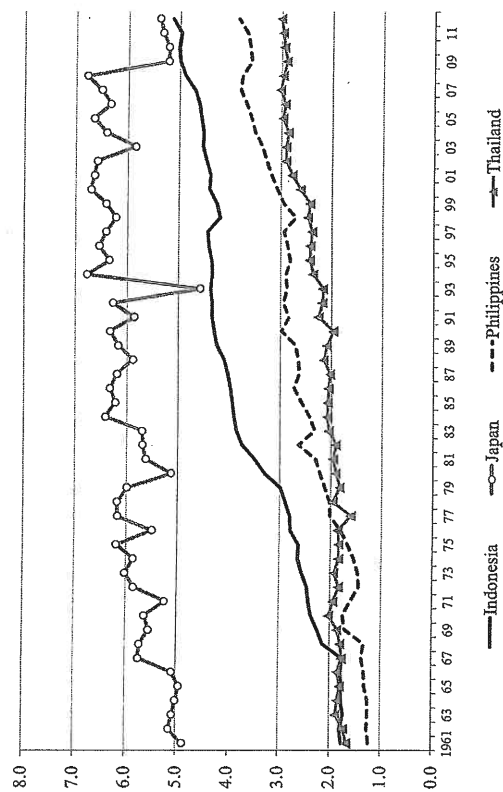
Understanding why and how rural investment programmes were implemented in Indonesia will help to reflect on present-day conditions for agricultural growth in Africa.

The discussion is organized in three steps. First, I will argue why Indonesia's green revolution can be rightly called a 'success'. Second, I will introduce a framework to disentangle the causal complex underpinning Indonesia's green revolution and discuss the interaction between five factors: ecology, history, technology, policy and the international environment. Third, the analysis will focus on the nature and timing of the policy-making process during the early years of the take-off. The bottom line of my argument will be that specific historical and ecological conditions make it very unlikely that the Indonesian green revolution can be replicated in sub-Saharan Africa, but that Indonesia's *agricultural policy history* does contain important lessons for African governments aspiring to a 'doubly green revolution'.⁸

What Constitutes 'Success'?

The term 'green revolution' usually refers to a phase of global agrarian transformation between the early 1940s and late 1970s driven by the development and large-scale adoption of 'modern' high-yielding varieties (HYVs) of cereal grains such as wheat, rice and maize. Indonesia followed a typically Asian pattern of this transformation process, in the sense that it was driven by the adoption of new rice varieties that were released since the mid-1960s.⁹ It is always questionable to what extent the term 'revolution' offers an appropriate description of historical processes of change, especially since in this case, most of the technological ingredients (the deliberate crossing of varieties, the use of artificial fertilizers, irrigation) had been around for decades, if not centuries. However, if one takes output or productivity growth as a measure of change, there is no denying that the Asian green revolution marked a clear breakpoint in the long-term evolution of Asian agriculture, and for Indonesia even more so.¹⁰

Indonesian rice yields rose from an average of 1.8 tonnes per hectare (t/ha) in the 1960s to an average of 3.9 t/ha in the 1980s and up to around 5 t/ha at present. Between 1967 and 1985, Indonesian rice production realized an annual average yield growth of 4.7 per cent. Total per capita production of cereals increased by 3.8 per cent, so that imports of staple foods declined up to a point where Indonesia became self-sufficient in rice by 1983–85. Figure 16.2 shows that Indonesian rice

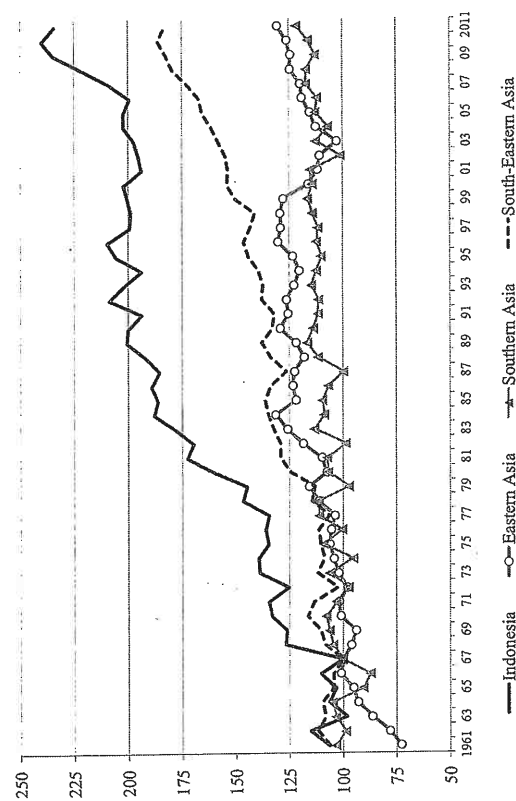


Source: FAOSTAT 2013 [accessed 20 August 2013].

Figure 16.2: Rice yields in Indonesia, Japan, the Philippines and Thailand, 1961–2012 (tons per hectare)

farmers, contrary to their colleagues in other major rice-growing economies such as Thailand and the Philippines, produce yields that are comparable to Japanese rice farmers, who can be considered the technology leaders of the twentieth century. Although the pace of rice-yield growth in Indonesia slowed down after 1985, and the sector suffered from the Asian economic crisis in the late 1990s, rice production did recover since 2006 and Indonesia regained self-sufficiency in rice by 2008. Even more important, however, present-day Indonesian rice farmers have adopted ecologically more sustainable production methods than in the early days of the green revolution, which increases the chances that high yield levels can be sustained in the future.¹¹

Indonesian cereal production, as shown in Figure 16.3, outpaced the growth rates observed in the rest of Asia by a considerable degree. This adds an extra dimension to the puzzle: why did Indonesian food production grow considerably faster than in the rest of Asia, while all these countries had, at least in theory, access to comparable production technologies? It underscores the notion that the release of modern HYVs was a *necessary* condition for achieving the high-recorded rates of agricultural



Source: FAOSTAT 2013 [accessed 20 August 2013].

Figure 16.3: Index of per capita cereal production in Indonesia and other parts of Asia, 1961–2011 (1967 = 100)

productivity growth, but certainly not a *sufficient* condition. The successful adoption of modern HYVs required complementary public and private investments in land use, water management, disease control and marketing as well as fine-tuned agricultural policies and favourable institutional and macro-economic conditions. Many of these conditions, as we will see further below, were met in post-1967 Indonesia.

Another reason for adopting the term ‘success’ is that Indonesia’s agricultural transition rapidly translated into tangible living-standard improvements. According to the SUSENAS survey, 60.9 per cent of the Javanese were categorized as ‘very poor’ in 1963–64 and 52.3 per cent in the Outer Islands. By 1984 these shares had dropped to respectively 23.0 per cent and 10.4 per cent.¹² The rice-producing sector was the key driving force of poverty reduction in the 1970s because of its dominant role in domestic production *and* consumption. Moreover, the combination of increasing production and purchasing power created effective demand conditions that lifted both the rural and urban economy from the ground and initiated a process of structural change towards higher value-added industrial and service activities, which in turn resulted in a

sustained increase in long-term per capita gross domestic product (GDP) growth rates. The break in GDP growth was striking, jumping up from a long-term annual average of around 0.5 per cent between 1870 and 1967 to an annual average of 3.5 per cent after 1967.¹³ Henley’s quote of Lipton’s one-liner couldn’t be more to the point: ‘*If you wish for industrialisation, prepare to develop agriculture.*’¹⁴

But the best justification for calling the Indonesian green revolution a ‘success’ is perhaps that it came so unexpectedly and that it took serious scholarship by surprise. The prevailing view up to the late 1960s was that Javanese smallholders disregarded the potential of modern techniques.¹⁵ David Penny has become famous for his widely quoted statement in 1969 that:

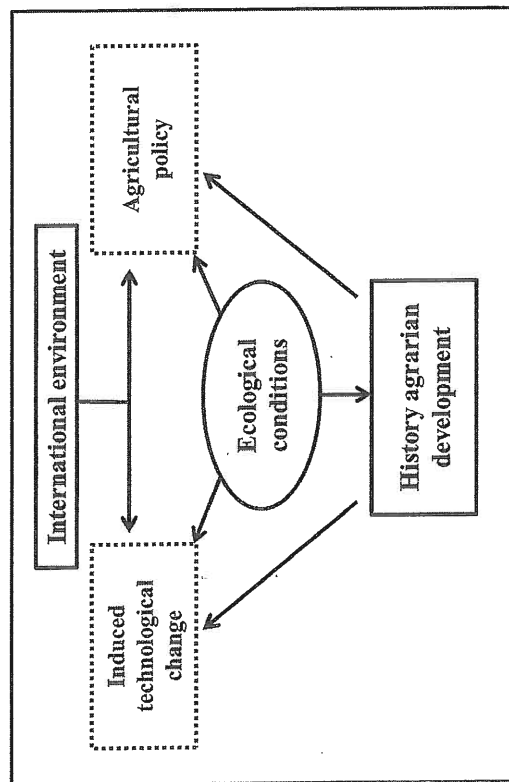
The reluctance of farmers to buy fertiliser, modern tools, etc., is still so great that it is unlikely that any substantial modernisation of Indonesian peasant agriculture will take place in the next decade or two.¹⁶

Clifford Geertz explained this resistance to change as the result of a supposed Javanese mentality of ‘shared poverty’. According to Geertz, the redistribution of agricultural output growth among a growing pool of surplus labour was a peasant strategy to cope with an increasingly dualistic economy. This dual economy was characterized by rising inequality between a capital-intensive, labour-saving plantation sector and a labour-absorbing impoverished peasantry, without strong intermediate links.¹⁷ For Geertz, it was hard to believe that these peasants were about to become the central agents of the greatest economic turning point in Indonesian history:

in the absence of any genuine reconstruction of Indonesian civilization [...] pouring fertiliser onto Java’s Lilliputian fields is likely, as modern irrigation, labour-intensive cultivation and crop diversification before it, to make only one thing grow: paralysis.¹⁸

Analysing Causal Complexity

To disentangle the causal complex underpinning Indonesia’s green revolution one can distinguish five factors: ecology, history, technology, policy and the international environment (referring to both world market developments and international politics). Their mutual interaction can be analysed according to the scheme presented in Figure 16.4. For the purpose of this chapter it is important to note that the factors of technology



Source: Author's own.

Figure 16.4: A framework to study the causal complexity of agricultural transitions

and policy are, in principle, transferable across time and space, whereas historical development trajectories and ecological conditions are not, while the impact of world markets and international politics are a largely exogenous force to farmers and agricultural policy-makers as well.

At the core of this framework rests the notion that ecological conditions constrain the set of technology and policy options available to rural societies and, thereby, set the boundaries for long-term agricultural development trajectories. The two major ecosystems relevant for the Indonesian Archipelago are: (1) dense lowland rainforest historically suited to shifting cultivation and, at a later stage, to the establishment of capital-intensive plantations producing tropical cash crops such as rubber, coffee, sugar and palm oil; (2) highly fertile, rain-fed volcanic slopes conducive to wet-rice cultivation. The possibilities to grow *padi sawah* on the volcanic soils of Java and Bali and the better irrigated regions of West Sumatra and South Sulawesi have induced great variation in population densities across the archipelago, explaining how Java could emerge as the central polity of the archipelago.

The release of 'modern' high-yielding rice varieties such as the IR8, IR5 and the C4-63 by the International Rice Research Institute (IRRI) in Los Baños, the Philippines, suited the ecological conditions of Indonesia very well. Earlier indigenous hybrid varieties such as the Syntha, Peta and Bengawan had been based on crossing local rice varieties, but none of them proved highly susceptible to chemical fertilizers.¹⁹ The IR8, also called the 'miracle rice', was a hybrid variety based on a crossing between the Taiwanese dwarf variety (DWGW) and the Indonesian Peta variety. The Peta did respond well to nitrogen applications, but the heavier ears had to be bred on the shorter stems of the DWGW in order to prevent the plant from lodging.²⁰ Hence, with the release of the IR8 in 1966, the IR5 in 1967 and the C4-63 in 1969 a major biotechnological hurdle had been taken: these were rice varieties that effectively transformed high supplies of nitrate and water into a high number of kernels per ear, without falling over. And apart from their improved kernel density, their rapid maturation facilitated multiple annual rice cropping or mixing the rice crops with other commercial crops.²¹

The rapid adoption of modern HYVs after 1967 cannot be understood without a long-term historical perspective of Indonesian agricultural development and the role of the Dutch colonial legacy in particular.²² According to Anne Booth, Javanese agricultural development can be studied in three consecutive stages of extensification, intensification and modernization.²³ Extensification refers to the *expansion of the cultivated area* to meet demographic growth. Intensification refers to the *growth in cropping ratio* (the ratio of harvested to cultivated area) after the land frontier has been closed. Modernization refers to the use of modern technologies (such as the application of fertilizer-responsive HYVs) to increase *yields per unit of harvested area*. According to Booth, the possibilities of extensive growth had largely run out on Java by 1920. In response to increasing demographic pressures, the Dutch colonial government started to intervene more systematically in food-crop agriculture from the start of the twentieth century onwards, as it had previously done by the forced cultivation of export crops during the 1830s–70s. Substantial public investments in irrigation and drainage infrastructure were complemented by agricultural research and extension services.²⁴ These government efforts, along with private efforts of smallholders to raise their harvests on gradually shrinking plots of land, led to a phase of intensification that dominated rice farming between c.1915 and 1965.²⁵ Rising cropping ratios indeed resulted in larger rice harvests, but these gains were insufficient to keep pace with the growing number of mouths to feed.²⁶

The closure of the Javanese land frontier and the subsequent phase of intensification resulted in a number of conditions for the successful adoption of modern HYVs. The growing pressure on land resources had stimulated the transition from communal to private property rights to land. This transition had been facilitated by the liberalization of colonial economic policies since the 1870s. Private land ownership made farmers' household income directly dependent on cultivation decisions, creating a favourable incentive structure for experimenting with yield-enhancing techniques. The irrigation infrastructure essential for the adoption of HYVs had been rapidly expanded under Dutch colonial rule to make intensive growth possible. Although parts of the irrigation infrastructure had run down by the 1960s, the framework for successful water management was largely in place.²⁷ Finally, the increasing population density on Java created favourable conditions for food-market integration, as the lion's share of producers and consumers of rice and other foodstuffs were living close to each other, thus limiting transportation and transaction costs, while enhancing labour specialization.²⁸

The role of the state as a co-ordinating institution was also widely accepted and tested in Java before 1967. The great depression forced the Dutch colonial government towards a more structural type of price intervention, building upon centuries of occasional interventions in rice markets in periods of harvest failure. In 1933 the Dutch colonial government started to restrict rice imports in view of the overproduction in Asia, undercutting the incomes of Indonesian rice farmers. In 1939 the colonial state went a step further by setting a fixed rice-selling price and committing itself to clear the market by buying up potentially unsalable supplies against this price.²⁹ This programme was adopted without significant changes by the Sukarno regime in the late 1940s and the 1950s.

The establishment of a full-fledge state monopoly required an institutional-bureaucratic apparatus that was sufficiently equipped to co-ordinate the rice trade. Seasonal and regional supply fluctuations had to be mediated, rice stocks had to be maintained and market information had to be collected to set the 'right' prices. To let this system function properly, it required a close monitoring of the income effects of price-fixing on both producers and consumers, which made both the logistic part of controlling the monopoly, as well as the collection and diffusion of accurate information, crucial for its success. The Dutch established the *Stichting het Voedingsmiddelenfonds* (VMF) to carry out these tasks. The organization was continued in the post-independence era under the name JUBM

(Jajasan Urusan Bahan Makanan, Foundation for Food Affairs), to be replaced by Bulog (Badan Urusan Logistik, Bureau of Logistics) in 1967.

According to Peter Timmer, JUBM became a failure because it was lacking the competencies to carry out the fairly complicated co-ordinative tasks.³⁰ Shortages of foreign reserves hampered the possibilities to stabilize rice supplies via imports in bad harvest years. The mounting budget deficits that sparked-off hyperinflation in the early 1960s derailed the economy and frustrated the functioning of the rice marketing system altogether. As the national rice market crumbled, local administrators started to protect regional supplies and rice price differentials shot up, undermining the attempts of the central government to restore control over this strategic commodity.

Macro-economic mismanagement and the collapse of the rice marketing system also frustrated the structural agricultural development programmes of the Sukarno government. According to Palmer, Java was a 'hothouse' of rural experiments in the 1960s.³¹ The implementation in 1959 of a three-year plan to boost rice production included mass demonstration programmes (DEMAS, *mass demonstration*) of fertilizer, pesticides, improved seed varieties, irrigation techniques and the provision of government credit at favourable interest rates. In 1963, attending extension services under the BIMAS programme (*mass guidance*) became mandatory. It remains open to question to what extent the failure of the DEMAS and BIMAS programmes to produce immediate results should be attributed to farmers' resistance to change, the bad management of the programmes (inputs that were not distributed, credits that were not supplied) or the macro-economic conditions (hyperinflation, huge rice price volatility) under which they were implemented or tried out.³²

It seems clear, however, that these factors reinforced each other. The government allocation of agricultural implements was hampered by a lack of foreign reserves to buy the necessary inputs. The BIMAS programme got the reputation of mismanagement because the promised delivery of agricultural inputs or credit was either delayed, restricted or completely abandoned. Farmers were hesitant to bear the risk of spending substantial parts of their hard-won cash income on high-cost chemical fertilizers, while facing 'unreliable' programme officers. But even if farmers had wanted to consider experimentation with new cultivation practices, they operated in a macro-context of mounting economic insecurity. The hyperinflation that reached its peak in 1966 made their precious cash savings evaporate before they could even spend it on chemical fertilizer or high-yielding rice seed.

Why did New Order Policies Succeed?

Obviously, the success of New Order agricultural policies cannot be explained by a sudden shift in smallholder mentality, or a sudden boost in farmers' education. Indonesian rice farmers did not become 'rational' entrepreneurs from one day to another. In a similar vein, we should not place much emphasis on the fact that Suharto had been the son of a peasant in order to explain his strong personal commitment to rural development.³³ When viewed from a long-run comparative perspective, it becomes clear that the Javanese rice sector was at the top of the political agenda ever since the start of the twentieth century. The goal of food self-sufficiency was no less important for Suharto than it had been for Sukarno, as both leaders knew that their political survival depended on their ability to guarantee food security. In fact, Sukarno had turned rice into an even more important strategic commodity by financing part of the public sector employees in rice allowances. The chapter by Cribb in this volume underlines the great strategic importance of rice during the Indonesian Revolution.

Yet, in comparison to Sukarno, Suharto enjoyed four major advantages, which together can explain the 'take-off'. These four conditions convoluted in the late 1960s were partly coincidental and partly a matter of government agency. The first advantage was this exogenous technology shock: the release of the IR8 in 1966 by the IRRI. What is important for the discussion here is the insight that this modern HYV changed the structure of the rice farmers' cost-benefit calculation. The IR8 raised the expected returns to farmers' investments in chemical fertilizer and irrigation. Village studies have shown that whether that shift in the expected profit margin was immediately acknowledged depended on many other local conditions such as marketing possibilities, access to credit, social structures and potential crop diseases. The bottom line, however, is that these new HYVs tilted the prevailing cost-benefit calculations in which traditional varieties were considered the safest choice.

The second advantage was that Suharto and his economic advisers had themselves experienced how a lack of foreign reserves and foreign political support had destabilized the Indonesian economy, while they did not have to pay the political price for this crisis—yet. In the face of this crisis, Suharto had basically no other option than to break with the economic policies of his predecessor and invest all his efforts in stabilization of the economy.³⁴ It meant a radical break in international political orientation, shifting away from economic nationalism towards Western

capitalism, and this move prevented Suharto from repeating the economic mistakes of Sukarno's 'guided democracy'.³⁵ The channelling of substantial oil revenues in the 1970s towards rural development programmes becomes much more comprehensible when you realize that the lessons of the crisis of the 1960s were not only still very fresh, but were basically the foundation of Suharto's political position.

The third advantage that Suharto enjoyed is a factor that his government can rightly be credited for: the encompassing price policy conducted by Bulog created favourable conditions for the adoption of modern HYVs. This price policy sought to mediate three sets of parameters: (1) balancing the opposing interests of consumers, producers and traders by setting a floor price for farmers at the state-controlled rice mills and a ceiling rice price for consumers, while leaving sufficient margins for traders to effectively deliver their milling and marketing services; (2) balancing the high costs of expensive agricultural inputs required to grow HYVs (fertilizers in particular) and the additional revenues that farmers expected to make. This balance was achieved by using a simple rule of thumb, the *rumus tami* (the farmer's formula), stipulating that the price of a kilogram of milled rice should be more or less equal to the price of a kilogram of fertilizer; (3) keeping domestic rice prices within a certain range of world market prices in order to contain the undermining impact of illegal exports (in case of underpricing) or imports (in case of overpricing).³⁶

Pierre van der Eng has shown that state intervention in both fertilizer and rice prices helped to cross a long-term threshold. The average ratio of nitrogen fertilizer to rice prices, shown in Table 16.1, indicates that virtual price-parity was reached in the 1970s. In comparison to Japan, the decreasing trend in the relative price of fertilizer in Indonesia lagged behind for about two decades.³⁷ Micro-studies comparing adoption rates between villages also underscore that the access to fertilizer was one of the key parameters in the decision of farmers to adopt HYVs.³⁸

Gonzales et al. demonstrate that Bulog also succeeded in balancing national and international rice prices. Their calculations of the rate of protection for a number of food and cash crops in Indonesia show that, between 1972 and 1988, the nominal rate of protection of Indonesian rice (that is, the ratio of domestic wholesale prices over c.i.f. import prices) fluctuated within a band of around -20 to +20 per cent. Meanwhile, Bulog managed to contain domestic rice price volatility, thereby raising farm investors' confidence.

Interestingly, other crops such as soybeans and sugar were receiving far higher rates of protection, paid by extensive government subsidies.³⁹

Table 16.1: Price ratio of chemical fertilizers to rice in Indonesia and Japan, 1900–89

	Indonesia		Japan	
	Nitrogen	Phosphorus	Nitrogen	Phosphorus
1900–09			7.6	2.1
1910–19	9.8		6.9	1.5
1920–29	5.5	2.6	3.5	1.2
1930–39	4.4	2.8	2.4	1.3
1951–59	2.4	1.2	1.5	1.1
1960–69	1.9		0.9	0.8
1970–79	1.1	1.1	0.5	0.6
1980–89	0.6	0.6	0.5	0.6

Notes: Prices for Indonesia (1910–19) refer to 1913–19, (1951–59) to 1951–55 and (1960–69) to 1962–69

Source: Van der Eng, *Agricultural Growth in Indonesia*, 116.

The different rates of protection of various crops concurs with Bulog's reputation for abusing its monopoly power in order to make money on the margins that it set between domestic prices and international market prices.⁴⁰ Bulog's lack of transparency, together with the limited tenability of expensive subsidy programmes, led to increasing discussions in the 1980s. Especially after the uniform objective of rice autarky had been achieved, and the social returns to high-cost subsidies became less visible, the call for agricultural policy reforms arose. Fertilizer subsidies became an ever-larger drain on the government budget, and the continuing support of the rice sector hampered the diversification of agricultural production, for instance into the tree crops (coffee, cocoa, tea, rubber and palm oil) that were considered important for smallholders in the lesser developed parts of the Outer Provinces.⁴¹

But let's turn back to the early years of policy success to discuss the fourth, and indispensable advantage of the New Order regime: large-scale international support (see also the chapter on food aid by Van der Eng in this volume). The regime change in Indonesia occurred right at the time that the war in Vietnam was escalating. For the US this war was spinning out of control. Convinced that the impoverished masses in Asia acted as a magnet to socialist propaganda, the US were eager to support Suharto's anti-communist actions by all means.⁴² The US had already invested heavily in rural development programmes in their former colony, the Philippines, and quickly grasped the opportunity to build up comparable

stakes in Indonesia, which was after all the largest Southeast Asian economy with a considerable geo-political weight.

The Western powers and Japan rescheduled Indonesia's foreign debt and granted ample access to international loans via the International Monetary Fund (IMF) to stabilize the Indonesian economy. In addition, large amounts of development aid started to flow in, soon followed by substantial flows of foreign direct investment.⁴³ This international assistance cemented the position of Bulog in various ways. Access to foreign reserves secured Bulog's ability to import food, replenish Indonesian rice stocks, and restart to mediate seasonal and regional variations in rice production. Western economic advisers and US-trained Indonesian economists helped to fine-tune agricultural policies and strengthen information collection procedures to guide agricultural policy-making. And, as Suharto successfully withstood the call for renewed economic nationalism, he managed to secure Western support during the remainder of the Cold War. By the time the Iron Curtain fell, Indonesia had become the largest net-recipient of international aid after India and China.⁴⁴

A Replicable Success?

Let's return to the key question of this chapter: is the success of Indonesia's green revolution replicable? The short answer is: No. Indonesia's combination of high demographic pressure, an ecosystem supporting wet rice cultivation, and a long history of intensive state investments in physical and organizational infrastructures for rice production was already fairly unique in Asia, let alone other parts of the world. The new HYVs came very close to a 'silver bullet'-type of innovation. In Africa, such biotechnological innovations are unlikely to have a comparable impact, because of greater ecological (climate, soil types, water resources and so on) and staple crop diversity.⁴⁵ This does not imply that rapid productivity gains on a local level based on modern rice varieties are impossible. In fact, in Benin and Rwanda rapid yield-based growth in rice has been recorded after 2000 and there still is a large stock of transferable technology available.⁴⁶ It only implies that new rice varieties cannot generate the same scale-effect as the rice revolution had in many Asian countries.

Following the logic of the induced institutional innovation model, which essentially builds upon a Boserupian line of argumentation, demographic pressures pushed colonial agricultural policies in the Netherlands Indies after 1900 in a direction that was very different from the African context of population scarcity.⁴⁷ Colonial governments in Africa disposed

of (much) smaller government budgets (by itself a function of different agricultural systems and population densities) and prioritized export crops and mining activities instead of food crop production. In this respect, Dutch colonial policies in the mid-nineteenth century resembled the colonial policies in Africa much better than after 1900. African colonial governments and European businesses were bent on solving labour scarcity problems as a result of high land-labour ratios and did not hesitate to withdraw labour from villages, the centres of food production, to support the export sector. Infrastructural investments were geared towards the export of tropical cash crops and minerals as well.⁴⁸

That said, there are a number of lessons we can draw from a closer inspection of Indonesia's *agricultural policy history*, which may actually gain relevance with demographic pressures building up so rapidly in present-day sub-Saharan Africa:

1. The case of Indonesia demonstrates that agricultural transitions can come unexpectedly and can lay at the basis of a fundamental break in income growth and living standards improvements for broad layers of the population. There is no ground for the deep-seated pessimism about African economic development that has dominated the academic literature for a long time, until the sentiment started to change in the late 2000s.⁴⁹
2. The case of Indonesia shows that state co-ordination is crucial by accommodating market imperfections that obstruct the adoption of new cultivation technologies and practices. Governments can accommodate an undersupply of infrastructure, spur the diffusion of knowledge or counter the negative impact of price volatility on investor's decisions. But state development programmes also require time to get a number of necessary conditions right, and should therefore not too quickly be dismissed as ineffective.
3. The case of Indonesia shows that price interventions need to be embedded in encompassing price policy, which has to be continuously evaluated against changing domestic and international market conditions. This requires a certain degree of state capacity and, in case of need, is supported by foreign know-how.
4. The case of Indonesia shows that smallholders, with very little education and small investment potential, can become central agents of change once a number of co-ordination problems are being resolved.
5. The case of Indonesia shows that international economic assistance and aid can help to spur agricultural productivity growth, once there

exists a shared view on development priorities and the policies required to target these priorities.

6. Finally, the last lesson that we can derive from the Indonesian case is that 'time' and 'timing' matter a lot. To explain the absence of a green revolution in Africa to date, it remains a puzzle as to what extent governments failed to support food agriculture because of neglect, or because they were incapable of resolving the weak conditions for a take-off per se? And how are both factors connected? Did weak conditions lead to ineffective policies and, in turn, to governments losing interest in support programmes? And to what extent did the structural adjustment programmes of the 1980s and 1990s generate conditions (austerity measures and trade liberalization) that were almost the opposite of the ample support that Suharto received in the 1970s and 1980s?

In retrospect it seems safe to conclude that the conditions for a green revolution in Africa were indeed suboptimal, to put it mildly. Post-independent governments lacked the state capacity to implement complicated support programmes. Farmers lacked market access, because of weak physical and institutional infrastructures, and low rates of consumer density. Fragile macro-economic conditions lowered farmers' time horizon. And, in a period where world food-market prices were historically low, as a result of green revolutions elsewhere in the world, governments faced an attractive alternative to domestic productivity growth to contain urban riots: cheap food imports made even cheaper by currency overvaluation.⁵⁰

Having said that, it appears that conditions in sub-Saharan Africa reveal increasing similarities to those in Indonesia in the 1960s. The concerns about current rates of African population growth and urbanization are remarkably similar to those voiced some fifty years ago in Asia, and it is bound to change the parameters of agrarian production. Growing urban demand, in combination with higher international food prices, will make investments in local African food production systems more attractive. Colonial investments in railways and harbours connected local economic enclaves to European markets during the first half of the twentieth century, but today's investments in road infrastructure, transport equipment, electricity, and information and communications (ICT) infrastructure allow for a much more fine-grained process of domestic market integration. New communication technologies offer real-time market information to farmers at acceptable costs and facilitate new forms of credit, saving and insurance. Indeed, the tyranny of distance in Africa is

rapidly dissolving. Last but not least, current macro-economic conditions in most African countries are far better than they were in the past forty years. There is controlled inflation. Exchange rates are no longer systematically overvalued and the majority of African economies grow at rates of 3–6 per cent per year, despite the severe financial and economic crisis in the industrialized world.⁵¹ Foreign investments are rapidly increasing. In previous periods of global economic crisis, during the Great Depression of the 1930s and the oil crises of the 1970s, African economies did experience serious setbacks. The current recession in Europe does not seem to backfire on Africa. Are these the first signs of a New Order?

Notes

1. See the chapter by Van der Eng in this volume for a discussion of food aid to Indonesia in the 1950s–70s.
2. See a Malthusian interpretation of Asian development prospects in Ehrlich, *The Population Bomb*; Myrdal, *Asian Drama*; and more specifically on Indonesia: Geertz, *Agricultural Involvement*; Penny, 'Indonesia. In *Agricultural Development in Asia*'.
3. See a number of key studies in Hansen, *Agricultural and Rural Development*; Booth, *Agricultural Development in Indonesia*; Van der Eng, *Agricultural Growth in Indonesia*; Hill, *The Indonesian Economy*, chapters 7 and 10; Tabor, 'Agriculture in Transition'.
4. See Frankema, *Africa and the Green Revolution*, 2; Tabor, 'Agriculture in Transition'.
5. See an extensive discussion of the threats and opportunities of African demographic growth in Severino and Ray, *Africa's Moment*.
6. See a discussion about the relationship between the Cold war, bio-technological change and the green revolution in Asia in Perkins, *Geopolitics and the Green Revolution* and Cullather, *The Hungry World*.
7. See the Indonesia-Nigeria comparison in Bevan et al., *The Political Economy*; Scherr, 'Agriculture in an Export Boom Economy'. For a broader perspective, see the edited volume by Gelb, *Oil Windfalls*.
8. The term 'Doubly Green Revolution' was coined by Gordon Conway and stresses the need for agricultural transitions based on ecologically sustainable production methods. Conway, *The Doubly Green Revolution*, 31–42.
9. Estrudillo and Otsuka, 'Lessons from the Asian Green Revolution in Rice', 18.
10. See a discussion in Frankema, *Africa and the Green Revolution*, 6–8. It is also interesting to note that the term 'green' does not actually refer to what people usually think it refers to, namely 'a field of green plants'. In fact, the term 'Green' was invented by USAID director William Gaud in 1968

(Cullather, *The Hungry World*, 7) to contrast America's foreign policy with the violence associated with Red guerilla movements. 'Green', as opposed to 'Red', referred to the colour of peace. Peaceful scientific progress was presented as the capitalist alternative to combat hunger, poverty and inequality and the Americans actively invested in this strategy, amongst others via the establishment of the IRRI in the Philippines. See Cullather, *The Hungry World*, 7 and Chandler, *An Adventure*, chapters 1 and 5.

11. Mariyono, 'Technological and Institutional Change', 125.
12. Booth, *Agricultural Development in Indonesia*, Table 5.29, 193. See also Hill, *The Indonesian Economy*, chapter 10.
13. Data are from Maddison, *Historical Statistics*. See for an account of the structural change and growth acceleration since 1967: Thee Kian Wie, 'The Soeharto Era'.
14. Lipton, *Why Poor People Stay Poor*, 24; quoted in Henley, *The Agrarian Roots of Industrial Growth*, s25.
15. Geertz, *Agricultural Involvement*, 146; Penny, 'Indonesia. In *Agricultural Development in Asia*', 263.
16. Penny, 'Indonesia. In *Agricultural Development in Asia*', 263.
17. Geertz, *Agricultural Involvement*, 138.
18. *Ibid.*, 146.
19. Prabowo and Sajogyo, 'Sidoarjo, East Java, and Subang', 71. See also Dalrymple, *Development and Spread of High-Yielding Rice Varieties*, 47–50.
20. Dalrymple, *Development and Spread of High-Yielding Rice Varieties*, xx; Chandler, *An Adventure in Applied Science*, 104–8.
21. Palmer, *The New Rice*, 110.
22. Booth, *Agricultural Development in Indonesia*; Hayami, 'An Ecological and Historical Perspective'.
23. Booth, *Agricultural Development in Indonesia*, 37.
24. Van der Eng, *Agricultural Growth in Indonesia*, 69–81.
25. Booth, *Agricultural Development in Indonesia*, 101.
26. *Ibid.*, 119–23.
27. See for a survey of colonial investments in irrigation infrastructure: Van der Eng, *Agricultural Growth in Indonesia*, 41–69.
28. Marks, 'Unity or Diversity', 310.
29. Timmer, 'The Formation of Indonesian Rice Policy', 33–7.
30. *Ibid.*, 35.
31. Palmer, *The New Rice*, 21.
32. *Ibid.*, 25–31.
33. On Suharto's biographic relationship to the Indonesian countryside, see Elson, *Suharto: A Political Biography*, 172–3.
34. Papaioannou and van Zanden, 'The Dictator Effect'.
35. See for an overview: Thee Kian Wie, 'The Soeharto Era'.

36. Djurfeldt and Jirstrom, 'The Puzzle', 47-8; Timmer, 'The Formation of Indonesian Rice Policy', 37-9.
37. Van der Eng, *Agricultural Growth*, 114-7.
38. Prabowo and Sajogyo, 'Sidoarjo, East Java, and Subang', 72.
39. Gonzales et al., *Economic Incentives*, 55-9, 67-72.
40. See Van der Eng in this volume.
41. Tabor, 'Agriculture in Transition', 196-9.
42. Thee, 'The Soeharto Era and After', 205.
43. *Ibid.*, 203-7.
44. *Ibid.*, 206.
45. Larson and Otsuka, *An African Green Revolution*, vi.
46. Frankema, *Africa and the Green Revolution*, 17; Estudillo and Otsuka, 'Lessons from the Asian Green Revolution in Rice'.
47. Hayami and Ruttan, 'An Ecological and Historical Perspective'.
48. See for a comparison of government budgets in the British empire, Frankema, 'Raising Revenue in the British Empire'. See a direct comparison of agricultural policies in Indonesia and the Congo in Booth, 'Varieties of Exploitation'.
49. See for instance Bates et al., 'Lost Decades: Postindependence Performance' or Radelet, 'Emerging Africa'.
50. Frankema, *Africa and the Green Revolution*, 14-6.
51. IMF, *Regional Economic Outlook*.

17

Policy Regimes, Statistics and Unintended Consequences: Transitions in Indonesia's Modern Economic History

Howard Dick

Total output is a figment which would not exist at all, were there no statisticians to create it.

— Joseph A. Schumpeter, 1939¹

A leitmotif of Indonesia's modern history over the past two hundred years has been the consolidation of a rational bureaucratic state.² This perspective was put forward in English writings by Clive Day and J.S. Furnivall before being taken up by many others.³ Ben Anderson argued that Suharto's New Order could best be understood as a restoration of an atrophied state.⁴ Thomas Lindblad with myself, Vincent Houben and Thee Kian Wie made state formation one of the three main threads of our economic history of Indonesia.⁵ Thomas is an economic historian who has sought to make what he can of statistics without being beholden to them. So here I want to turn our argument inside out by exploring the relationship between policy regimes and statistics. This approach undermines any narrative of inexorable progress and suggests that the normal